PROJECT MANUAL

ESCC LOLLEY GYMNASIUM

Enterprise, Alabama

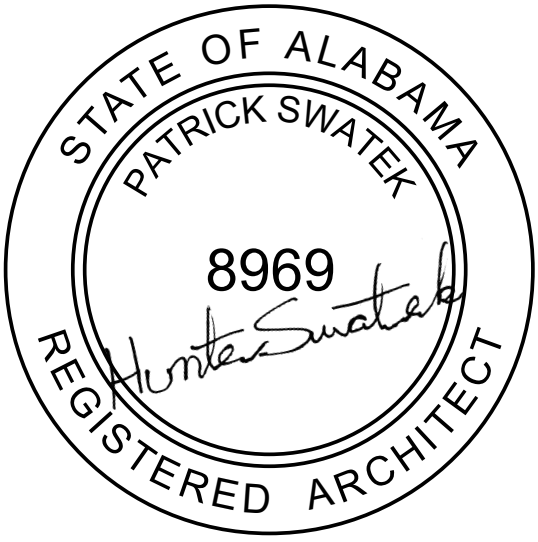
for

Enterprise State Community College

(Local Funds)

November 6, 2026

ISSUED FOR BID



Prepared By

GMC

Goodwyn Mills Cawood, LLC.
2400 5th Avenue South, Suite 200
Birmingham, AL 35233
T 205.879.4462
www.gmcnetwork.com

GMC PROJECT NUMBER: ABHM250051

OWNERSHIP OF DOCUMENTS AND DISCLAIMER

The Project Manual, Technical Specifications, Drawings, and all other documents relating to this project have been prepared for this individual and particular project, and for the exclusive use of the original Owner, developer or other party so indicated.

Actual project conditions and as-built conditions may vary significantly. Changes made during bidding, negotiations, construction, due to additions or deletions of portions of this project, and/or for other reasons, may not be indicated in these documents.

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GOODWYN MILLS CAWOOD, LLC.

GMCNETWORK.COM

SECTION 00 0103
PROJECT DIRECTORY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Identification of project team members and their contact information.

1.2 OWNER:

A. Name: Enterprise State Community College
   1. Address Line 1: 600 Plaza Drive.
   2. City: Enterprise.
   3. State: AL.
   4. Zip Code: 36330.

1.3 CONSULTANTS:

A. Architect: Design Professional of Record. All correspondence from the Contractor regarding construction documents authored by Architect's consultants will be through this party, unless alternate arrangements are mutually agreed upon at preconstruction meeting.
   1. Company Name: Goodwyn Mills Cawood, LLC.
      a. Address Line 1: 2400 5th Avenue South, Suite 200.
      b. City: Birmingham.
      c. State: AL.
      d. Zip Code: 35233.
      e. Telephone: 205-879-4462.
   2. Primary Contact:
      a. Title: Project Architect.
      b. Name: Hunter Swatek, AIA.
      c. Email: hunter.swatek@gmcnetwork.com.
   3. Secondary Contact
      a. Title: Project Manager
      b. Name: Trent Catron, IIDA
      c. Email: trent.catron@gmcnetwork.com

B. Civil Engineering Consultant:
   1. Company Name: Goodwyn Mills Cawood, LLC.
      a. Address Line 1: 2400 5th Avenue South, Suite 200.
      b. City: Birmingham.
      c. State: AL.
      d. Zip Code: 35233.
      e. Telephone: 205-879-4462.
   2. Primary Contact:
      a. Name: Corey Shoop, PE.
      b. Email: corey.shoop@gmcnetwork.com.

C. Landscape Architecture Consultant:
   1. Company Name: Goodwyn Mills Cawood, LLC..
      a. Address Line 1: 2400 5th Avenue South, Suite 200.
      b. City: Birmingham.
      c. State: AL.
      d. Zip Code: 35233.

e. Telephone: 205-879-4462.

2. Primary Contact:
   a. Name: Lori Woodham, PLA.
   b. Email: lori.woodham@gmcnetwork.com.

D. Structural Engineering Consultant:
1. Company Name: Tucker-Jones Engineers Associates.
   a. Address Line 1: 3300 Cahaba Road, Suite 210.
   b. City: Birmingham.
   c. State: AL.
   d. Zip Code: 35223.
   e. Telephone: 205-879-5660.
2. Primary Contact:
   a. Name: Greg Tucker, PE.
   b. Email: gtucker@tuckerjones.com.

E. Mechanical Engineering Consultant - HVAC & Plumbing:
1. Company Name: M W Davis Dumas & Associates.
   a. Address Line 1: 4500 Southlake Park Ste 200.
   b. City: Hoover.
   c. State: AL.
   d. Zip Code: 35244.
   e. Telephone: (205) 252-0246.
2. Primary Contact:
   a. Name: Sammy Davis, PE.
   b. Email: sdavid@mwdda.com.

F. Electrical Engineering Consultant:
1. Company Name: Jackson Renfro & Associates, Inc..
   a. Address Line 1: 31 Inverness Parkway, Suite 300.
   b. City: Birmingham.
   c. State: AL.
   d. Zip Code: 35242.
   e. Telephone: 205-995-1078.
2. Primary Contact:
   a. Name: Bobby Renfro, PE.
   b. Email: bobby@jraee.com.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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END OF SECTION

ADVERTISEMENT FOR PREQUALIFICATION AND BIDS

PREQUALIFICATION PROPOSALS will be received via email, or other electronic transmission, on behalf of the Owner by Goodwyn Mills Cawood, LLC., at 2400 5th Avenue South, Ste. 200, Birmingham, AL 35233, for the below referenced project, until **2:00 PM Local Time, October 15, 2026.** The prequalification procedure is intended to identify responsible and competent bidders relative to the requirements of the Project. Prequalification proposal requirements may be obtained from the Architect, by request by e-mail alyssa.martin@gmcnetwork.com, to Alyssa Martin. Additional qualifications and requirements for General Contractor Bidders and separate Subcontractors are indicated in the Bid and Contract Documents.

SEALED PROPOSALS will be received only from previously PRE-QUALIFIED General Contractors by Alabama Community College Systems located at Wallace Administration Building, President's Board Room at 600 Plaza Dr., Enterprise, AL 36330; until 2:00 PM Local Time, December 10, 2026, for this project:

LOLLEY GYM RENOVATION
ENTERPRISE STATE COMMUNITY COLLEGE
ENTERPRISE, ALABAMA

(LOCALLY FUNDED)

at which time and place they will be publicly opened and read.

A cashiers check or bid bond payable to Alabama Community College Systems in an amount not less than five (5) percent of the amount of the bid, but in no event more than $10,000, must accompany the bidder's proposal. Performance and statutory Labor and Material Payment Bonds, and insurance in compliance with requirements, will be required at the signing of the Contract.

Drawings and Specifications may be examined at the Office of the Architect; Dodge Data & Analytics; Data Fax; and ConstructConnect.

Bid documents (Plans, Specifications, and Addenda) will be sent to prequalified General Contractors only from the Architect electronically with no deposit. Subcontractors should contact a General Contractor or plan room for documents.

Only General Contractors who have completed the prequalification process within the stated time limits, and which are properly licensed in accordance with criteria established by the State Licensing Board for General Contractors under the Provision of Title 34, Chapter 8, Code of Alabama, 1975, as amended, will be considered for prequalification for the Work of this project.

A **MANDATORY PRE-BID CONFERENCE** will be held at the same location as bids are to be opened, at **2:00 PM local time November 12, 2026,** for the purpose of reviewing the project and answering Bidder's questions. **Attendance at the Pre-Bid Conference IS REQUIRED for all General Contractor Bidders** intending to submit a Proposal, and is highly recommended for Subcontractors. Bids from General Contractors not attending the Pre-Bid Conference will be rejected.

Per the Owner and the Alabama Department of Revenue (ADOR), Act 2013-205, the project will be bid **EXCLUDING TAXES** and will require the Contractor to complete ACCS Form 5-A Accounting of Sales Tax Attachment to ACCS Form 5-E Proposal Form which will be submitted with the Contractors Proposal at the time of the Bid. If awarded the bid, both tax exempt entity and contractor shall apply for certificates of exemption. ADOR shall issue certificates of exemption from sales and

use tax for each tax exempt project. Certificates shall only be issued to contractors licensed by the State Licensing Board for General Contractors or any subcontractor working under the same contract. Items eligible for exemption are building materials, construction materials and supplies and other tangibles that become part of the structure. ADOR will handle the administration of the certificates and the accounting of exempt purchases.

The Owner reserves the right to reject any or all proposals, to waive technical errors and/or abandon the prequalification and bid process if, in their judgment, the best interests of the Owner will thereby be promoted.

ALABAMA COMMUNITY COLLEGE SYSTEMS
P.O. BOX 302130
MONTGOMERY, ALABAMA 35213

GOODWYN MILLS CAWOOD, LLC.
MEMBERS, AMERICAN INSTITUTE OF ARCHITECTS
2400 5th Avenue South, Suite 200
Birmingham, Alabama 35233
Phone: (205) 879-4462
Fax: (205) 879-4493

****

END OF ADVERTISEMENT

FACILITIES MANAGEMENT

ACCS FORM 5-C

INSTRUCTIONS *to* BIDDERS

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2. General Contractor's State Licensing Requirements
3. Qualifications of Bidders and Prequalification Procedures
4. Preference to Resident Contractors
5. Examination of Bid Documents and the Site of the Work
6. Explanations and Interpretations
7. Substitutions
8. Preparation and Delivery of Bids
9. Withdrawal or Revision of Bids
10. Opening of Bids
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13. Disqualification of Bidders
14. Consideration of Bids
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16. Unit Prices
17. Award of Contract

1 BID DOCUMENTS:

The Bid Documents consist of the Advertisement for Bids, these Instructions to Bidders, any supplements to these Instructions to Bidders, the Proposal Form and the Accounting of Sales Tax, and the proposed Contract Documents. The proposed Contract Documents consist of the Construction Contract, the Performance Bond and Payment Bond, the Conditions of the Contract (General, Supplemental, and other Conditions), Drawings, Specifications and all addenda issued prior to execution of the Construction Contract. Bid Documents may be obtained or examined as set forth in the Advertisement for Bids.

2 GENERAL CONTRACTOR'S STATE LICENSING REQUIREMENTS:

When the amount bid for a contract exceeds $100,000, the bidder must be licensed by the State Licensing Board for General Contractors and must show the Architect evidence of license before bidding or the bid will not be received by the Architect or considered by the Awarding Authority. A bid exceeding the bid limit stipulated in the bidder's license, or which is for work outside of the type or types of work stipulated in the bidder's license, will not be considered. In case of a joint venture of two or more contractors, the amount of the bid shall be within the maximum bid limitation as set by the State Licensing Board for General Contractors of the combined limitations of the partners to the joint venture.

3 QUALIFICATIONS *of* BIDDERS *and* PREQUALIFICATION PROCEDURES:

(a) Any special qualifications required of general contractors, subcontractors, material suppliers, or fabricators are set forth in the Bid Documents.

(B) The Awarding Authority may have elected to prequalify bidders. Parties interested in bidding for this contract are directed to the Advertisement for Bids and Supplemental Instructions to Bidders to determine whether bidders must be prequalified and how they may obtain copies of the Awarding Authority's published prequalification procedures and criteria.

(C) Release of Bid Documents by the Architect to a prospective bidder will not constitute any determination by the Awarding Authority or Architect that the bidder has been found to be qualified, prequalified, or responsible.

4 PREFERENCE *to* RESIDENT CONTRACTORS:

(If this project is federally funded in whole or in part, this Article shall not apply.)

(A) In awarding the Contract, preference will be given to Alabama resident contractors and a nonresident bidder domiciled in a state having laws granting preference to local contractors shall be awarded the Contract only on the same basis as the nonresident bidder's state awards contracts to Alabama contractors bidding under similar circumstances.

(B) A nonresident bidder is a contractor which is neither organized and existing under the laws of the State of Alabama, nor maintains its principal place of business in the State of Alabama. A nonresident contractor which has maintained a permanent office within the State of Alabama for at least five continuous years shall not thereafter be deemed to be a non-resident contractor so long as the contractor continues to maintain a branch office within Alabama.

5 **EXAMINATION of BID DOCUMENTS** *and the* **SITE** *of the* **WORK:**

Before submitting a bid for the Work, the bidders shall carefully examine the Bid Documents, visit the site, and satisfy themselves as to the nature and location of the Work, and the general and local conditions, including weather, the general character of the site or building, the character and extent of existing work within or adjacent to the site and any other work being performed thereon at the time of submission of their bids. They shall obtain full knowledge as to transportation, disposal, handling, and storage of materials, availability of water, electric power, and all other facilities in the area which will have a bearing on the performance of the Work for which they submit their bids. The submission of a bid shall constitute a representation by the bidder that the bidder has made such examination and visit and has judged for and satisfied himself or herself as to conditions to be encountered regarding the character, difficulties, quality, and quantities of work to be performed and the material and equipment to be furnished, and as to the contract requirements involved.

6 **EXPLANATIONS** *and* **INTERPRETATIONS:**

(A) Should any bidder observe any ambiguity, discrepancy, omission, or error in the drawings and specifications, or in any other bid document, or be in doubt as to the intention and meaning of these documents, the bidder should immediately report such to the Architect and request clarification.

(B) Clarification will be made only by written Addenda sent to all prospective bidders. Neither the Architect nor the Awarding Authority will be responsible in any manner for verbal answers or instructions regarding intent or meaning of the Bid Documents.

(C) In the case of inconsistency between drawings and specifications or within either document, a bidder will be deemed to have included in its bid the better quality or greater quantity of the work involved unless the bidder asked for and obtained the Architect's written clarification of the requirements before submission of a bid.

7 **SUBSTITUTIONS:**

(A) The identification of any product, material, system, item of equipment, or service in the Bid Documents by reference to a trade name, manufacturer's name, model number, etc. (hereinafter referred to as "source"), is intended to establish a required standard of performance, design, and quality and is not intended to limit competition unless the provisions of paragraph "d" below apply.

(B) When the Bid Documents identify only one or two sources, or three or more sources followed by "or approved equal" or similar wording, the bidder's proposal may be based on a source not identified but considered by the bidder to be equal to the standard of performance, design and quality as specified; however, such substitutions must ultimately be approved by the Architect. If the bidder elects to bid on a substitution without "Pre-bid Approval" as described below, then it will be understood that proof of compliance with specified requirements is the exclusive responsibility of the bidder.

(C) When the Bid Documents identify three or more sources and the list of sources is not followed by "or approved equal" or similar wording, the bidder's proposal shall be based upon one of the identified sources, unless the bidder obtains "Pre-bid Approval" of another source as described below. Under these conditions it will be expressly understood that no product, material, system, item of equipment, or service that is not

identified in the Bid Documents or granted "Pre-Bid Approval" will be incorporated into the Work unless such substitution is authorized and agreed upon through a Contract Change Order.

(D) If the Bid Documents identify only one source and expressly provide that it is an approved sole source for the product, material, system, item of equipment, or service, the bidder's proposal must be based upon the identified sole source.

(E) Procedures for "Pre-bid Approval". If it is desired that a product, material, system, piece of equipment, or service from a source different from those sources identified in the Bid Documents be approved as an acceptable source, application for the approval of such source must reach the hands of the Architect at least ten days prior to the date set for the opening of bids. At the Architect's discretion, this ten day provision may be waived. The application for approval of a proposed source must be accompanied by technical data which the applicant desires to submit in support of the application. The Architect will give consideration to reports from reputable independent testing laboratories, verified experience records showing the reputation of the proposed source with previous users, evidence of reputation of the source for prompt delivery, evidence of reputation of the source for efficiency in servicing its products, or any other pertinent written information. The application to the Architect for approval of a proposed source must be accompanied by a schedule setting forth in which respects the materials or equipment submitted for consideration differ from the materials or equipment designated in the Bid Documents. The burden of proof of the merit of the proposed substitution is upon the proposer. To be approved, a proposed source must also meet or exceed all express requirements of the Bid Documents. Approval, if granted, shall not be effective until published by the Architect in an addendum to the Bid Documents.

8 PREPARATION *and* DELIVERY *of* BIDS:

(A) ACCS Form 5-E: Proposal Form:

(1) Bids must be submitted on the Proposal Form as contained in the Bid Documents; only one copy is required to be submitted. A completed ACCS Form 5-H: Accounting of Sales Tax must be submitted with the Proposal Form.

(2) All information requested of the bidder on the Proposal Form must be filled in. The form must be completed by typewriter or hand-printed in ink.

(3) Identification of Bidder: On the first page of the Proposal Form the bidder must be fully identified by completing the spaces provided for:

a. the legal name of the bidder,
b. the state under which laws the bidder's business is organized and existing,
c. the city (and state) in which the bidder has its principal offices,
d. the bidder's business organization, i.e., corporation, partnership, or individual (to be indicated by marking the applicable box and writing in the type of organization if it is not one of those listed), and
e. the partners or officers of the bidder's organization, if the bidder is other than an individual.

If the space provided on the Proposal Form is not adequate for this listing, the bidder may insert "See Attachment" in this space and provide the listing on an attachment to the Proposal Form.

(4) Where indicated by the format of the Proposal Form, the bidder must specify lump sum prices in both words and figures. In case of discrepancy between the prices shown in words and in figures, the words will govern.

(5) All bid items requested in the Proposal Form, including alternate bid prices and unit prices for separate items of the Work, must be bid. If a gross sum of bid items is requested in the Proposal Form, the gross sum shall be provided by the bidder.

(6) In the space provided in the Proposal Form under "Bidder's Alabama License", the bidder must insert his or her current general contractor's state license number, current bid limit, and type(s) of work for which bidder is licensed.

(7) The Proposal Form shall be properly signed by the bidder. If the bidder is:

a. **an individual,** that individual or his or her "authorized representative" must sign the Proposal Form;
b. **a partnership,** the Proposal Form must be signed by one of the partners or an "authorized representative" of the Partnership;
c. **a corporation,** the president, vice-president, secretary, or "authorized representative" of the corporation shall sign and affix the corporate seal to the Proposal Form.
As used in these Instructions to Bidders, "authorized representative" is defined as a person to whom the bidder has granted written authority to conduct business in the bidder's behalf by signing and/or modifying the bid. Such written authority shall be signed by the bidder (the individual proprietor, or a member of the Partnership, or an officer of the Corporation) and shall be attached to the Proposal Form.

(8) Interlineation, alterations or erasures on the Proposal Form must be initialed by the bidder or its "authorized representative".

(B) ACCS Form 5-H: Accounting *of* Sales Tax

A completed ACCS Form 5-H: Accounting of Sales Tax must be submitted with ACCS Form 5-E: Proposal Form. Submission of ACCS Form 5-H is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

(C) Bid Guaranty

(1) The Proposal Form must be accompanied by a cashier's check, drawn on an Alabama bank, or a Bid Bond, executed by a surety company duly authorized and qualified to make such bonds in the State of Alabama, payable to the Awarding Authority.

(2) If a Bid Bond is provided in lieu of a cashier's check, the bond shall be on the Bid Bond form as stipulated in the Bid Documents.

(3) The amount of the cashier's check or Bid Bond shall not be less than five percent of the contractor's bid, but is not required to be in an amount more than ten thousand dollars.

(D) Delivery *of* Bids:

(1) Bids will be received until the time set, and at the location designated, in the Advertisement for Bids unless notice is given of postponement. Any bid not received prior to the time set for opening bids will be rejected absent extenuating circumstances and such bids shall be rejected in all cases where received after other bids are opened.

(2) Each bid shall be placed, together with the bid guaranty, in a sealed envelope. On the outside of the envelope the bidder shall write in large letters "Proposal", below which the bidder shall identify the Project and the Work bid on, the name of the bidder, and the bidder's current general contractor's state license number.

(3) Bids may be delivered in person, or by mail if ample time is allowed for delivery. When sent by mail, the sealed envelope containing the bid, marked as indicated above, shall be enclosed in another envelope for mailing.

9 WITHDRAWAL *or* REVISION *of* BIDS:

(A) A bid may be withdrawn prior to the time set for opening of bids, provided a written request, executed by the bidder or the bidder's "authorized representative", is filed with the Architect prior to that time. The bid will then be returned to the bidder unopened.

(B) A bid which has been sealed in its delivery envelope may be revised by writing the change in price on the outside of the delivery envelope over the signature of the bidder or the bidder's "authorized representative". In revising the bid in this manner, the bidder must only write the amount of the change in price on the envelope **and must not reveal the bid price.**

(C) Written communications, signed by the bidder or its "authorized representative", to revise bids will be accepted if received by the Architect prior to the time set for opening bids. The Architect will record the instructed revision upon opening the bid. Such written communication may be by facsimile if so stipulated in Supplemental Instructions to Bidders. In revising the bid in this manner, the bidder must only write the amount of the change in price **and must not reveal the bid price.**

(D) Except as provided in Article 12 of these Instructions to Bidders, no bid shall be withdrawn, modified, or corrected after the time set for opening bids.

10 OPENING *of* BIDS:

(A) Bids will be opened and read publicly at the time and place indicated in the Advertisement for Bids. Bidders or their authorized representatives are invited to be present.

(B) A list of all proposed major subcontractors and suppliers will be submitted by Bidders to the Architect at a time subsequent to the receipt of bids as established by the Architect in the Bid Documents but in no event shall this time exceed twenty-four (24) hours after receipt of bids. If the list includes a fire alarm contractor and/or fire sprinkler contractor, Bidders will also submit a copy of the fire alarm contractor's and/or fire sprinkler contractor's permits from the State of Alabama Fire Marshal's Office.

11 **INCOMPLETE *and* IRREGULAR BIDS:**
A bid that is not accompanied by data required by the Bid Documents, or a bid which is in any way incomplete, may be rejected. Any bid which contains any uninitialed alterations or erasures, or any bid which contains any additions, alternate bids, or conditions not called for, or any other irregularities of any kind, will be subject to rejection.

12 **BID ERRORS:**
(A) Errors and Discrepancies in the Proposal Form. In case of error in the extension of prices in bids, the unit price will govern. In case of discrepancy between the prices shown in the figures and in words, the words will govern.

(B) Mistakes within the Bid. If the low bidder discovers a mistake in its bid, the low bidder may seek withdrawal of its bid without forfeiture of its bid guaranty under the following conditions:

(1) Timely Notice: The low bidder must notify the Awarding Authority and Architect in writing, within three working days after the opening of bids, that a mistake was made. This notice must be given within this time frame whether or not award has been made.

(2) Substantial Mistake: The mistake must be of such significance as to render the bid price substantially out of proportion to the other bid prices.

(3) Type of Mistake: The mistake must be due to calculation or clerical error, an inadvertent omission, or a typographical error which results in an erroneous sum. A mistake of law, judgment, or opinion shall not constitute a valid ground for withdrawal without forfeiture.

(4) Documentary Evidence: Clear and convincing documentary evidence of the mistake must be presented to the Awarding Authority and the Architect as soon as possible, but no later than three working days after the opening of bids.

The Awarding Authority's decision regarding a low bidder's request to withdraw its bid without penalty shall be made within 10 days after receipt of the bidder's evidence or by the next regular meeting of the Awarding Authority. Upon withdrawal of bid without penalty, the low bidder shall be prohibited from (1) doing work on the project as a subcontractor or in any other capacity and (2) bidding on the same project if it is re-bid.

13 **DISQUALIFICATION *of* BIDDERS:**
Any bidder(s) may be disqualified from consideration for contract award for the following reasons:

(A) Collusion. Any agreement or collusion among bidders or prospective bidders in restraint of freedom of competition to bid at a fixed price or to refrain from bidding or otherwise shall render the bids void and shall cause the bidders or prospective bidders participating in such agreement or collusion to be disqualified from submitting further bids to the Awarding Authority on future lettings. (See § 39-2-6, Code of Alabama 1975, for possible criminal sanctions.)

(B) Advance Disclosure. Any disclosure in advance of the terms of a bid submitted in response to an Advertisement for Bids shall render the proceedings void and require re-advertisement and rebid.

(C) Failure to Settle Other Contracts. The Awarding Authority may reject a bid from a bidder who has not paid, or satisfactorily settled, all bills due for labor and material on other contracts in force at the time of letting.

14 CONSIDERATION *of* BIDS:

(A) After the bids are opened and read publicly, the bid prices will be compared and the results of this comparison will be available to the public. Until the final award of the contract, however, the Awarding Authority shall have the right to reject any or all bids, and it shall have the right to waive technical errors and irregularities if, in its judgment, the bidder will not have obtained a competitive advantage and the best interests of the Awarding Authority will be promoted.

(B) If the Bid Documents request bids for projects or parts of projects in combination or separately, the Bid Documents must include supplements to, these Instructions to Bidders setting forth applicable bid procedures. Award or awards will be made to the lowest responsible and responsive bidder or bidders in accordance with such bid procedures.

15 BID ALTERNATES:

(A) Bid Alternates: Additive alternate bids are preferred, and may be used in order to obtain prices for the addition of items not included in the base bid. The alternate bids shall be listed in the Proposal Form.

(B) Deductive Bid Alternates: Deductive alternate bids shall only be used with the prior approval of the Chief Facilities Officer.

(C) ACCS reserves the right to select or reject some, any, or all alternates in making the final determination of the lowest responsible and responsive bidder to whom the Construction Contract is awarded.

16 UNIT PRICES:

(A) Work Bid on a Unit Price Basis. Where all, or part(s), of the planned Work is bid on a unit price basis, both the unit prices and the extensions of the unit prices constitute a basis of determining the lowest responsible and responsive bidder. In cases of error in the extension of prices of bids, the unit price will govern. A bid may be rejected if any of the unit prices are obviously unbalanced or non-competitive. Each unit price is to include overhead, profit, and all other related costs.

(B) Unit Prices for Application to Change Orders. As a means of predetermining unit costs for changes in certain elements of the Work, the Bid Documents may require that the bidders furnish unit prices for those items in the Proposal Form. Unit prices for application to changes in the work are not a basis for determining the lowest bidder. Non-competitive unit prices proposed by the successful bidder may be rejected and competitive prices negotiated by the Awarding Authority prior to contract award. Unit prices for application to changes in the work are not effective unless specifically included and agreed upon in the Construction Contract. Each unit price is to include overhead, profit, and all other related costs.

17 AWARD *of* CONTRACT:

(A) The contract shall be awarded to the lowest responsible and responsive bidder unless the Awarding Authority finds that all the bids are unreasonable or that it is not in the best interest of the Awarding Authority to accept any of the bids. A responsible bidder is one who, among other qualities determined necessary for performance, is competent, experienced, and financially able to perform the contract. A responsive bidder is one who submits a bid that complies with the terms and conditions of the Advertisement for Bids and the Bid Documents. Minor irregularities in the bid shall not defeat responsiveness.

(B) A bidder to whom award is made will be notified by telegram, confirmed facsimile, or letter to the address shown on the Proposal Form at the earliest possible date. Unless other time frames are stipulated in Supplemental Instructions to Bidders, the maximum time frames allowed for each step of the process between the opening of bids and the issuance of an order to proceed with the work shall be as follows:

(1) Award of contract by Awarding Authority: 30 calendar days after the opening of bids

(2) Contractor's return of the fully executed contract, with bonds and evidence of insurance, to the Awarding Authority: 15 calendar days after the contract has been presented to the contractor for signature (from the Lead Design Professional)

(3) Awarding Authority's approval of the contractor's bonds and evidence of insurance and completion of contract execution: 20 calendar days after the contractor presents complete and acceptable documents to the Architect

(4) Notice To Proceed issued to the contractor along with distribution of the fully executed construction contract to all parties: 15 calendar days after final execution of contract by the Awarding Authority, by various State Agencies if required and by the Governor if his or her signature on the contract is required by law

The time frames stated above, or as otherwise specified in the Bid Documents, may be extended by written agreement between the parties. Failure by the Awarding Authority to comply with the time frames stated above or stipulated in Supplemental Instructions to Bidders, or agreed extensions thereof, shall be just cause for the withdrawal of the contractor's bid and contract without forfeiture of bid security.

Should the successful bidder or bidders to whom the contract is awarded fail to execute the Construction Contract and furnish acceptable Performance and Payment Bonds and satisfactory evidence of insurance within the specified period, the Awarding Authority shall retain from the bid guaranty, if it is a cashier's check, or recover from the principal or the sureties, if the guaranty is a bid bond, the difference between the amount of the contract as awarded and the amount of the bid of the next lowest responsible and responsive bidder, but not more than $10,000. If no other bids are received, the full amount of the bid guaranty shall be so retained or recovered as liquidated damages for such default. Any sums so retained or recovered shall be the property of the Awarding Authority.

All bid guaranties, except those of the three lowest bona fide bidders, will be returned immediately after bids have been checked, tabulated, and the relation of the bids established. The bid guaranties of the three lowest bidders will be returned as soon as the contract bonds and the contract of the successful bidder have been properly executed and approved. When the award is deferred for a period of time longer than 15 days after the opening of the bids, all bid guaranties, except those of the potentially successful bidders, shall be returned. If no award is made within the specified period, as it may by agreement be extended, all bids will be rejected, and all guaranties returned. If any potentially successful bidder agrees in writing to a stipulated extension in time for consideration of its bid and its bid was guaranteed with a cashier's check, the Awarding Authority may permit the potentially successful bidder to substitute a satisfactory bid bond for the cashier's check.

END OF INSTRUCTIONS TO BIDDERS

FACILITIES DIVISION

ACCS FORM 5-E

PROPOSAL FORM

To: Alabama Community College System Date: _____

In compliance with the Advertisement for Bids and subject to all the conditions thereof, the undersigned

<Legal Name of Bidder>

hereby proposes to furnish all labor and materials and perform all work required for the construction of
WORK:

in accordance with Drawings and Specifications, dated _____ , prepared by:

_____ , Architect/Engineer

The Bidder, which is organized and existing under the laws of the State of: _____ ,

having its principal offices in the City of: _____ ,

is: ◯ a Corporation ◯ a Partnership ◯ an Individual ◯ Other: _____

LISTING OF PARTNERS OR OFFICERS:

If Bidder is a Partnership, list all partners and their addresses; if Bidder is a Corporation, list the names, titles, and business addresses of its officers:

BIDDER'S REPRESENTATION: The Bidder declares that it has examined the site of the Work, having become fully informed regarding all pertinent conditions, and that it has examined the Drawings and Specifications (including all Addenda received) for the Work and the other Bid and Contract Documents relative thereto, and that it has satisfied itself relative to the Work to be performed.

ADDENDA: The Bidder acknowledges receipt of Addenda Nos._____ through _____inclusively.

BASE BID: For construction complete as shown and specified, the sum of:

_____ Dollars ($)

ALTERNATES: If alternates as set forth in the Bid Documents are accepted, the following adjustments are to be made to the Base Bid:

For Alternate No. 1 (<Keyword for Amount>) ◯ add ◯ deduct $

For Alternate No. 2 (<Keyword for Amount>) ◯ add ◯ deduct $

For Alternate No. 3 (<Keyword for Amount>) ◯ add ◯ deduct $

For Alternate No. 4 (<Keyword for Amount>) ◯ add ◯ deduct $

For Alternate No. 5 (<Keyword for Amount>) ◯ add ◯ deduct $

For Alternate No. 6 (<Keyword for Amount>) ◯ add ◯ deduct $

UNIT PRICES - (Attach to this Proposal Form the unit prices, if any, on a separate sheet.)

BID SECURITY: The undersigned agrees to enter into a Construction Contract and furnish the prescribed Performance and Payment Bonds and evidence of insurance within fifteen calendar days, or such other period stated in the Bid Documents, after the contract forms have been presented for signature, provided such presentation is made within 30 calendar days after the opening of bids, or such other period stated in the Bid Documents. As security for this condition, the undersigned further agrees that the funds represented by the Bid Bond (or cashier's check) attached hereto may be called and paid into the account of the Awarding Authority as liquidated damages for failure to so comply.

Attached hereto is a (Mark the appropriate box and provide the applicable information):

- ☐ Bid Bond, executed by _____ as Surety,
- ☐ A cashier's check on the _____ Bank: _____,
  for the sum of: _____
  Dollars ($_____) made payable to the Awarding Authority.

BIDDER'S ALABAMA LICENSE:

State License for General Contracting: _____ / _____ / _____

License Number **Bid Limit** **Type(s) of Work**

CERTIFICATIONS: The undersigned certifies that he or she is authorized to execute contracts on behalf of the Bidder as legally named, that this proposal is submitted in good faith without fraud or collusion with any other bidder, that the information indicated in this document is true and complete, and that the bid is made in full accord with State law. Notice of acceptance may be sent to the undersigned at the address set forth below.

The Bidder also declares that a list of all proposed major subcontractors and suppliers will be submitted at a time subsequent to the receipt of bids as established by the Architect in the Bid Documents but in no event shall this time exceed twenty-four (24) hours after receipt of bids.

Legal Name of Bidder: _____

Mailing Address: _____

***By (Legal Signature):** _____

*Name & Title (Print):

Telephone Number:

Email Address:

(SEAL)

* If other than the individual proprietor, or an above named member of the Partnership, or the above named president, vice-president, or secretary of the Corporation, attach written authority to bind the Bidder. Any modification to a bid shall be over the initials of the person signing the bid, or of an authorized representative.

FACILITIES DIVISION

ACCS FORM 5-F

BID BOND

- *Do not staple this form; use clips.*

The **PRINCIPAL** (Bidder's Company Name and Address)
Name:
Address:

The **SURETY** (Company Name and Primary Place of Business)
Name:
Address:

The **OWNER**
Name: Alabama Community College System
Address: 135 S. Union Street, Montgomery, AL 36130

The **PROJECT** for which the Principal's Bid is submitted (Project name as it appears in the Bid Documents):

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned Principal and Surety, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the **PENAL SUM of five percent (5%) of the amount of the Principal's bid, but in no event more than Ten-thousand Dollars ($10,000.00).**

THE CONDITION OF THIS OBLIGATION is that the Principal has submitted to the Owner the attached bid, which is incorporated herein by reference, for the Project identified above.

NOW, THEREFORE, if, within the terms of the Bid Documents, the Owner accepts the Principal's bid and the Principal thereafter either:

(a) executes and delivers a Construction Contract with the required Performance and Payment Bonds (each in the form contained in the Bid Documents and properly completed in accordance with the bid) and delivers evidence of insurance as prescribed in the Bid Documents, or

(b) fails to execute and deliver such Construction Contract with such Bonds and evidence of insurance, but pays the Owner the difference, not to exceed the Penal Sum of this Bond, between the amount of the Principal's Bid and the larger amount for which the Owner may award a Construction Contract for the same Work to another bidder, **then**, this obligation shall be null and void, otherwise it shall remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of the Surety under this Bond shall not in any manner be impaired or affected by any extension of the time within which the Owner may accept the Principal's bid, and the Surety does hereby waive notice of any such extension.

SIGNED AND SEALED this -Day- day of -Month- -Year-

PRINCIPAL: _____ **ATTEST:**

BY: _____ _____
NAME AND TITLE

SURETY: _____ **ATTEST:**

BY: _____ _____
NAME AND TITLE

FACILITIES DIVISION

ACCS FORM 5-H

(Must be submitted with ACCS Form 5-E)

ACCOUNTING OF SALES TAX

ATTACHMENT TO ACCS FROM 5-E: PROPOSAL FORM

TO:		**DATE:**	
NAME OF PROJECT:			

SALES TAX ACCOUNTING

Pursuant to Act 2013-205, Section 1(g) the Contractor accounts for the sales tax NOT included in the bid proposal form as follows:

			ESTIMATED SALES TAX AMOUNT
BASE BID:			Dollars $
For Alternate No. 1 (	<Keyword for Amount>)	◯ add	◯ deduct $
For Alternate No. 2 (	<Keyword for Amount>)	◯ add	◯ deduct $
For Alternate No. 3 (	<Keyword for Amount>)	◯ add	◯ deduct $
For Alternate No. 4 (	<Keyword for Amount>)	◯ add	◯ deduct $
For Alternate No. 5 (	<Keyword for Amount>)	◯ add	◯ deduct $
For Alternate No. 6 (	<Keyword for Amount>)	◯ add	◯ deduct $

Failure to provide an accounting of sales tax shall render the bid non-responsive. Other than determining responsiveness, sales tax accounting shall not affect the bid pricing nor be considered in the determination of the lowest responsible and responsive bidder.

Legal Name of Bidder:

Mailing Address:

***By (Legal Signature):** _____

*Name (Print):

*Title (Print):

*Telephone Number:

Email Address:

(SEAL)

Note: A completed ACCS Form 5-H: Accounting of Sales Tax must be submitted with ACCS Form 5-E: Proposal Form. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

SECTION 00 4000.05
ALABAMA DEPARTMENT OF REVENUE TAX EXEMPTION GUIDANCE AND FORMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. ALABAMA DEPARTMENT OF REVENUE TAX EXEMPTION GUIDANCE AND FORMS follow herein and are available at www.revenue.alabama.gov.

1.2 LISTED DOCUMENTS

A. ALDOR Rule 810-6-3.77 - Exeption for Certain Purchases By Contractors and Subcontractors in Conjunction with Construction Contracts with Certain Government Entities.

B. ALDOR Form ST: EXC-01 - Application for Sales and Use Tax Certificate of Exemption for Government Entity Projects.

C. Instructions for Preparation of Form ST: EXC-01.

D. State of Alabama Department of Revenue NOTICE: Guidance for Contractors, Subcontractors and Alabama Governmental Entities Regarding Construction-related Contracts.

END OF SECTION

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810-6-3-.77 Exemption For Certain Purchases By Contractors And Subcontractors In Conjunction With Construction Contracts With Certain Governmental Entities

(1) On and after January 1, 2014, the sale to, or the storage, use, or consumption by, any contractor or subcontractor of any tangible personal property to be incorporated into realty pursuant to a contract entered into on or after January 1, 2014, with a governmental entity is exempt from all state, county, and municipal sales and use taxes.

For this rule, a governmental entity is defined as:

(a) The State of Alabama.

(b) A county or incorporated municipality of the State of Alabama.

(c) An educational institution of the State of Alabama, or a county or incorporated municipality of the State of Alabama.

(d) An industrial or economic development board or authority that is exempt from the payment of Alabama sales and use taxes.

(e) Other governmental entities that are exempt from the payment of Alabama sales and use taxes excluding those agencies as provided in sections (2) and (3) below.

(f) On and after January 1, 2019, the term governmental entity includes any public water or sewer authority, district, system, or board that otherwise is exempt from sales and use tax. The sale to, or the storage, use, or consumption by, any contractor or subcontractor of any tangible personal property to be incorporated into realty pursuant to a contract entered into on or after January 1, 2019, with any public water or sewer authority, district, system, or board that otherwise is exempt from sales and use tax is exempt from all state, county, and municipal sales and use taxes.

(g) On or after January 1, 2020, the term governmental entity includes any airport authority established pursuant to Chapter 3 of Title 4 of the Code of Ala. 1975, that otherwise is exempt from sales and use tax. The sale to, or the storage, use, or consumption by, any contractor or subcontractor of any tangible personal property to be incorporated into realty pursuant to a contract entered into on or after January 1, 2020, with an airport authority that otherwise is exempt from sales and use tax is exempt from all state, county, and municipal sales and use taxes.

(h) On and after January 1, 2022, the purchase of construction materials for use on construction projects for governmental entities; to include any contract for the construction of highways, roads, or bridge projects is exempt from all state, county, and municipal sales and use taxes.

(2) Purchases Not Exempt. The exemptions outlined in section (1) do not apply to any of the following:

(a) Purchases of tangible personal property by a contractor or subcontractor for storage, use, or consumption in conjunction with performing a contract with a governmental entity that is not itself exempt from Alabama sales and use taxes.

(b) Purchases of tangible personal property by a contractor or subcontractor that are not incorporated into realty pursuant to the contract.

(c) Purchases of tangible personal property for contracts with the federal government.

(d) Purchases of tangible personal property made pursuant to any contract entered into prior to applicable date set forth in section (1), (1)(f), (1)(g), or (1)(h) above, as applicable.

(3) Exclusion from Governmental Entity Exemption. The exemption outlined in section (1) does not apply to the sale to, or the storage, use, or consumption by, any contractor or subcontractor of any tangible personal property to be incorporated into realty pursuant to a contract with a state other than the State of Alabama, a county or incorporated municipality of a state other than the State of Alabama, an industrial development board created pursuant to the Constitution or general or local laws of a state other than the State of Alabama, an educational institution of a state other than the State of Alabama, or an educational institution of a county or incorporated municipality of a state other than the State of Alabama.

(4) Application Requirements. In order to qualify for the sales and use tax exemption referenced in section (1), the governmental entity must complete an application (Form ST: EXC-01) for a sales and use tax certificate of exemption (Form STC-1) for each tax-exempt project. Contractors and subcontractors licensed by the State Licensing Board for General Contractors, must also apply per project to the Department of Revenue for a sales and use tax certificate of exemption (Form STC-1). Upon review and approval of the application, the department shall issue the applicant a Form STC-1 which shall be used by the certificate holder to claim the exemption when making qualifying tax-exempt purchases for the project listed on the certificate. Before approving or denying the application, the Department of Revenue may require the applicant to submit additional documentation that the property to be purchased tax-exempt with the certificate will be incorporated into realty pursuant to contracts with one of the governmental entities enumerated in section (1) or to subcontracts arising from contracts with one of the governmental entities enumerated in section (1). If the

department denies the application, the applicant may appeal the denial in accordance with §40-2A-8, Code of Ala. 1975.

(5) Record Retention Requirement. A contractor or subcontractor who obtains a Form STC-1 must comply with all of the provisions of §40-23-9, Code of Ala. 1975, and must maintain records sufficient to document the tax-exempt status of qualifying purchases. Further, the contractor or subcontractor who presents Form STC-1 to a vendor for purchases of tangible personal property without the payment of sales or use tax must make an electronic report of all exempt purchases to the Department of Revenue on their assigned consumer use tax return (Form 2610). The report of exempt purchases shall be a prerequisite to the renewal of a certificate of exemption. Failure to report the exempt purchases will result in an assessment against the contractor or subcontractor for sales and use taxes on any items purchased with the certificate of exemption.

(6) Violation Penalties. Any contractor or subcontractor who intentionally uses a certificate of exemption (STC-1) in violation of §40-9-14.1, Code of Ala. 1975, will be:

(a) Liable for the actual sales and use tax due.

(b) Subject to a civil penalty levied by the department in the amount of not less than a minimum of two thousand dollars ($2,000) or two times any state and local sales or use tax due for the tangible personal property, whichever is the greater.

(c) May be barred from the use of any certificate of exemption (STC-1) on any project for up to two years based on the contractor's or subcontractor's willful misuse of a certificate of exemption. Contractors and subcontractors may appeal any such decisions in accordance with §40-2A-8, Code of Ala. 1975.

(7) Determination of Qualification According to Date. (a) The date of the sale to, or the purchase, withdrawal, storage, use or consumption by, the contractor must be used to determine if an otherwise qualifying transaction or event qualifies for the exemption. Jobs or projects entered into prior to the applicable dates noted in section (1), (1)(f), (1)(g), or (1)(h) above shall not qualify for the exemption regardless of the transaction date.

(b) For the purpose of this rule, the term "entered into" means the date that a contractor or subcontractor signs a contract with a governmental entity defined in section (1).

Authors: Michelle Mayberry, Traci Floyd, Ginger L. Buchanan, Lee Ann Rouse

Authority: §§40-2A-7(a)(5), 40-2A-8, 40-23-9, 40-23-31, 40-23-83, Code of Ala. 1975.

History: New Rule: Filed February 20, 2001; effective March 27, 2001.
Amended: Filed May 6, 2005; effective June 10, 2005.
Amended: Filed November 20, 2013; effective December 25, 2013.
Amended: Filed January 11, 2019; effective February 25, 2019.
Amended: Filed December 20, 2021; effective February 13, 2022.

ST: EXC-01
7/22

ALABAMA DEPARTMENT OF REVENUE
SALES AND USE TAX DIVISION

P.O. Box 327710 • Montgomery, AL 36132-7710

Reset

Application For
Sales and Use Tax Certificate of Exemption

FOR GOVERNMENT ENTITY PROJECT

This Certificate of Exemption will be limited to purchases which qualify for an exemption of sales and use taxes pursuant to Rule No. 810-6-3-.77

PROJECT INFORMATION:

PROJECT NAME				PROJECT OWNER'S FEIN (EXEMPT ENTITY)
STREET ADDRESS OF PROJECT (CITY AND COUNTY INCLUDED)	CITY	ZIP	COUNTY	

APPLICANT'S INFORMATION:

RELATION: *(CHOOSE ONE)*

☐ Government Entity ☐ General Contractor ☐ Subcontractor

APPLICANT'S LEGAL NAME				FEIN
DBA				CONSUMER'S USE TAX ACCOUNT NUMBER
MAILING ADDRESS: STREET	CITY	STATE	ZIP	COUNTY
CONTACT PERSON				BUSINESS TELEPHONE NUMBER
				( )

EMAIL ADDRESS

PROJECT START DATE	PROJECT END DATE

WILL THE APPLICANT HAVE ANY SUBCONTRACTORS ON THIS JOB?	NAME OF PARTY TO THE CONTRACT
☐ Yes ☐ No If yes, please attach list.	

JOB DESCRIPTION

WILL ANY POLLUTION CONTROL EXEMPTION BE APPLICABLE?	ESTIMATED POLLUTION CONTROL COST
☐ Yes ☐ No	$

TOTAL PROJECT BID AMOUNT (APPLICANT'S PORTION OF PROJECT)	LABOR COST (APPLICANT'S PORTION OF PROJECT)	MATERIAL COST (APPLICANT'S PORTION OF PROJECT)
$	$	$

REVENUE DEPARTMENT USE ONLY

PENDING DOCUMENTATION / INFORMATION:

☐ GCL ☐ SBL ☐ Contract / NTP / LOI ☐ LOS ☐ Project Dates / Breakdown of Costs

Contact Dates: _____ Received Date: _____

_____ Forwarded for Denial: _____

PROJECT NAME	PROJECT OWNER'S FEIN (EXEMPT ENTITY)

FORM OF OWNERSHIP:

☐ Individual ☐ Partnership ☐ Corporation ☐ Multi member LLC ☐ Single member LLC ☐ Government Entity

If applicant is a corporation, a copy of the certified certificate of incorporation, amended certificate of incorporation, certificate of authority, or articles of incorporation should be attached. If the applicant is a limited liability company or a limited liability partnership, a copy of the certified articles of organization should be attached.

OWNERSHIP INFORMATION:

Corporations – give name, title, home address, and Social Security Number of each officer.

Partnerships – give name, home address, Social Security Number or FEIN of each partner.

Sole Proprietorships – give name, home address, Social Security Number of owner.

LLC – give name, home address, and Social Security Number or FEIN of each member.

LLP – give name, home address, and Social Security Number or FEIN of each partner.

NAME *(PLEASE PRINT)* _____ SIGNATURE _____

TITLE _____ DATE _____

REVENUE DEPARTMENT USE ONLY

PENDING OTHER:

☐ Government Entity ☐ General Contractor ☐ Not on LOS

Contact Dates: _____ Received Date: _____

_____ Forwarded for Denial: _____

Examiner's Remarks _____

Examiner _____ Date _____

Instructions For Preparation of Form ST: EXC-01
Sales and Use Tax Certificate of Exemption for Government Entity Project

NOTE: Exemption Certificates will be issued as of the project start date or the received date of the application. If, upon receipt of the application, the project has already commenced, the certificate will be issued as of the received date of the application. Any purchases made prior to the issuance of a certificate will not be exempt.

In order to expedite the processing of your application, please include the following documentation when submitting your application:

Exempt Entity:
1. Signed Application
2. Copy of Executed/Signed Contract, Letter of Intent, Notice of Award, and/or Notice to Proceed

General Contractor:
1. Signed Application
2. Copy of Executed/Signed Contract, Letter of Intent, Notice of Award, and/or Notice to Proceed
3. List of Subcontractors
4. Alabama Board of General Contractor's License
5. State/County Business License (usually obtained through county probate office)

Subcontractor:
1. Signed Application
2. Alabama Board of General Contractor's License
3. State/County Business License (usually obtained through county probate office)
4. List of Subcontractors (if any)

General contractors and subcontractors:
- Any additions and/or deletions to the list of subcontractors working on a project must be submitted to the Department within 30 days of occurrence.
- If an extension is needed for a project, please contact the Department of Revenue at the address, number, or email listed below. Extension requests should be submitted no more than 30 days after expiration date.
- Subcontractors Project Start Date should be the date they will begin working on the project and ordering materials

THERE IS A FILING REQUIREMENT IF YOUR APPLICATION IS APPROVED. The return will be filed through the Consumer's Use Tax account. Please see the following page for detailed instructions and general information regarding the reporting requirements.

The application and required documentation may be mailed, faxed, or emailed to the following:

Fax: (334) 353-7867

Email: STExemptionUnit@revenue.alabama.gov

Mailing Address: ATTN: Contractor's Exemption
Alabama Department of Revenue
Sales & Use Tax Division
Room 4303
PO Box 327710
Montgomery, AL 36132-7710

JULIE P. MAGEE
Commissioner

State of Alabama
Department of Revenue
(www.revenue.alabama.gov)
50 North Ripley Street
Montgomery, Alabama 36132

MICHAEL E. MASON
Assistant Commissioner
JOE W. GARRETT, JR.
Deputy Commissioner
CURTIS E. STEWART
Deputy Commissioner

Alabama Department of Revenue
NOTICE

Tax Guidance for Contractors, Subcontractors and Alabama Governmental Entities Regarding Construction-related Contracts

Legislative Act 2013-205 requires the Department of Revenue to issue Form STC-1, *Sales and Use Tax Certificate of Exemption for Government Entity Projects*, to all contractors and subcontractors working on qualifying governmental entity projects once the Form ST: EXC-01 is approved.

Each exempt entity, contractor and subcontractor must make application for qualification of the exemption using Form ST: EXC-01 for each tax-exempt project. The application is available on the department's website at http://revenue.alabama.gov/salestax/ST-EXC-01.pdf. Applications should be submitted directly to the Sales and Use Tax Division Central Office, P.O Box 327710, Montgomery, AL 36132-7710.

The sales and use tax exemption provided for in Act 2013-205 applies to the purchase of building materials, construction materials and supplies, and other tangible personal property that become part of the structure pursuant to a qualifying contract entered into on or after January 1, 2014. Qualifying projects and contracts are those generally entered into with the following governmental entities, unless otherwise noted: the State of Alabama, a county or incorporated municipality of Alabama, an Alabama public school, or an Alabama industrial or economic development board or authority already exempt from sales and use taxes. **Please note that contracts entered into with the federal government and contracts pertaining to highway, road, or bridge construction or repair do not qualify for the exemption provided for in Act 2013-205**. [Reference: Sales and Use Tax Division Administrative Rule 810-6-3-.77 *Exemption for Certain Purchases by Contractors and Subcontractors in Conjunction with Construction Contracts with Certain Governmental Entities.*]

The Alabama Department of Revenue will assign each contractor and sub-contractor a consumers use tax account, if one is currently not in place, at the time the Form STC-1, Sales *and Use Tax Certificate of Exemption for Government Entity Projects*, is issued.

Contractors and sub-contractors for qualifying projects will be required to file monthly consumers use tax returns and report all exempt purchases for ongoing projects, as well as all taxable purchases on one return. These returns are required to be filed through the department's online tax return filing and payment portal, My Alabama Taxes (https://myalabamataxes.alabama.gov).

As another option for these types of contracts, as well as with other contracts entered into with other types of exempt entities, the Form ST:PAA1, *Purchasing Agent Appointment*, may be used. However, please be advised that the use of the Form ST:PAA1 option will require the exempt entity to be invoiced directly and pay for directly from their funds any construction and building material and supply purchases.

For additional information concerning this guidance, taxpayers should contact Sales and Use Tax Division representative Thomas Sims at 334-242-1574 or by email at Thomas.Sims@revenue.alabama.gov.

ATTACHMENT "A"
TO PROPOSAL FORM

GENERAL CONTRACTOR _____

UNIT PRICES: The undersigned proposes the following Unit Prices for additions to or deductions from the Work wherein Unit Prices are applicable as determined by the Architect and Owner. These Unit Prices include all charges for labor and materials, fees, layout, supervision (field and home office), general expenses, taxes, insurance, overhead and profit, for Unit Item of Work in place. The Contract Sum shall be increased or decreased based upon quantity difference multiplied by the applicable Unit Price, in accordance with the General Conditions of the Construction Contract.

Refer to Section 01 2200 – Unit Prices and the respective item Specification Section for the complete Unit Price item description, quantities, units, and measurement thereof.

Submit the following Unit Prices with the Proposal Form on Bid Date.

	UNIT PRICE ITEM	UNIT OF MEASURE	UNIT PRICE
A	ADDITIONAL SOIL: 1a: SELECT/STRUCTURAL FILL	CY	$_____
B	SOD	SY	$_____
C	UNDERCUT AND BACKFILL IN BUILDING CONTROL AREA	CY	$_____
D	CONCRETE SIDEWALK	SF	$_____
E	CAST-IN-PLACE CONCRETE	SF	$_____
F	GRAVEL	TN	$_____

G	FLOOR TILE AND MASTIC	SF	$_____
H	TRANSITE PIPE (ASBESTOS-CEMENT)	LF	$_____
I	TRANSITE SIDING AND PANELS	SF	$_____
J	TRANSITE DUCTWORK	LF	$_____
K	WINDOW GLAZING	LF	$_____
L	SPRAY-APPLIED CEILING TEXTURE	SF	$_____
M	THERMAL SYSTEM INSULATION	LF	$_____
N	PIPE INSULATION – RUNS, ELBOWS, AND JOINTS	LF	$_____
O	ROOFING MATERIALS – FELTS, FLASHINGS, MASTICS	SF	$_____
P	PLASTER SYSTEMS	SF	$_____
Q	CEILING TILES	SF	$_____
R	FIRE DOORS	EA	$_____
S	GASKETS AND PACKINGS	LF	$_____

Abbreviations: Each Item (EA), Ton (TN), Cubic Yard (CY), Square Yard (SY), Cubic Foot (CF), Square Foot (SF), Linear Foot (LF), Acre (AC).

SIGNED this _____ day of _____, 2026.

CONTRACTOR

_____
(Contractor Company Name)

By:

_____
_____
(Signee's Printed Name and Title)

ATTACHMENT "B"
TO PROPOSAL FORM

GENERAL CONTRACTOR _____

SUB-CONTRACTOR LISTING: Submit the following Subcontractor's company names with the Proposal Form NO LATER THAN 2:00 PM local time on Bid Date, or at the Contractor's option, deliver to Owner with copy to Architect within twenty-four (24) hours of the scheduled Bid Opening.

02 4100 – DEMOLITION	Firm Name: _____ Location (City/ State): _____
03 3000 – CAST IN PLACE CONCRETE	Firm Name: _____ Location (City/ State): _____
03 3660 – USER-SEALED CONCRETE FLOOR	Firm Name: _____ Location (City/ State): _____
03 3680 – CONCRETE POLISHING	Firm Name: _____ Location (City/ State): _____
03 3931 – CURING, SEALING AND HARDENING CONCRETE FLOORS	Firm Name: _____ Location (City/ State): _____
05 5000 – METAL FABRICATIONS	Firm Name: _____ Location (City/ State): _____

05 5133 – METAL LADDERS	Firm Name: _____ Location (City/ State): _____
05 5213 – PIPE AND TUBE RAILINGS	Firm Name: _____ Location (City/ State): _____
06 1000 – ROUGH CARPENTRY	Firm Name: _____ Location (City/ State): _____
07 1300 – SHEET WATERPROOFING	Firm Name: _____ Location (City/ State): _____
07 1400 – FLUID-APPLIED WATERPROOFING	Firm Name: _____ Location (City/ State): _____
07 8400 – FIRESTOPPING	Firm Name: _____ Location (City/ State): _____
07 9200 – JOINT SEALERS	Firm Name: _____ Location (City/ State): _____
08 1113 – STEEL DOORS AND FRAMES	Firm Name: _____

	Location (City/ State): _____
08 3100 – ACCESS DOORS AND PANELS	Firm Name: _____ Location (City/ State): _____
08 8000 – GLAZING	Firm Name: _____ Location (City/ State): _____
08 9100 – LOUVERS	Firm Name: _____ Location (City/ State): _____
09 2116 – GYPSUM BOARD ASSEMBLIES	Firm Name: _____ Location (City/ State): _____
09 3000 – TILING	Firm Name: _____ Location (City/ State): _____
09 5100 – ACOUSTICAL CEILINGS	Firm Name: _____ Location (City/ State): _____
09 6500 – RESILIENT FLOORING	Firm Name: _____ Location (City/ State): _____
09 9100 – PAINTING	Firm Name: _____

	Location (City/ State): _____
DIVISION 22 – PLUMBING	Firm Name: _____ Location (City/ State): _____
DIVISION 23 – HVAC	Firm Name: _____ Location (City/ State): _____
DIVISION 26 – ELECTRICAL	Firm Name: _____ Location (City/ State): _____
DIVISION 31 – EARTHWORK	Firm Name: _____ Location (City/ State): _____
32 3500 – SITE SCREENING DEVICES	Firm Name: _____ Location (City/ State): _____
33 1000 – WATER UTILITIES	Firm Name: _____ Location (City/ State): _____
33 3000 – SANITARY SEWERAGE UTILITIES	Firm Name: _____ Location (City/ State): _____
33 4001 – STORM DRAINAGE	

	Firm Name: _____ Location (City/ State): _____
***** OTHER PRIMARY SUBCONTRACTORS NOT LISTED ABOVE *****	
	Firm Name: _____ Location (City/ State): _____
	Firm Name: _____ Location (City/ State): _____
	Firm Name: _____ Location (City/ State): _____
	Firm Name: _____ Location (City/ State): _____
	Firm Name: _____ Location (City/ State): _____
	Firm Name: _____ Location (City/ State): _____

	Firm Name: _____ Location (City/ State): _____

SECTION 00 4000.08
ALABAMA E-VERIFY GUIDANCE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. ALABAMA IMMIGRATION INFORMATION CENTER GUIDANCE AND FORMS follow herein and are available at www.immigration.alabama.gov/eVerify.

1.2 LISTED DOCUMENTS

A. E-Verify Memorandum of Understanding.

B. Business Entity Employer Contractor Compliance Form.

C. Subcontractor to be given to Contractor Compliance Form.

END OF SECTION

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THE E-VERIFY PROGRAM FOR EMPLOYMENT VERIFICATION MEMORANDUM OF UNDERSTANDING FOR EMPLOYERS USING A E-VERIFY EMPLOYER AGENT

ARTICLE I

PURPOSE AND AUTHORITY

This Memorandum of Understanding (MOU) sets forth the points of agreement between the Department of Homeland Security (DHS), _____(Employer), and _____ (E-Verify Employer Agent) regarding the Employer's and E-Verify Employer Agent's participation in the Employment Eligibility Verification Program (E-Verify). This MOU explains certain features of the E-Verify program and enumerates specific responsibilities of DHS, the Social Security Administration (SSA), the Employer, and the E-Verify Employer Agent. References to the Employer include the E-Verify Employer Agent when acting on behalf of the Employer. E-Verify is a program that electronically confirms an employee's eligibility to work in the United States after completion of the Employment Eligibility Verification Form (Form I-9). For covered government contractors, E-Verify is used to verify the employment eligibility of all newly hired employees and all existing employees assigned to Federal contracts or to verify the entire workforce if the contractor so chooses.

Authority for the E-Verify program is found in Title IV, Subtitle A, of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA), Pub. L. 104-208, 110 Stat. 3009, as amended (8 U.S.C. § 1324a note). Authority for use of the E-Verify program by Federal contractors and subcontractors covered by the terms of Subpart 22.18, "Employment Eligibility Verification", of the Federal Acquisition Regulation (FAR) (hereinafter referred to in this MOU as a "Federal contractor with the FAR E-Verify clause") to verify the employment eligibility of certain employees working on Federal contracts is also found in Subpart 22.18 and in Executive Order 12989, as amended.

ARTICLE II

FUNCTIONS TO BE PERFORMED

A. RESPONSIBILITIES OF SSA

1. SSA agrees to provide the Employer (through the E-Verify Employer Agent) with available information that will allow the Employer to confirm the accuracy of Social Security Numbers provided by all employees verified under this MOU and the employment authorization of U.S. citizens.

2. SSA agrees to provide the Employer and E-Verify Employer Agent appropriate assistance with operational problems that may arise during the Employer's participation in E-Verify. SSA agrees to provide the E-Verify Employer Agent with names, titles, addresses, and telephone numbers of SSA representatives to be contacted during the E-Verify process.

3. SSA agrees to safeguard the information provided by the Employer through the E-Verify program procedures, and to limit access to such information, as appropriate by law, to individuals responsible for the verification of Social Security Numbers and for

evaluation of E-Verify or such other persons or entities who may be authorized by SSA as governed by the Privacy Act (5 U.S.C. § 552a), the Social Security Act (42 U.S.C. 1306(a)), and SSA regulations (20 CFR Part 401).

4. SSA agrees to provide a means of automated verification that is designed (in conjunction with DHS's automated system if necessary) to provide confirmation or tentative nonconfirmation of U.S. citizens' employment eligibility within 3 Federal Government work days of the initial inquiry.

5. SSA agrees to provide a means of secondary verification (including updating SSA records as may be necessary) for employees who contest SSA tentative nonconfirmations that is designed to provide final confirmation or nonconfirmation of U.S. citizens' employment eligibility and accuracy of SSA records for both citizens and non-citizens within 10 Federal Government work days of the date of referral to SSA, unless SSA determines that more than 10 days may be necessary. In such cases, SSA will provide additional verification instructions.

B. RESPONSIBILITIES OF DHS

1. After SSA verifies the accuracy of SSA records for employees through E-Verify, DHS agrees to provide the Employer (through the E-Verify Employer Agent) access to selected data from DHS's database to enable the Employer (through the E-Verify Employer Agent) to conduct, to the extent authorized by this MOU:

- Automated verification checks on employees by electronic means, and
- Photo verification checks (when available) on employees.

2. DHS agrees to provide to the Employer and E-Verify Employer Agent appropriate assistance with operational problems that may arise during the Employer's participation in E-Verify. DHS agrees to provide the E-Verify Employer Agent names, titles, addresses, and telephone numbers of DHS representatives to be contacted during the E-Verify process.

3. DHS agrees to make available to the Employer (through the E-Verify Employer Agent), at the E-Verify Web site and on the E-Verify Web browser, instructional materials on E-Verify policies, procedures and requirements for both SSA and DHS, including restrictions on the use of E-Verify. DHS agrees to provide training materials on E-Verify.

4. DHS agrees to provide to the Employer (through the E-Verify Employer Agent) a notice, which indicates the Employer's participation in the E-Verify program. DHS also agrees to provide to the Employer (through the E-Verify Employer Agent) anti-discrimination notices issued by the Office of Special Counsel for Immigration-Related Unfair Employment Practices (OSC), Civil Rights Division, U.S. Department of Justice.

5. DHS agrees to issue the E-Verify Employer Agent a user identification number and password that will be used exclusively by the E-Verify Employer Agent, on behalf of the Employer, to verify information provided by employees with DHS's databases.

6. DHS agrees to safeguard the information provided to DHS by the Employer (through the E-Verify Employer Agent), and to limit access to such information to individuals responsible for the verification of employees' employment eligibility and for evaluation of the E-Verify program, or to such other persons or entities as may be authorized by applicable law. Information will be used only to verify the accuracy of Social Security Numbers and employment eligibility, to enforce the Immigration and Nationality Act (INA) and Federal criminal laws, and to administer Federal contracting requirements.

7. DHS agrees to provide a means of automated verification that is designed (in conjunction with SSA verification procedures) to provide confirmation or tentative nonconfirmation of employees' employment eligibility within 3 Federal Government workdays of the initial inquiry.

8. DHS agrees to provide a means of secondary verification (including updating DHS records as may be necessary) for employees who contest DHS tentative nonconfirmations and photo non-match tentative nonconfirmations that is designed to provide final confirmation or nonconfirmation of the employees' employment eligibility within 10 Federal Government work days of the date of referral to DHS, unless DHS determines that more than 10 days may be necessary. In such cases, DHS will provide additional verification instructions.

C. RESPONSIBILITIES OF THE EMPLOYER

1. The Employer agrees to display the notices supplied by DHS (through the E-Verify Employer Agent) in a prominent place that is clearly visible to prospective employees and all employees who are to be verified through the system.

2. The Employer agrees to provide to the SSA and DHS the names, titles, addresses, and telephone numbers of the Employer representatives to be contacted regarding E-Verify.

3. The Employer agrees to become familiar with and comply with the most recent version of the E-Verify User Manual. The Employer will obtain the E-Verify User Manual from the E-Verify Employer Agent.

4. The Employer agrees to comply with current Form I-9 procedures, with two exceptions:

   - If an employee presents a "List B" identity document, the Employer agrees to only accept "List B" documents that contain a photo. (List B documents identified in 8 C.F.R. § 274a.2(b)(1)(B)) can be presented during the Form I-9 process to establish identity.) If an employee objects to the photo requirement for religious reasons, the Employer should contact E-Verify at 1-888-464-4218.

   - If an employee presents a DHS Form I-551 (Permanent Resident Card) or Form I-766 (Employment Authorization Document) to complete the Form I-9, the Employer agrees to make a photocopy of the document and to retain the photocopy with the employee's Form I-9. The photocopy must be of sufficient quality to allow for verification of the photo and written information. The employer will use the photocopy to verify the photo and to assist DHS with its review of photo non-matches that are contested by employees. Note that employees

retain the right to present any List A, or List B and List C, documentation to complete the Form I-9. DHS may in the future designate other documents that activate the photo screening tool.

5. The Employer understands that participation in E-Verify does not exempt the Employer from the responsibility to complete, retain, and make available for inspection Forms I-9 that relate to its employees, or from other requirements of applicable regulations or laws, including the obligation to comply with the antidiscrimination requirements of section 274B of the INA with respect to Form I-9 procedures, except for the following modified requirements applicable by reason of the Employer's participation in E-Verify: (1) identity documents must have photos, as described in paragraph 4 above; (2) a rebuttable presumption is established that the Employer has not violated section 274A(a)(1)(A) of the Immigration and Nationality Act (INA) with respect to the hiring of any individual if it obtains confirmation of the identity and employment eligibility of the individual in good faith compliance with the terms and conditions of E-Verify; (3) the Employer must notify DHS if it continues to employ any employee after receiving a final nonconfirmation, and is subject to a civil money penalty between $550 and $1,100 for each failure to notify DHS of continued employment following a final nonconfirmation; (4) the Employer is subject to a rebuttable presumption that it has knowingly employed an unauthorized alien in violation of section 274A(a)(1)(A) if the Employer continues to employ an employee after receiving a final nonconfirmation; and (5) no person or entity participating in E-Verify is civilly or criminally liable under any law for any action taken in good faith based on information provided through the confirmation system. DHS reserves the right to conduct Form I-9 and E-Verify system compliance inspections during the course of E-Verify, as well as to conduct any other enforcement activity authorized by law.

6. The Employer agrees to initiate E-Verify verification procedures (through the E-Verify Employer Agent), for new employees within 3 Employer business days after each employee has been hired (but after both sections 1 and 2 of the Form I-9 have been completed), and to complete as many (but only as many) steps of the E-Verify process as are necessary according to the E-Verify User Manual, or in the case of Federal contractors with the FAR E-Verify clause, the E-Verify User Manual for Federal Contractors. The Employer is prohibited from initiating verification procedures before the employee has been hired and the Form I-9 completed. If the automated system to be queried is temporarily unavailable, the 3-day time period is extended until it is again operational in order to accommodate the Employer's attempting, in good faith, to make inquiries during the period of unavailability. Employers may initiate verification, through the E-Verify Employer Agent, by notating the Form I-9 in circumstances where the employee has applied for a Social Security Number (SSN) from the SSA and is waiting to receive the SSN, provided that the Employer (through the E-Verify Employer Agent) performs an E-Verify employment verification query using the employee's SSN as soon as the SSN becomes available.

7. The Employer agrees not to use E-Verify procedures for pre-employment screening of job applicants, in support of any unlawful employment practice, or for any other use not authorized by this MOU. Employers must use E-Verify (through its E-Verify Employer Agent) for all new employees, unless an Employer is a Federal contractor that qualifies for the exceptions described in Article II.D.1.c. Except as provided in

Article II.D, the Employer will not verify selectively and will not verify employees hired before the effective date of this MOU. The Employer understands that if the Employer uses the E-Verify system for any purpose other than as authorized by this MOU, the Employer may be subject to appropriate legal action and termination of its access to SSA and DHS information pursuant to this MOU.

8. The Employer (through its E-Verify Employer Agent) agrees to follow appropriate procedures (see Article III. below) regarding tentative nonconfirmations, including notifying employees in private of the finding and providing them written notice of the findings, providing written referral instructions to employees, allowing employees to contest the finding, and not taking adverse action against employees if they choose to contest the finding. Further, when employees contest a tentative nonconfirmation based upon a photo non-match, the Employer is required to take affirmative steps (see Article III.B. below) to contact DHS with information necessary to resolve the challenge.

9. The Employer agrees not to take any adverse action against an employee based upon the employee's perceived employment eligibility status while SSA or DHS is processing the verification request unless the Employer obtains knowledge (as defined in 8 C.F.R. § 274a.1(l)) that the employee is not work authorized. The Employer understands that an initial inability of the SSA or DHS automated verification system to verify work authorization, a tentative nonconfirmation, a case in continuance (indicating the need for additional time for the government to resolve a case), or the finding of a photo non-match, does not establish, and should not be interpreted as evidence, that the employee is not work authorized. In any of the cases listed above, the employee must be provided a full and fair opportunity to contest the finding, and if he or she does so, the employee may not be terminated or suffer any adverse employment consequences based upon the employee's perceived employment eligibility status (including denying, reducing, or extending work hours, delaying or preventing training, requiring an employee to work in poorer conditions, refusing to assign the employee to a Federal contract or other assignment, or otherwise subjecting an employee to any assumption that he or she is unauthorized to work, or otherwise mistreating an employee) until and unless secondary verification by SSA or DHS has been completed and a final nonconfirmation has been issued. If the employee does not choose to contest a tentative nonconfirmation or a photo non-match or if a secondary verification is completed and a final nonconfirmation is issued, then the Employer can find the employee is not work authorized and terminate the employee's employment. Employers or employees with questions about a final nonconfirmation may call E-Verify at 1-888-464-4218 or OSC at 1-800-255-8155 or 1-800-237-2515 (TDD).

10. The Employer agrees to comply with Title VII of the Civil Rights Act of 1964 and section 274B of the INA, as applicable, by not discriminating unlawfully against any individual in hiring, firing, or recruitment or referral practices because of his or her national origin or, in the case of a protected individual as defined in section 274B(a)(3) of the INA, because of his or her citizenship status. The Employer understands that such illegal practices can include selective verification or use of E-Verify except as provided in part D below, or discharging or refusing to hire employees because they appear or sound "foreign" or have received tentative nonconfirmations. The Employer further understands that any violation of the unfair

immigration-related employment practices provisions in section 274B of the INA could subject the Employer to civil penalties, back pay awards, and other sanctions, and violations of Title VII could subject the Employer to back pay awards, compensatory and punitive damages. Violations of either section 274B of the INA or Title VII may also lead to the termination of its participation in E-Verify. If the Employer has any questions relating to the anti-discrimination provision, it should contact OSC at 1-800-255-8155 or 1-800-237-2515 (TDD).

11. The Employer agrees to record the case verification number on the employee's Form I-9 or to print the screen containing the case verification number and attach it to the employee's Form I-9.

12. The Employer agrees that it will use the information it receives from SSA or DHS (through the E-Verify Employer Agent) pursuant to E-Verify and this MOU only to confirm the employment eligibility of employees as authorized by this MOU. The Employer agrees that it will safeguard this information, and means of access to it (such as PINS and passwords) to ensure that it is not used for any other purpose and as necessary to protect its confidentiality, including ensuring that it is not disseminated to any person other than employees of the Employer who are authorized to perform the Employer's responsibilities under this MOU, except for such dissemination as may be authorized in advance by SSA or DHS for legitimate purposes.

13. The Employer acknowledges that the information which it receives through the E-Verify Employer Agent from SSA is governed by the Privacy Act (5 U.S.C. § 552a(i)(1) and (3)) and the Social Security Act (42 U.S.C. 1306(a)), and that any person who obtains this information under false pretenses or uses it for any purpose other than as provided for in this MOU may be subject to criminal penalties.

14. The Employer agrees to cooperate with DHS and SSA in their compliance monitoring and evaluation of E-Verify, including by permitting DHS and SSA, upon reasonable notice, to review Forms I-9 and other employment records and to interview it and its employees regarding the Employer's use of E-Verify, and to respond in a timely and accurate manner to DHS requests for information relating to their participation in E-Verify.

D. RESPONSIBILITIES OF FEDERAL CONTRACTORS WITH THE FAR E-VERIFY CLAUSE

1. The Employer understands that if it is a Federal contractor subject to the employment verification terms in Subpart 22.18 of the FAR it must verify the employment eligibility of any existing employee assigned to the contract and all new hires, as discussed in the Supplemental Guide for Federal Contractors. Once an employee has been verified through E-Verify by the Employer, the Employer may not reverify the employee through E-Verify.

    a. Federal contractors with the FAR E-Verify clause agree to become familiar with and comply with the most recent versions of the E-Verify User Manual for Federal Contractors and the E-Verify Supplemental Guide for Federal Contractors.

b. Federal contractors with the FAR E-Verify clause agree to complete a tutorial for Federal contractors with the FAR E-Verify clause.

c. Federal contractors with the FAR E-Verify clause not enrolled at the time of contract award: An Employer that is not enrolled in E-Verify as a Federal contractor at the time of a contract award must enroll as a Federal contractor with the FAR E-Verify clause in E-Verify within 30 calendar days of contract award and, within 90 days of enrollment, begin to use E-Verify to initiate verification of employment eligibility of new hires of the Employer who are working in the United States, whether or not assigned to the contract. Once the Employer begins verifying new hires, such verification of new hires must be initiated within 3 business days after the date of hire. Once enrolled in E-Verify as a Federal contractor with the FAR E-Verify clause, the Employer must initiate verification of employees assigned to the contract within 90 calendar days from the time of enrollment in the system and then selecting which employees will be verified in E-Verify or within 30 days of an employee's assignment to the contract, whichever date is later.

d. Employer that are already enrolled in E-Verify at the time of a contract award but are not enrolled in the system as a Federal contractor with the FAR E-Verify clause: Employers enrolled in E-Verify as a Federal contractor for 90 days or more at the time of a contract award must use E-Verify to initiate verification of employment eligibility for new hires of the Employer who are working in the United States, whether or not assigned to the contract, within 3 business days after the date of hire. Employers enrolled in E-Verify as other than a Federal contractor with the FAR E-Verify clause, must update E-Verify to indicate that they are a Federal contractor with the FAR E-Verify clause within 30 days after assignment to the contract. If the Employer is enrolled in E-Verify for 90 calendar days or less at the time of contract award, the Employer must, within 90 days of enrollment, begin to use E-Verify to initiate verification of new hires of the contractor who are working in the United States, whether or not assigned to the contract. Such verification of new hires must be initiated within 3 business days after the date of hire. An Employer enrolled as a Federal contractor with the FAR E-Verify clause in E-Verify must initiate verification of each employee assigned to the contract within 90 calendar days after date of contract award or within 30 days after assignment to the contract, whichever is later.

e. Institutions of higher education, State, local and tribal governments and sureties: Federal contractors with the FAR E-Verify clause that are institutions of higher education (as defined at 20 U.S.C. 1001(a)), State or local governments, governments of Federally recognized Indian tribes, or sureties performing under a takeover agreement entered into with a Federal agency pursuant to a performance bond may choose to only verify new and existing employees assigned to the Federal contract. Such Federal contractors with the FAR E-Verify clause may, however, elect to verify all new hires, and/or all existing employees hired after November 6, 1986. The provisions of Article II, part D, paragraphs 1.a and 1.b of this MOU providing timeframes for initiating employment verification of employees assigned to a

contract apply to such institutions of higher education, State, local , tribal governments, and sureties.

f. Verification of all employees: Upon enrollment, Employers who are Federal contractors with the FAR E-Verify clause may elect to verify employment eligibility of all existing employees working in the United States who were hired after November 6, 1986, instead of verifying only new employees and those existing employees assigned to a covered Federal contract. After enrollment, Employers must elect to do so only in the manner designated by DHS and initiate E-Verify verification of all existing employees within 180 days after the election.

g. Form I-9 procedures for existing employees of Federal contractors with the FAR E-Verify clause: Federal contractors with the FAR E-Verify clause (through their E-Verify Employer Agent) may choose to complete new Forms I-9 for all existing employees other than those that are completely exempt from this process. Federal contractors with the FAR E-Verify clause may also update previously completed Forms I-9 to initiate E-Verify verification of existing employees who are not completely exempt as long as that Form I-9 is complete (including the SSN), complies with Article II.C.4, the employee's work authorization has not expired, and the Employer has reviewed the information reflected in the Form I-9 either in person or in communications with the employee to ensure that the employee's stated basis in section 1 of the Form I-9 for work authorization has not changed (including, but not limited to, a lawful permanent resident alien having become a naturalized U.S. citizen). If the Employer is unable to determine that the Form I-9 complies with Article II.C.4, if the employee's basis for work authorization as attested in section 1 has expired or changed, or if the Form I-9 contains no SSN or is otherwise incomplete, the Employer shall complete a new I-9 consistent with Article II.C.4, or update the previous I-9 to provide the necessary information. If section 1 of the Form I-9 is otherwise valid and up-to-date and the form otherwise complies with Article II.C.4, but reflects documentation (such as a U.S. passport or Form I-551) that expired subsequent to completion of the Form I-9, the Employer shall not require the production of additional documentation, or use the photo screening tool described in Article II.C.4, subject to any additional or superseding instructions that may be provided on this subject in the Supplemental Guide for Federal Contractors. Nothing in this section shall be construed to require a second verification using E-Verify of any assigned employee who has previously been verified as a newly hired employee under this MOU, or to authorize verification of any existing employee by any Employer that is not a Federal contractor with the FAR E-Verify clause.

2. The Employer understands that if it is a Federal contractor with the FAR E-Verify clause, its compliance with this MOU is a performance requirement under the terms of the Federal contract or subcontract, and the Employer consents to the release of information relating to compliance with its verification responsibilities under this MOU to contracting officers or other officials authorized to review the Employer's compliance with Federal contracting requirements.

E. RESPONSIBILITIES OF THE E-VERIFY EMPLOYER AGENT

1. The E-Verify Employer Agent agrees to provide to the SSA and DHS the names, titles, addresses, and telephone numbers of the E-Verify Employer Agent representatives who will be accessing information under E-Verify.

2. The E-Verify Employer Agent agrees to become familiar with and comply with the E-Verify User Manual and provide a copy of the manual to the Employer so that the Employer can become familiar with and comply with E-Verify policy and procedures.

3. The E-Verify Employer Agent agrees that any E-Verify Employer Agent Representative who will perform employment verification queries will complete the E-Verify Tutorial before that individual initiates any queries.

    a. The E-Verify Employer Agent agrees that all E-Verify Employer Agent representatives will take the refresher tutorials initiated by the E-Verify program as a condition of continued use of E-Verify, including any tutorials for Federal contractors if the Employer is a Federal contractor.

    b. Failure to complete a refresher tutorial will prevent the E-Verify Employer Agent and Employer from continued use of the program.

4. The E-Verify Employer Agent agrees to obtain the necessary equipment to utilize E-Verify.

5. The E-Verify Employer Agent agrees to provide the Employer with the notices described in Article II.B.4 above.

6. The E-Verify Employer Agent agrees to initiate E-Verify procedures on behalf of the Employer in accordance with the E-Verify Manual and E-Verify Web-Based Tutorial. The E-Verify Employer Agent will query the automated system using information provided by the Employer and will immediately communicate the response back to the Employer. If the automated system to be queried is temporarily unavailable, the 3-day time period is extended until it is again operational in order to accommodate the E-Verify Employer Agent's attempting, in good faith, to make inquiries on behalf of the Employer during the period of unavailability. In all cases, the E-Verify Employer Agent will use the SSA verification procedures first, and will use DHS verification procedures only as directed by the SSA verification response.

7. The E-Verify Employer Agent agrees to cooperate with DHS and SSA in their compliance monitoring and evaluation of E-Verify, including by permitting DHS and SSA, upon reasonable notice, to review Forms I-9 and other employment records and to interview it and its employees regarding the use of E-Verify, and to respond in a timely and accurate manner to DHS requests for information relating to their participation in E-Verify.

ARTICLE III

REFERRAL OF INDIVIDUALS TO SSA AND DHS

A. REFERRAL TO SSA

1. If the Employer receives a tentative nonconfirmation issued by SSA, the Employer must print the tentative nonconfirmation notice as directed by the automated system and provide it to the employee so that the employee may determine whether he or she will contest the tentative nonconfirmation.

2. The Employer will refer employees to SSA field offices only as directed by the automated system based on a tentative nonconfirmation, and only after the Employer records the case verification number, reviews the input to detect any transaction errors, and determines that the employee contests the tentative nonconfirmation. The Employer (through the E-Verify Employer Agent), will transmit the Social Security Number to SSA for verification again if this review indicates a need to do so. The Employer will determine whether the employee contests the tentative nonconfirmation as soon as possible after the Employer receives it.

3. If the employee contests an SSA tentative nonconfirmation, the Employer will provide the employee with a system-generated referral letter and instruct the employee to visit an SSA office within 8 Federal Government work days. SSA will electronically transmit the result of the referral to the Employer (through the E-Verify Employer Agent) within 10 Federal Government work days of the referral unless it determines that more than 10 days is necessary. The Employer agrees to check the E-Verify system regularly for case updates.

4. The Employer agrees not to ask the employee to obtain a printout from the Social Security Number database (the Numident) or other written verification of the Social Security Number from the SSA.

B. REFERRAL TO DHS

1. If the Employer receives a tentative nonconfirmation issued by DHS, the Employer must print the tentative nonconfirmation notice as directed by the automated system and provide it to the employee so that the employee may determine whether he or she will contest the tentative nonconfirmation.

2. If the Employer finds a photo non-match for an employee who provides a document for which the automated system has transmitted a photo, the employer must print the photo non-match tentative nonconfirmation notice as directed by the automated system and provide it to the employee so that the employee may determine whether he or she will contest the finding.

3. The Employer agrees to refer individuals to DHS only when the employee chooses to contest a tentative nonconfirmation received from DHS automated verification process or when the Employer issues a tentative nonconfirmation based upon a photo non-match. The Employer will determine whether the employee contests the tentative nonconfirmation as soon as possible after the Employer receives it.

4. If the employee contests a tentative nonconfirmation issued by DHS, the Employer will provide the employee with a referral letter and instruct the employee to contact

DHS through its toll-free hotline (as found on the referral letter) within 8 Federal Government work days.

5. If the employee contests a tentative nonconfirmation based upon a photo non-match, the Employer will provide the employee with a referral letter to DHS. DHS will electronically transmit the result of the referral to the Employer within 10 Federal Government work days of the referral unless it determines that more than 10 days is necessary. The Employer agrees to check the E-Verify system regularly for case updates.

6. The Employer agrees that if an employee contests a tentative nonconfirmation based upon a photo non-match, the Employer (or the E-Verify Employer Agent) will send a copy of the employee's Form I-551 or Form I-766 to DHS for review by:
   - Scanning and uploading the document, or
   - Sending a photocopy of the document by and express mail account (pain for at employer expense).
7. If the Employer (through the E-Verify Employer Agent) determines that there is a photo non-match when comparing the photocopied List B document described in Article II.C.4 with the image generated in E-Verify, the Employer (through the E-Verify Employer Agent) must forward the employee's documentation to DHS using one of the means described in the preceding paragraph, and allow DHS to resolve the case.

ARTICLE IV

SERVICE PROVISIONS

The SSA and DHS will not charge the Employer or the E-Verify Employer Agent for verification services performed under this MOU. DHS is not responsible for providing the equipment needed to make inquiries. A personal computer with Internet access is needed to access the E-Verify System.

ARTICLE V

PARTIES

A. This MOU is effective upon the signature of all parties, and shall continue in effect for as long as the SSA and DHS conduct the E-Verify program unless modified in writing by the mutual consent of all parties, or terminated by any party upon 30 days prior written notice to the others. Any and all system enhancements to the E-Verify program by DHS or SSA, including but not limited to the E-Verify checking against additional data sources and instituting new verification procedures, will be covered under this MOU and will not cause the need for a supplemental MOU that outlines these changes. DHS agrees to train employers on all changes made to E-Verify through the use of mandatory refresher tutorials and updates to the E-Verify User Manual, the E-Verify User Manual for Federal Contractors, or the E-Verify Supplemental Guide for Federal Contractors. Even without changes to E-Verify, DHS reserves the right to require employers to take mandatory refresher tutorials. An Employer that is a Federal contractor with the FAR E-Verify clause may terminate this MOU when the Federal contract that requires its participation in E-Verify is terminated or

completed. In such a circumstance, the Federal contractor with the FAR E-Verify clause must provide written notice to DHS. If an Employer that is a Federal contractor with the FAR E-Verify clause fails to provide such notice, that Employer will remain a participant in the E-Verify program, will remain bound by the terms of this MOU that apply to participants that are not Federal contractors with the FAR E-Verify clause, and will be required to use the E-Verify procedures to verify the employment eligibility of all newly hired employees.

B. Notwithstanding Article V, part A of this MOU, DHS may terminate access to E-Verify if it is deemed necessary because of the requirements of law or policy, or upon a determination by SSA or DHS that there has been a breach of system integrity or security by the E-Verify Employer Agent or the Employer, or a failure on the part of either to comply with established procedures or legal requirements. The Employer understands that if it is a Federal contractor with the FAR E-Verify clause, termination of this MOU by any party for any reason may negatively affect the Employer's performance of its contractual responsibilities.

C. Some or all SSA and DHS responsibilities under this MOU may be performed by contractor(s), and SSA and DHS may adjust verification responsibilities between each other as they may determine necessary. By separate agreement with DHS, SSA has agreed to perform its responsibilities as described in this MOU.

D. Nothing in this MOU is intended, or should be construed, to create any right or benefit, substantive or procedural, enforceable at law by any third party against the United States, its agencies, officers, or employees, or against the E-Verify Employer Agent, the Employer, or their agents, officers, or employees.

E. Each party shall be solely responsible for defending any claim or action against it arising out of or related to E-Verify or this MOU, whether civil or criminal, and for any liability wherefrom, including (but not limited to) any dispute between the E-Verify Employer Agent or the Employer and any other person or entity regarding the applicability of Section 403(d) of IIRIRA to any action taken or allegedly taken by the E-Verify Employer Agent or the Employer.

F. Participation in E-Verify is not confidential information and may be disclosed as authorized or required by law and DHS or SSA policy, including but not limited to, Congressional oversight, E-Verify publicity and media inquiries, determinations of compliance with Federal contractual requirements, and responses to inquiries under the Freedom of Information Act (FOIA).

G. The foregoing constitutes the full agreement on this subject between DHS, the Employer and the E-Verify Employer Agent.

_____(Employer) hereby designates and appoints_____(E-Verify Employer Agent), including its officers and employees, as the E-Verify Employer Agent for the purpose of carrying out_____(Employer) responsibilities under the MOU between the Employer, the E-Verify Employer Agent, and DHS.

The individuals whose signatures appear below represent that they are authorized to enter into this MOU on behalf of the Employer, the E-Verify Employer Agent and DHS respectively.

If you have any questions, contact E-Verify at 1-888-464-4218.

FORM FOR SECTIONS 9 (a) and (b) BEASON-HAMMON ALABAMA TAXPAYER AND CITIZEN PROTECTION ACT; CODE OF ALABAMA, SECTIONS 31-13-9 (a) and (b)

AFFIDAVIT FOR BUSINESS ENTITY/EMPLOYER /CONTRACTOR
(To be completed as a condition for the award of any contract, grant, or incentive by the State of Alabama, any political subdivision thereof, or any state-funded entity to a business entity or employer that employs one or more employees)

State of _____

County of _____

Before me, a notary public, personally appeared _____ (print name) who, being duly sworn, says as follows:

As a condition for the award of any contract, grant, or incentive by the State of Alabama, any political subdivision thereof, or any state-funded entity to a business entity or employer that employs one or more employees, I hereby attest that in my capacity as _____(state position) for _____ _____ (state business entity/employer/contractor name) that said business entity/employer/contractor shall not knowingly employ, hire for employment, or continue to employ an unauthorized alien.

I further attest that said business entity/employer/contractor is enrolled in the E-Verify program. (ATTACH DOCUMENTATION ESTABLISHING THAT BUSINESS ENTITY/EMPLOYER/CONTRACTOR IS ENROLLED IN THE E-VERIFY PROGRAM)

_____Signature of Affiant

Sworn to and subscribed before me this _____day of _____, 2____.

I certify that the affiant is known (or made known) to me to be the identical party he or she claims to be.

_____Signature and Seal of Notary Public

Author: Jean Brown
Statutory Authority: Code of Alabama, sections 31-13-9 (a) and (b); Section 31-13-9 (h).
History: **New Rule:** Filed December 12, 2011; effective December 12, 2011

FORM FOR SECTION 9 (d) BEASON-HAMMON ALABAMA TAXPAYER AND CITIZEN PROTECTION ACT; CODE OF ALABAMA, SECTION 31-13-9 (d)

AFFIDAVIT OF DIRECT SUBCONTRACTOR TO BE GIVEN TO CONTRACTOR

State of _____

County of _____

Before me, a notary public, personally appeared _____(print name) who, being duly sworn, says as follows:

I hereby attest that as _____(state position) for the direct subcontractor _____(state business entity/employer/subcontractor name) for _____(state business entity/employer/contractor name) said direct subcontractor has not knowingly employed, hired for employment, or continued to employ an unauthorized alien. I further attest that I have verified each of the above-named direct subcontractor's employee's eligibility for employment. I further attest that I have in good faith complied with Code of Alabama, Section 31-13-9 (c)*

_____Signature of Affiant

Sworn to and subscribed before me this ____day of _____, 2_____.

I certify that the affiant is known (or made known) to me to be the identical party he or she claims to be.

_____Signature and Seal of Notary Public

*Code of Alabama, Section 31-13-9 (c) provides: "No subcontractor on a project paid for by contract, grant, or incentive by the state [of Alabama], any political subdivision thereof, or any state-funded entity shall knowingly employ, hire for employment, or continue to employ an unauthorized alien and shall attest to such by sworn affidavit signed before a notary. The subcontractor shall also enroll in the E-Verify program prior to performing any work on the project and shall attach to the sworn affidavit documentation establishing that the subcontractor is enrolled in the E-Verify program."

Author: Jean Brown
Statutory Authority: Code of Alabama, section 31-13-9 (d); Section 31-13-9 (h).

FACILITIES DIVISION

ACCS FORM 2-A

CONSTRUCTION CONTRACT

•Do not staple this form and/or attachments; use clips. Print single-sided; do not submit double-side printed documents.

1 **ACCS PROJECT#:**	

2 This Construction Contract is entered into this **31st** day of **<month>** in the year of **<year>**
3 between the **OWNER**, the Alabama Community College System on behalf of:

<Select Client>

Address:			
Email:		Phone:	

4 and the **CONTRACTOR,**

Company Name:			
Address:			
Email:		Phone:	

5 for the **WORK** of the Project identified as:

6 The **CONTRACT DOCUMENTS** are dated and have been amended by
7 **ADDENDA:**

Review/Initial of Regional Facilities Director _____

8 The **ARCHITECT** is

Firm Name:			
Address:			
Email:		Phone:	

9 The **CONTRACT SUM** is:

Dollars $

and is the sum of the Contractor's Base Bid for the Work and the following

10 **BID ALTERNATE PRICES**:

11 The **CONTRACT TIME** is ( ) calendar days

THE OWNER AND THE CONTRACTOR AGREE AS FOLLOWS: The Contract Documents, as defined in the General Conditions of the Contract (ACCS Form 2-B), are incorporated herein by reference. The Contractor shall perform the Work in accordance with the Contract Documents. The Owner will pay and the Contractor will accept as full compensation for such performance of the Work, the Contract Sum subject to additions and deductions (including liquidated damages) as provided in the Contract Documents. The Work shall commence on a date to be specified in a Notice to Proceed issued by the Chief Facilities Officer, ACCS Facilities Division, and shall then be substantially completed within the Contract Time.

12 **LIQUIDATED DAMAGES** for which the Contractor and its Surety (if any) shall be liable and may be required to pay the Owner in accordance with the Contract Documents shall be equal to six percent interest per annum on the total Contract Sum unless a dollar amount is stipulated in the following space, in which case liquidated damages shall be determined at:

Dollars ($) per calendar day

13 **SPECIAL PROVISIONS:** (Special Provisions may be inserted here, such as acceptance or rejection of unit prices. If Special Provisions are continued in an attachment, identify the attachment below).

14 **STATE GENERAL CONTRACTOR'S LICENSE:** The Contractor does hereby certify that Contractor is currently licensed by the Alabama State Licensing Board for General Contractors and that the certificate for such license bears the following:

License No.:		Expiration Date	
Bid Limit:		Classifications	

The Owner and Contractor have entered into this Construction Contract as of the date first written above and have executed this Construction Contract in sufficient counterparts to enable each contracting party to have an originally executed Construction Contract each of which shall, without proof or accounting for the other counterparts, be deemed an original thereof.

The Owner does hereby certify that this Construction Contract was let in accordance with the provisions of Title 39, Code of Alabama 1975, as amended, and all other applicable provisions of law, and that the terms and commitments of this Construction Contract do not constitute a debt of the State of Alabama in violation of Article 11, Section 213 of the Constitution of Alabama, 1901, as amended by Amendment No. 26.

15

APPROVALS

LOCAL COLLEGE OR TRADE SCHOOL

BY: _____

AS PRESIDENT OF

<Select Client>

ALABAMA COMMUNITY COLLEGE SYSTEM (ACCS)

BY: _____ DATE: _____

CHIEF FACILITIES OFFICER

CONTRACTING PARTIES

_____

CONTRACTOR COMPANY

BY: _____

SIGNATURE

NAME: _____

TITLE: _____

ALABAMA COMMUNITY COLLEGE SYSTEM
(AS OWNER)

BY: _____

CHANCELLOR

ATTACHMENTS:

- ☐ Copy of Alabama General Contractor's License
- ☐ Proposal Form **(ACCS Form 5-E)**
- ☐ List of all proposed major subcontractors and suppliers
- ☐ Accounting of Sales Tax **(ACCS Form 5-H)**
- ☐ Bid Tabulation
- ☐ Schedule of Values
- ☐ Certificate of Liability Insurance
- ☐ **Performance Bond (ACCS Form 2-C)**
- ☐ **Payment Bond (ACCS Form 2-D)**
- ☐ State of Alabama Disclosure Statement
- ☐ E-Verify Memorandum of Understanding
- ☐ **W-9** (Request for Taxpayer Identification Number and Certificate)

Review/Initial of Regional Facilities Director _____

FACILITIES DIVISION

ACCS FORM 2-B

GENERAL CONDITIONS *of the* CONTRACT

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Article 1
DEFINITIONS

Whenever the following terms, or pronouns in place of them, are used in the Contract Documents, the intent and meaning shall be interpreted as follows:

A **ACCS FACILITIES DIVISION:** The ACCS Facilities Division, which is responsible for oversight and management of all ACCS construction projects, pursuant to the policies and procedures adopted by the ACCS Board of Trustees.

B **ARCHITECT:** The Architect is the person or entity lawfully licensed to practice architecture in the State of Alabama, who is under contract with the Owner as the primary design professional for the Project and identified as the Architect in the Construction Contract. The term "Architect" means the Architect or the Architect's authorized representative. If the employment of the Architect is terminated, the Owner shall employ a new Architect whose status under the Contract Documents shall be that of the former Architect. If the primary design professional for the Project is a Professional Engineer, the term "Engineer" shall be substituted for the term "Architect" wherever it appears in this document.

C **CONTRACT:** The Contract is the embodiment of the Contract Documents. The Contract represents the entire and integrated agreement between the Owner and Contractor and supersedes any prior written or oral negotiations, representations or agreements that are not incorporated into the Contract Documents. The Contract may be amended only by a Contract Change Order or a Modification to the Construction Contract. The contractual relationship which the Contract creates between the Owner and the Contractor extends to no other persons or entities. The Contract consists of the following Contract Documents, including all additions, deletions, and modifications incorporated therein before the execution of the Construction Contract:

(1) Construction Contract
(2) Performance and Payment Bonds
(3) Conditions of the Contract (General, Supplemental, and other Conditions)
(4) Specifications
(5) Drawings
(6) Contract Change Orders
(7) Modifications to the Construction Contract (applicable to PSCA Projects)

D **CONTRACT SUM:** The Contract Sum is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. The term "Contract Sum" means the Contract Sum stated in the Construction Contract as may have been increased or decreased by Change Order(s) in accordance with the Contract Documents.

E **CONTRACT TIME:** The Contract Time is the period of time in which the Contractor must achieve Substantial Completion of the Work. The date on which the Contract Time begins is specified in the written Notice To Proceed issued to the Contractor by the Owner. The Date of Substantial Completion is the date established in accordance with Article 32. The term "Contract Time" means the Contract Time stated in the Construction Contract as may have been extended by Change Order(s) in accordance with the Contract Documents. The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

F **CONTRACTOR:** The Contractor is the person or persons, firm, partnership, joint venture, association, corporation, cooperative, limited liability company, or other legal entity, identified as such in the Construction Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

G **DEFECTIVE WORK:** The term "Defective Work" shall apply to: **(1)** any product, material, system, equipment, or service, or its installation or performance, which does not conform to the requirements of the Contract Documents, **(2)** in-progress or completed Work the workmanship of which does not conform to the quality specified or, if not specified, to the quality produced by skilled workers performing work of a similar nature on similar projects in the state, **(3)** substitutions and deviations not properly submitted and approved or otherwise authorized, **(4)** temporary supports, structures, or construction which will not produce the results required by the Contract Documents, and **(5)** materials or equipment rendered unsuitable for incorporation into the Work due to improper storage or protection.

H **CHIEF FACILITIES OFFICER:** The Director of the ACCS Facilities Division.

I **DRAWINGS:** The Drawings are the portions of the Contract Documents showing graphically the design, location, layout, and dimensions of the Work, in the form of plans, elevations, sections, details, schedules, and diagrams.

J **FINAL COMPLETION:** Stage in the project when all work specified in the contract has been completed and all contractual requirements have been satisfied.

K **NOTICE TO PROCEED:** A proceed order issued by the Owner, as applicable, fixing the date on which the Contractor shall begin the prosecution of the Work, which is also the date on which the Contract Time shall begin.

L **OWNER:** The Owner is the entity or entities identified as such in the Construction Contract and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative. The term "Owner" as used herein shall be synonymous with the term "Awarding Authority" as defined and used in Title 39 - Public Works, Code of Alabama, 1975, as amended.

M **THE PROJECT:** The Project is the total construction of which the Work required by these Contract Documents may be the entirety or only a part with other portions to be constructed by the Owner or separate contractors.

N **PRE-CLOSEOUT REVIEW:** Stage in the progress of the Work when the Work or designated portion of the Work is sufficiently complete and the remaining punch list items can be completed and reinspected within 30 days.

O **PROJECT MANUAL:** The Project Manual is the volume usually assembled for the Work which may include the Advertisement for Bids, Instructions to Bidders, sample forms, General Conditions of the Contract, Supplementary Conditions, and Specifications of the Work.

P **SPECIFICATIONS:** The Specifications are that portion of the Contract Documents which set forth in writing the standards of quality and performance of products, equipment, materials, systems, and services and workmanship required for acceptable performance of the Work.

Q **SUBCONTRACTOR:** A Subcontractor is a person or entity who is undertaking the performance of any part of the Work by virtue of a contract with the Contractor. The term "Subcontractor" means a Subcontractor or its authorized representatives.

R **SUBSTANTIAL COMPLETION:** Stage in the progress of the Work or designated portion of the work that all punch list items are completed, all change orders are executed, the Owner can occupy or utilize the Work for its intended use, warranties commence, Contractor is no longer liable for Liquidated Damages, and the Owner becomes responsible for security, utilities, insurance and maintenance.

S **THE WORK:** The Work is the construction and services required by the Contract Documents and includes all labor, materials, supplies, equipment, and other items and services as are necessary to produce the required construction and to fulfill the Contractor's obligations under the Contract. The Work may constitute the entire Project or only a portion of it.

Article 2
INTENT *and* INTERPRETATION *of the* CONTRACT DOCUMENTS

A INTENT
It is the intent of the Contract Documents that the Contractor shall properly execute and complete the Work described by the Contract Documents, and unless otherwise provided in the Contract, the Contractor shall provide all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, in full accordance with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

B COMPLEMENTARY DOCUMENTS
The Contract Documents are complementary. If Work is required by one Contract Document, the Contractor shall perform the Work as if it were required by all of the Contract Documents. However, the Contractor shall be required to perform Work only to the extent that is consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

C ORDER of PRECEDENCE
Should any discrepancy arise between the various elements of the Contract Documents, precedence shall be given to them in the following order unless to do so would contravene the apparent Intent of the Contract Documents stated in preceding Paragraph A:

(1) The Construction Contract.
(2) Addenda, with those of later date having precedence over those of earlier date.
(3) Supplementary Conditions (or other Conditions which modify the General Conditions of the Contract).
(4) General Conditions of the Contract.
(5) The Specifications.
(6) Details appearing on the Drawings; large scale details shall take precedence over smaller scale details.
(7) The Drawings; large scale drawings shall take precedence over smaller scale drawings.

D ORGANIZATION
Except as may be specifically stated within the technical specifications, neither the organization of the Specifications into divisions, sections, or otherwise, nor any arrangement of the Drawings shall control how the Contractor subcontracts portions of the Work or assigns Work to any trade.

E INTERPRETATION
(1) The Contract Documents shall be interpreted collectively, each part complementing the others and consistent with the Intent of the Contract Documents stated in preceding Paragraph A. Unless an item shown or described in the Contract Documents is specifically identified to be furnished or installed by the Owner or others or is identified as "Not In Contract" ("N.I.C."), the Contractor's obligation relative to that item shall be interpreted to include furnishing, assembling, installing, finishing, and/or connecting the item at the Contractor's expense to produce a product or system that is complete, appropriately tested, and in operative condition ready for use or subsequent construction or operation of the Owner or separate contractors. The omission of words or phases for brevity of the Contract Documents, the inadvertent omission of words or phrases, or obvious typographical or written errors shall not defeat such interpretation as long as it is reasonably inferable from the Contract Documents as a whole.

(2) Words or phrases used in the Contract Documents which have well-known technical or construction industry meanings are to be interpreted consistent with such recognized meanings unless otherwise indicated.

(3) Except as noted otherwise, references to standard specifications or publications of associations, bureaus, or organizations shall mean the latest edition of the referenced standard specification or publication as of the date of the Advertisement for Bids.

(4) In the case of inconsistency between Drawings and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

(5) Any portions of the Contract Documents written in longhand must be initialed by all parties.

(6) Any doubt as to the meaning of the Contract Documents or any obscurity as to the wording of them, shall be promptly submitted in writing to the Architect for written interpretation, explanation, or clarification.

F **SEVERABILITY**

The partial or complete invalidity of any one or more provision of this Contract shall not affect the validity or continuing force and effect of any other provision.

Article 3
CONTRACTOR'S REPRESENTATION

By executing the Construction Contract the Contractor represents to the Owner:

A The Contractor has visited the site of the Work to become familiar with local conditions under which the Work is to be performed and to evaluate reasonably observable conditions as compared with requirements of the Contract Documents.

B The Contractor shall use its best skill and attention to perform the Work in an expeditious manner consistent with the Contract Documents.

C The Contractor is an independent contractor and in performance of the Contract remains and shall act as an independent contractor having no authority to represent or obligate the Owner in any manner unless authorized by the Owner in writing.

Article 4
DOCUMENTS FURNISHED *to* CONTRACTOR

Unless otherwise provided in the Contract Documents, one readable standard PDF set of Drawings and Project Manuals will be furnished to the Contractor by the Architect without charge. Other copies requested will be furnished at reproduction cost.

Article 5
OWNERSHIP *of* DRAWINGS

All original or duplicated Drawings, Specifications, and other documents prepared by the Architect, and furnished to the Contractor are the property of the Architect and are to be used solely for this Project and not to be used in any manner for other work. Upon completion of the Work, all copies of Drawings and Specifications, with the exception of the Contractor's record set, shall be returned or accounted for by the Contractor to the Architect, on request.

Article 6
SUPERVISION, SUPERINTENDENT, *and* EMPLOYEES

A **SUPERVISION and CONSTRUCTION METHODS**

(1) The term "Construction Methods" means the construction means, methods, techniques, sequences, and procedures utilized by the Contractor in performing the Work. The Contractor is solely responsible for supervising and coordinating the performance of the Work, including the selection of Construction Methods, unless the Contract Documents give other specific instructions concerning these matters.

(2) The Contractor is solely and completely responsible for job site safety, including the protection of persons and property in accordance with Article 14.

(3) The Contractor shall be responsible to the Owner for acts and omissions of not only the Contractor and its agents and employees, but all persons and entities, and their agents and employees, who are performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

(4) The Contractor shall be responsible to inspect the in-progress and completed Work to verify its compliance with the Contract Documents and to insure that any element or portion of the Work upon which subsequent Work is to be applied or performed is in proper condition to receive the subsequent Work.

B **SUPERINTENDENT**

(1) The Contractor shall employ and maintain a competent level of supervision for the performance of the Work at the Project site, including a superintendent who shall:

(a) have full authority to receive instructions from the Architect or Owner and to act on those instructions &
(b) be present at the Project site at all times during which Work is being performed.

(2) Before beginning performance of the Work, the Contractor shall notify the Architect in writing of the name and qualifications of its proposed superintendent so that the Owner may review the individual's qualifications. If, for reasonable cause, the Owner refuses to approve the individual, or withdraws its approval after once giving it, the Contractor shall name a different superintendent for the Owner's review and approval. Any disapproved superintendent will not perform in that capacity thereafter at the Project site.

C **EMPLOYEES**

The Contractor shall permit only fit and skilled persons to perform the Work. The Contractor shall enforce safety procedures, strict discipline, and good order among persons performing the Work. The Contractor will remove from its employment on the Project any person who deliberately or persistently produces non-conforming Work or who fails or refuses to conform to reasonable rules of personal conduct contained in the Contract Documents or implemented by the Owner and delivered to the Contractor in writing during the course of the Work.

Article 7
REVIEW *of* CONTRACT DOCUMENTS *and* FIELD CONDITIONS *by* CONTRACTOR

A In order to facilitate assembly and installation of the Work in accordance with the Contract Documents, before starting each portion of the Work, the Contractor shall examine and compare the relevant Contract Documents, and compare them to relevant field measurements made by the Contractor and any conditions at the site affecting that portion of the Work.

B If the Contractor discovers any errors, omissions, or inconsistencies in the Contract Documents, the Contractor shall promptly report them to the Architect as a written request for information that includes a detailed statement identifying the specific Drawings or Specifications that are in need of clarification and the error, omission, or inconsistency discovered in them.

(1) The Contractor shall not be expected to act as a licensed design professional and ascertain whether the Contract Documents comply with applicable laws, statutes, ordinances, building codes, and rules and regulations, but the Contractor shall be obligated to promptly notify the Architect of any such noncompliance discovered by or made known to the Contractor. If the Contractor performs Work without fulfilling this notification obligation, the Contractor shall pay the resulting costs and damages that would have been avoided by such notification.

(2) The Contractor shall not be liable to the Owner for errors, omissions, or inconsistencies that may exist in the Contract Documents, or between the Contract Documents and conditions at the site, unless the Contractor knowingly fails to report a discovered error, omission, or inconsistency to the Architect, in which case the Contractor shall pay the resulting costs and damages that would have been avoided by such notification.

C If the Contractor considers the Architect's response to a request for information to constitute a change to the Contract Documents involving additional costs and/or time, the Contractor shall follow the procedures of Article 20, Claims for Extra Cost or Extra Work.

D If, with undue frequency, the Contractor requests information that is obtainable through reasonable examination and comparison of the Contract Documents, site conditions, and previous correspondence, interpretations, or clarifications, the Contractor shall be liable to the Owner for reasonable charges from the Architect for the additional services required to review, research, and respond to such requests for information.

Article 8
SURVEYS *by* CONTRACTORS

A The Contractor shall provide competent engineering services to assure accurate execution of the Work in accordance with the Contract Documents. The Contractor shall verify the figures given for the contours, approaches and locations shown on the Drawings before starting any Work and be responsible for the accuracy of the finished Work. Without extra cost to the Owner, the Contractor shall engage a licensed surveyor if necessary to verify boundary lines, keep within property lines, and shall be responsible for encroachments on rights or property of public or surrounding property owners.

B The Contractor shall establish all base lines for the location of the principal components of the Work and make all detail surveys necessary for construction, including grade stakes, batter boards and other working points, lines and elevations. If the Work involves alteration of or addition to existing structures or improvements, the Contractor shall locate and measure elements of the existing conditions as is necessary to facilitate accurate fabrication, assembly, and installation of new Work in the relationship, alignment, and/or connection to the existing structure or improvement as is shown in the Contract Documents.

Article 9
SUBMITTALS

A Where required by the Contract Documents, the Contractor shall submit shop drawings, product data, samples and other information (hereinafter referred to as Submittals) to the Architect for the purpose of demonstrating the way by which the Contractor proposes to conform to the requirements of the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect without action.

B The Contractor shall be responsible to the Owner for the accuracy of its Submittals and the conformity of its submitted information to the requirements of the Contract Documents. Each Submittal shall bear the Contractor's approval, evidencing that the Contractor has reviewed and found the information to be in compliance with the requirements of the Contract Documents. Submittals which are not marked as reviewed and approved by the Contractor may be returned by the Architect without action.

C The Contractor shall prepare and deliver its submittals to the Architect sufficiently in advance of construction requirements and in a sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. In coordinating the Submittal process with its construction schedule, the Contractor shall allow sufficient time to permit adequate review by the Architect. Within twenty-four (24) hours of the Bid Opening, the Contractor's Schedule of Values must be submitted to the Architect from the apparent low bidder

D By approving a Submittal the Contractor represents not only that the element of Work presented in the Submittal complies with the requirements of the Contract Documents, but also that the Contractor has:

(1) found the layout and/or dimensions in the Submittal to be comparable with those in the Contract Documents and other relevant Submittals and has made field measurements as necessary to verify their accuracy, and

(2) determined that products, materials, systems, equipment and/or procedures presented in the Submittal are compatible with those presented, or being presented, in other relevant Submittals and with the Contractor's intended Construction Methods.

E The Contractor shall not fabricate or perform any portion of the Work for which the Contract Documents require Submittals until the respective Submittals have been approved by the Architect.

F In the case of a resubmission, the Contractor shall direct specific attention to all revisions in a Submittal. The Architect's approval of a resubmission shall not apply to any revisions that were not brought to the Architect's attention.

G If the Contract Documents specify that a Submittal is to be prepared and sealed by a registered architect or licensed engineer retained by the Contractor, all drawings, calculations, specifications, and certifications of the Submittal shall bear the Alabama seal of registration and signature of the registered/licensed design professional who prepared them or under whose supervision they were prepared. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of such a Submittal, provided that all performance and design criteria that such Submittal must satisfy are sufficiently specified in the Contract Documents. The Architect will review, approve or take other appropriate action on such a

Submittal 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 or design criteria specified in the Contract Documents.

H **DEVIATIONS**

(1) The Architect is authorized by the Owner to approve "minor" deviations from the requirements of the Contract Documents through the use of an Architect's Supplemental Instruction (ASI). These "minor" deviations, or ASIs, are defined as those which are in the interest of the Owner, do not materially alter the quality or performance of the finished Work, and do not affect the cost or time of performance of the Work. Deviations which are not "minor" may be authorized only by the Owner through the Change Order procedures of Article 19.

(2) Any deviation from the requirements of the Contract Documents contained in a Submittal shall be clearly identified as a "Deviation from Contract Requirements" (or by similar language) within the Submittal and, in a letter transmitting the Submittal to the Architect, the Contractor shall direct the Architect's attention to, and request specific approval of, the deviation. Otherwise, the Architect's approval of a Submittal does not constitute approval of deviations from the requirements of the Contract Documents contained in the Submittal.

(3) The Contractor shall bear all costs and expenses of any changes to the Work, changes to work performed by the Owner or separate contractors, or additional services by the Architect required to accommodate an approved deviation unless the Contractor has specifically informed the Architect in writing of the required changes and a Change Order has been issued authorizing the deviation and accounting for such resulting changes and costs.

I **ARCHITECT'S REVIEW** *and* **APPROVAL**

(1) The Architect will review the Contractor's Submittals for conformance with requirements of, and the design concept expressed in, the Contract Documents and will approve or take other appropriate action upon them. This review is not intended to verify the accuracy and completeness of details such as dimensions and quantities nor to substantiate installation instructions or performance of equipment or systems, all of which remain the responsibility of the Contractor. However, the Architect shall advise the Contractor of any errors or omissions which the Architect may detect during this review. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

(2) The Architect will review and respond to all Submittals with reasonable promptness to avoid delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time to permit adequate review.

(3) No corrections or changes to Submittals indicated by the Architect will be considered as authorizations to perform Extra Work. If the Contractor considers such correction or change of a Submittal to require Work which differs from the requirements of the Contract Documents, the Contractor shall promptly notify the Architect in writing in accordance with Article 20, Claims for Extra Cost or Extra Work.

J **CONFORMANCE** *with* **SUBMITTALS**

The Work shall be constructed in accordance with approved Submittals.

Article 10
DOCUMENTS *and* SAMPLES *at the* SITE

A **"CONFORMANCE DOCUMENTS" SET**

The Contractor will be provided a Conformance Documents issue set of Drawings and Project Manual that incorporates all addenda items and all accepted alternates. The Contractor shall maintain at the Project site, in good order, at least one set of the Conformance Documents Drawings and Project Manual.

The Contractor shall assure that all sets of the Drawings and Project Manuals being used by the Contractor, Subcontractors, and suppliers are "Conformance Documents" with the current information to insure that updated Contract Documents are used for performance of the Work.

B **RECORD SET**

One set of the Drawings and Project Manual described in Paragraph A shall be the Contractor's record set in which the Contractor shall record all field changes, corrections, selections, final locations, and other information as will be duplicated on the "As-built" documents required under Article 11. The Contractor shall record such "as-built" information in its record set as it becomes available through progress of the Work. The Contractor's performance of this requirement shall be subject to confirmation by the Architect at any time as a prerequisite to approval of Progress Payments.

C The documents and samples required by this Article to be maintained at the Project site shall be readily available to the Architect, Owner, AHJ or other reviewing entity, and their representatives.

Article 11
"AS-BUILT" DOCUMENTS

A Unless otherwise provided in the Contract Documents, the Contractor shall deliver two (2) sets or one reapable standard PDF set of "As-built" documents, as described herein, to the Architect for submission to the Owner upon completion of the Work. Each set of "As-built' documents shall consist of a copy of the Drawings and Project Manual, in like-new condition, into which the Contractor has neatly incorporated all Addenda, Change Orders, supplemental drawings, clarifications, field changes, corrections, selections, actual locations of underground utilities, and other information as required herein or specified elsewhere in the Contract Documents.

B The Contractor shall use the following methods for incorporating information into the "As-built" documents:

(1) Drawings

(a) To the greatest extent practicable, information shall be carefully drawn and lettered, in ink, on the Drawings in the form of sketches, details, plans, notes, and dimensions as required to provide a fully dimensioned record of the Work. When required for clarity, sketches, details, or partial plans shall be drawn on supplemental sheets and bound into the Drawings and referenced on the drawing being revised.

(b) Where a revised drawing has been furnished by the Architect, the drawing of latest date shall be bound into the Drawings in the place of the superseded drawing.

(c) Where a supplemental drawing has been furnished by the Architect, the supplemental drawing shall be bound into the Drawings in an appropriate location and referred to by notes added to the drawing being supplemented.

(d) Where the Architect has furnished details, partial plans, or lengthy notes of which it would be impractical for the Contractor to redraw or letter on a drawing, such information may be affixed to the appropriate drawing with transparent tape if space is available on the drawing.

(e) Any entry of information made in the Drawings that is the result of an Addendum or Change Order, shall identify the Addendum or Change Order from which it originated.

(2) Project Manual

(a) A copy of all Addenda and Change Orders, excluding drawings thereof, shall be bound in the front of the Project Manual.

(b) Where a document, form, or entire specification section is revised, the latest issue shall be bound into the Project Manual in the place of the superseded issue.

(c) Where information within a specification section is revised, the deleted or revised information shall be drawn through in ink and an adjacent note added identifying the Addendum or Change Order containing the revised information.

C Within ten days after the Date of Substantial Completion of the Work, or the last completed portion of the Work, the Contractor shall submit the "As-built" documents to the Architect for approval. If the Architect requires that any corrections be made, the documents will be returned in a reasonable time for correction and resubmission.

Article 12
PROGRESS SCHEDULE

(Not applicable if the Contract Time is 60 days or less.)

A The Contractor shall within fifteen days after the date of commencement stated in the Notice to Proceed, or such other time as may be provided in the Contract Documents, prepare and submit to the Architect for review and approval a practicable construction schedule informing the Architect and Owner of the order in which the Contractor plans to carry on the Work within the Contract Time. The Architect's review and approval of the Contractor's construction schedule shall be only for compliance with the specified format, Contract Time, and suitability for monitoring progress of the Work and shall not be construed as a representation that the Architect has analyzed the schedule to form opinions of sequences or durations of time represented in the schedule.

B In conjunction with the construction schedule a progress schedule shall be prepared using ACCS Form 6-H "Progress Schedule and Report", (contained in the Project Manual) or similar format of suitable scale and detail to indicate the percentage of Work scheduled to be completed at the end of each month. ACCS Form 6-H shall not be used as the construction schedule. At the end of each month the Contractor shall enter the actual percentage of completion on the construction schedule submit two copies to the Architect, and attach one copy to each copy of the monthly Application for Payment. The construction schedule shall be revised to reflect any agreed extensions of the Contract Time or as required by conditions of the Work.

C The Contractor's construction schedule shall be used by the Contractor, Architect, and Owner to determine the adequacy of the Contractor's progress. The Contractor shall be responsible for maintaining progress in accordance with the currently approved construction schedule and shall increase the number of shifts, and/or overtime operations, days of work, and/or the amount of construction plant and equipment as may be necessary to do so. If the Contractor's progress falls materially behind the currently approved construction schedule, it is expected that the Architect formally notify the Contractor to produce a recovery schedule to meet the construction deadlines. If the Contractor is not taking sufficient steps to regain schedule, the Architect may, with the Owner's concurrence, issue the Contractor a Notice to Cure pursuant to Article 27. In such a Notice to Cure the Architect may require the Contractor to submit such supplementary or revised construction schedules as may be deemed necessary to demonstrate the manner in which schedule will be regained.

Article 13
EQUIPMENT, MATERIALS, *and* SUBSTITUTIONS

A Every part of the Work shall be executed in a workmanlike manner in accordance with the Contract Documents and approved Submittals. All materials used in the Work shall be furnished in sufficient quantities to facilitate the proper and expeditious execution of the Work and shall be new except such materials as may be expressly provided or allowed in the Contract Documents to be otherwise.

B Whenever a product, material, system, item of equipment, or service is identified in the Contract Documents by reference to a trade name, manufacturer's name, model number, etc.(hereinafter referred to as "source"), and only one or two sources are listed, or three or more sources are listed and followed by "or approved equal" or similar wording, it is intended to establish a required standard of performance, design, and quality, and the Contractor may submit, for the Architect's approval, products, materials, systems, equipment, or services of other sources which the Contractor can prove to the Architect's satisfaction are equal to, or exceed, the standard of performance, design and quality specified, unless the provisions of Paragraph D below apply. Such proposed substitutions are not to be purchased or installed without the Architect's written approval of the substitution.

C If the Contract Documents identify three or more sources for a product, material, system, item of equipment or service to be used and the list of sources is not followed by "or approved equal" or similar wording, the Contractor may make substitution only after evaluation by the Architect and execution of an appropriate Contract Change Order.

D If the Contract Documents identify only one source and expressly provide that it is an approved sole source for the product, material, system, item of equipment, or service, the Contractor must furnish the identified sole source.

Article 14
SAFETY *and* PROTECTION *of* PERSONS *and* PROPERTY

A The Contractor shall be solely and completely responsible for conditions at the Project site, including safety of all persons (including employees) and property. The Contractor shall create, maintain, and supervise conditions and programs to facilitate and promote safe execution of the Work, and shall supervise the Work with the attention and skill required to assure its safe performance. Safety provisions shall conform to OSHA requirements and all other federal, state, county, and local laws, ordinances, codes, and regulations.

B Where any of these are in conflict, the more stringent requirement shall be followed. Nothing contained in this Contract shall be construed to mean that the Owner has employed the Architect nor has the Architect employed its consultants to administer, supervise, inspect, or take action regarding safety programs or conditions at the Project site.

The Contractor shall employ Construction Methods, safety precautions, and protective measures that will reasonably prevent damage, injury or loss to:

(1) workers and other persons on the Project site and in adjacent and other areas that may be affected by the Contractor's operations;

(2) the Work and materials and equipment to be incorporated into the Work and stored by the Contractor on or off the Project site; and

(3) other property on, or adjacent to, the Project site, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and other improvements not designated in the Contract Documents to be removed, relocated, or replaced.

C The Contractor shall be responsible for the prompt remedy of damage and loss to property, including the filing of appropriate insurance claims, caused in whole or in part by the fault or negligence of the Contractor, a Subcontractor, or anyone for whose acts they may be liable.

D The Contractor shall comply with and give notices required by applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety and protection of persons or property, including without limitation notices to adjoining property owners of excavation or other construction activities that potentially could cause damage or injury to adjoining property or persons thereon.

E The Contractor shall erect and maintain barriers, danger signs, and any other reasonable safeguards and warnings against hazards as may be required for safety and protection during performance of the Contract and shall notify owners and users of adjacent sites and utilities of conditions that may exist or arise which may jeopardize their safety.

F If use or storage of explosives or other hazardous materials or equipment or unusual Construction Methods are necessary for execution of the Work, the Contractor shall exercise commensurate care and employ supervisors and workers properly qualified to perform such activity.

G The Contractor shall furnish a qualified safety representative at the Project site whose duties shall include the prevention of accidents. The safety representative shall be the Contractor's superintendent, unless the Contractor assigns this duty to another responsible member of its on-site staff and notifies the Owner and Architect in writing of such assignment.

H The Contractor shall not permit a load to be applied, or forces introduced, to any part of the construction or site that may cause damage to the construction or site or endanger safety of the construction, site, or persons on or near the site.

I The Contractor shall have the right to act as it deems appropriate in emergency situations jeopardizing life or property. The Contractor shall be entitled to equitable adjustment of the Contract Sum or Contract Time for its efforts expended for the sole benefit of the Owner in an emergency. Such adjustment shall be determined as provided in Articles 19 and 20.

J The duty of the Architect and the Architect's consultants to visit the Project site to conduct periodic inspections of the Work or for other purposes shall not give rise to a duty to review or approve the adequacy of the Contractor's safety program, safety supervisor, or any safety measure which Contractor takes or fails to take in, on, or near the Project site.

Article 15
HAZARDOUS MATERIALS

A A Hazardous Material is any substance or material identified as hazardous under any federal, state, or local law or regulation, or any other substance or material which may be considered hazardous or otherwise subject to statutory or regulatory requirements governing its handling, disposal, and/or clean-up. Existing Hazardous Materials are Hazardous Materials discovered at the Project site and not introduced to the Project site by the Contractor, a Subcontractor, or anyone for whose acts they may be liable.

B If, during the performance of the Work, the Contractor encounters a suspected Existing Hazardous Material, the Contractor shall immediately stop work in the affected area, take measures appropriate to the condition to keep people away from the suspected Existing Hazardous Material, and immediately notify the Architect and Owner of the condition in writing.

C The Owner shall obtain the services of an independent laboratory or professional consultant, appropriately licensed and qualified, to determine whether the suspected material is a Hazardous Material requiring abatement and, if so, to certify after its abatement that it has been rendered harmless. Any abatement of Existing Hazardous Materials will be the responsibility of the Owner. The Owner will advise the Contractor in writing of the persons or entities who will determine the nature of the suspected material and those who will, if necessary, perform the abatement. The Owner will not employ persons or entities to perform these services to whom the Contractor or Architect has reasonable objection.

D After certification by the Owner's independent laboratory or professional consultant that the material is harmless or has been rendered harmless, work in the affected area shall resume upon written agreement between the Owner and Contractor. If the material is found to be an Existing Hazardous Material and the Contractor incurs additional cost or delay due to the presence and abatement of the material, the Contract Sum and/or Contract Time shall be appropriately adjusted by a Contract Change Order pursuant to Article 19.

E The Owner shall not be responsible for Hazardous Materials introduced to the Project site by the Contractor, a Subcontractor, or anyone for whose acts they may be liable unless such Hazardous Materials were required by the Contract Documents.

Article 16
INSPECTION *of the* WORK

A **GENERAL**

(1) The Contractor is solely responsible for the Work's compliance with the Contract Documents; therefore, the Contractor shall be responsible to inspect in-progress and completed Work, and shall verify its compliance with the Contract Documents and that any element or portion of the Work upon which subsequent Work is to be applied or performed is in proper condition to receive the subsequent Work. Neither the presence nor absence of inspections by the Architect, Owner, AHJ, any public authority having

jurisdiction, or their representatives shall relieve the Contractor of responsibility to inspect the Work, for responsibility for Construction Methods and safety precautions and programs in connection with the Work, or from any other requirement of the Contract Documents.

(2) The Architect, Owner, AHJ, any public authority having jurisdiction, and their representatives shall have access at all times to the Work for inspection whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection. All materials, workmanship, processes of manufacture, and methods of construction, if not otherwise stipulated in the Contract Documents, shall be subject to inspection, examination, and test at any and all places where such manufacture and/or construction are being carried on. Such inspections will not unreasonably interfere with the Contractor's operations.

(3) The Architect will inspect the Work as a representative of the Owner. The Architect's inspections may be supplemented by inspections by an AHJ or other reviewing entity.

(4) The Contractor may be charged by the Owner for any extra cost of a failed inspection or reinspection incurred by the Owner or Architect on account of material and workmanship not being ready for inspection at the time of inspection set by the Contractor. This will be credited back to the Owner through a deductive change order.

(5) It is the Contractor's responsibility to communicate to the Design Team the date and time of requested inspection(s). It is the Design Team's responsibility to coordinate the date and time of the requested inspection with the Contractor, AHJ or ICC, Owner (ACCS) and College (college designated representative).

(6) The following are the minimum participation requirements for inspections:

(a) Required inspection without an AHJ or ICC - both the Contractor and Design Professional of record.

(b) Required inspection with an AHJ or ICC - both the Contractor and Design Professional of record.

B TYPES of INSPECTIONS

(1) SCHEDULED INSPECTIONS and **CONFERENCES**. Scheduled Inspections and Conferences are conducted by the Architect, scheduled by the Architect in coordination with the Contractor and AHJ where applicable, and are attended by the Contractor and applicable Subcontractors, suppliers and manufacturers. Scheduled Inspections and Conferences of this Contract include:

(a) Pre-construction Conference.

(b) Pre-roofing Conference (not applicable if the Contract involves no roofing work)

(c) Pre-Asphalt Paving Installation and Expectations Conference

(d) Pre-Landscape Sod Installation and Expectations Conference

(e) Pre-Flooring Installation and Expectations Conference

(f) Below Slab/Underground Utility Inspection

(g) Footings and Foundation Inspection

(h) Concrete Slab Inspection

(i) Waterproofing and Building Envelope Inspection

(j) In-Wall Inspection

(k) Gypsum Board Inspection

(l) Roofing Inspection

(m) Storm Shelter Inspection (if applicable)

(n) Above Ceiling Inspection(s): An above ceiling inspection of all spaces in the building is required before the ceiling material is installed. Above ceiling inspections are to be conducted at a time when all above ceiling systems are complete and tested to the greatest extent reasonable pending installation of the ceiling material. System identifications and markings are to be complete. All fire-rated construction including fire-stopping of penetrations and specified identification above the ceiling shall be complete. Ceiling framing and suspension systems shall be complete with lights, grilles and diffusers, access panels, fire protection drops for sprinkler heads, etc., installed in their final locations to the greatest extent reasonable. Above ceiling framing to support ceiling mounted equipment shall be complete. The above ceiling construction shall be complete to the extent that after the inspection the ceiling material can be installed without disturbance.

(o) Elevator Inspection

(p) Fire Suppression Systems Inspection

(q) Fire Alarm System Inspection

(r) Emergency Lights and Exit Signs Inspection

(s) ADA Inspection

(t) Pre-Closeout Review

(u) Substantial Completion and Final Inspection(s): A Final Inspection shall establish that the Work, or a designated portion of the Work, as Substantially Complete in accordance with Article 32 and is accepted by the Architect, Owner, and AHJ or other reviewing entity as being ready for the Owner's occupancy or use. If closeout documents are not completed within 45 days of issuance of Certificate of Substantial Completion, a Notice to Cure may be issued. If the Work, or designated portion of the Work, includes the installation, or modification, of a fire alarm system or other life safety systems essential to occupancy, such systems shall have been tested and appropriately certified before Substantial Completion.

(v) Year-End Inspection(s): An inspection of the Work, or each separately completed portion thereof, is required near the end of the Contractor's one year warranty period(s). The subsequent delivery of the Architect's report of this inspection will serve as confirmation that the Contractor was notified of Defective Work found within the warranty period in accordance with Article 35.

(2) PERIODIC INSPECTIONS. Periodic Inspections are conducted throughout the course of the Work by the Architect, the Architect's consultants, their representatives, or other reviewing entity at the direction of the Owner, jointly or independently, with or without advance notice to the Contractor.

(3) SPECIFIED INSPECTIONS and **TESTS**. Specified Inspections and Tests include inspections, tests, demonstrations, and approvals that are either specified in the Contract Documents or required by laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction, to be performed by the Contractor, one of its Subcontractors, or an independent testing laboratory or firm (whether paid for by the Contractor or Owner).

C INSPECTIONS *by the* ARCHITECT

(1) The Architect is not authorized to revoke, alter, relax, or waive any requirements of the Contract Documents (other than "minor" deviations as defined in Article 9 and "minor" changes as defined in Article 19), to finally approve or accept any portion of the Work or to issue instructions contrary to the Contract Documents without concurrence of the Owner.

(2) The Architect will visit the site at intervals appropriate to the stage of the Contractor's operations and as otherwise necessary to:

(a) become generally familiar with the in-progress and completed Work and the quality of the Work,

(b) determine whether the Work is progressing in general accordance with the Contractor's schedule and is likely to be completed within the Contract Time,

(c) visually compare readily accessible elements of the Work to the requirements of the Contract Documents to determine, in general, if the Contractor's performance of the Work indicates that the Work will conform to the requirements of the Contract Documents when completed,

(d) endeavor to guard the Owner against Defective Work,

(e) review and address with the Contractor any problems in implementing the requirements of the Contract Documents that the Contractor may have encountered, and

(f) keep the Owner fully informed about the Project.

(3) The Architect shall have the authority to reject Defective Work or require its correction, but shall not be required to make exhaustive investigations or examinations of the in-progress or completed portions of the Work to expose the presence of Defective Work. However, it shall be an obligation of the Architect to report in writing, to the Owner, Contractor, and ACCS Facilities Division, any Defective Work recognized by the Architect.

(4) The Architect shall have the authority to require the Contractor to stop work only when, in the Architect's reasonable opinion, such stoppage is necessary to avoid Defective Work. The Architect shall not be liable to the Contractor or Owner for the consequences of any decisions made by the Architect in good faith either to exercise or not to exercise this authority.

(5) "Inspections by the Architect" includes appropriate inspections by the Architect's consultants as dictated by their respective disciplines of design and the stage of the Contractor's operations.

D INSPECTIONS BY THE LOCAL AHJ OR INDEPENDENT CODE CONSULTANTS

(1) The Local AHJ or Independent Code Consultant will:

(a) participate in scheduled inspections and conferences as practicable,

(b) perform periodic inspections of in-progress and completed Work to ensure code compliance of the Project and general conformance of the Work with the Contract Documents, and

(c) monitor the Contractor's progress and performance of the Work.

(2) The Local AHJ or Independent Code Consultant shall have the authority to:

(a) reject Work that is not in compliance with the State Building Code, unless the Work is in accordance with the Contract Documents in which case the Architect shall initiate appropriate corrective action, and

(b) notify the Architect, Owner, and Contractor of Defective Work recognized by the Local AHJ or Independent Code Consultant.

(3) The Local AHJ or Independent Code Consultant's periodic inspections will usually be scheduled around key stages of construction based upon information reported by the Architect. As the Architect or Owner deems appropriate, the Local AHJ or Independent Code Consultants can be requested to schedule special inspections or meetings to address specific matters. The written findings of the Local AHJ or Independent Code Consultants will be transmitted to the Owner, Contractor, and Architect.

(4) The Local AHJ or Independent Code Consultant is not authorized to revoke, alter, relax, or waive any requirements of the Contract Documents, to finally approve or accept any portion of the Work or to issue instructions contrary to the Contract Documents without concurrence of the Owner. The Contractor shall not proceed with Work as a result of instructions or findings of the Local AHJ or Independent Code Consultant which the Contractor considers to be a change to the requirements of the Contract Documents without written authorization of the Owner through the Architect.

E UNCOVERING WORK

(1) If the Contractor covers a portion of the Work before it is examined by the Architect and this is contrary to the Architect's request or specific requirements in the Contract Documents, then, upon written request of the Architect, the Work must be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

(2) Without a prior request or specific requirement that Work be examined by the Architect before it is covered, the Architect may request that Work be uncovered for examination and the Contractor shall uncover it. If the Work is in accordance with the Contract Documents, the Contract Sum shall be equitably adjusted under Article 19 to compensate the Contractor for the costs of uncovering and replacement. If the Work is not in accordance with the Contract Documents, uncovering, correction, and replacement 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.

F SPECIFIED INSPECTIONS *and* TESTS

(1) The Contractor shall schedule and coordinate Specified Inspections and Tests to be made at appropriate times so as not to delay the progress of the Work or the work of the Owner or separate contractors. If the Contract Documents require that a Specified Inspection or Test be witnessed or attended by the Architect or Architect's consultant, the Contractor shall give the Architect timely notice of the time and place of the Specified Inspection or Test. If a Specified Inspection or Test reveals that Work is not in compliance with requirements of the Contract Documents, the Contractor shall bear the costs of correction, repeating the Specified Inspection or Test, and any related costs incurred by the Owner, including reasonable charges, if any, by the Architect for additional services. Through appropriate Contract Change Order the Owner shall bear costs of tests, inspections or approvals which become Contract requirements subsequent to the receipt of bids.

(2) If the Architect, Owner, or public authority having jurisdiction determines that inspections, tests, demonstrations, or approvals in addition to Specified Inspections and Tests are required, the Contractor

shall, upon written instruction from the Architect, arrange for their performance by an entity acceptable to the Owner, giving timely notice to the architect of the time and place of their performance. Related costs shall be borne by the Owner unless the procedures reveal that Work is not in compliance with requirements of the Contract Documents, in which case the Contractor shall bear the costs of correction, repeating the procedures, and any related costs incurred by the Owner, including reasonable charges, if any, by the Architect for additional services.

(3) Unless otherwise required by the Contract Documents, required certificates of Specified Inspections and Tests shall be secured by the Contractor and promptly delivered to the Architect.

(4) Failure of any materials to pass Specified Inspections and Tests will be sufficient cause for refusal to consider any further samples of the same brand or make of that material for use in the Work.

Article 17
CORRECTION *of* DEFECTIVE WORK

A The Contractor shall, at the Contractor's expense, promptly correct Defective Work rejected by the Architect or which otherwise becomes known to the Contractor, removing the rejected or nonconforming materials and construction from the project site.

B Correction of Defective Work shall be performed in such a timely manner as will avoid delay of completion, use, or occupancy of the Work and the work of the Owner and separate contractors.

C The Contractor shall bear all expenses related to the correction of Defective Work, including but not limited to: **(1)** additional testing and inspections, including repeating Specified Inspections and Tests,

(2) reasonable services and expenses of the Architect, and (3) the expense of making good all work of the Contractor, Owner, or separate contractors destroyed or damaged by the correction of Defective Work.

D All Defective Work, or Deficiencies, shall be tracked on a Project Deficiency Log that is reviewed and updated at least monthly at OAC meetings.

Article 18
DEDUCTIONS *for* UNCORRECTED WORK

If the Owner deems it advisable and in the Owner's interest to accept Defective Work, the Owner may allow part or all of such Work to remain in place, provided an equitable deduction from the Contract Sum, acceptable to the Owner, is offered by the Contractor.

Article 19
CHANGES *in* WORK

A **GENERAL**

(1) The Owner may at any time direct the Contractor to make changes in the Work which are within the general scope of the Contract, including changes in the Drawings, Specifications, or other portions of the Contract Documents to add, delete, or otherwise revise portions of the Work. The Architect is authorized by the Owner to direct "minor" changes in the Work by written order to the Contractor through the use of an

Architect's Supplemental Instruction (ASI). These "minor" changes, or ASIs, in the Work are defined as those which are in the interest of the Owner, do not materially alter the quality or performance of the finished Work, and do not affect the cost or time of performance of the Work. Changes in the Work which are not "minor" may be authorized only by the Owner.

(2) If the Owner directs a change in the Work, the change shall be incorporated into the Contract by a Contract Change Order prepared by the Architect and signed by the Contractor, Owner, and other signatories to the Construction Contract, stating their agreement upon the change or changes in the Work and the adjustments, if any, in the Contract Sum and the Contract Time.

(3) Subject to compliance with Alabama's Public Works Law, the Owner may, upon agreement by the Contractor, incorporate previously unawarded bid alternates into the Contract.

(4) In the event of a claim or dispute as to the appropriate adjustment to the Contract Sum or Contract Time due to a directive to make changes in the Work, the Work shall proceed as provided in this article subject to subsequent agreement of the parties or final resolution of the dispute pursuant to Article 24.

(5) Consent of surety will be obtained for all Contract Change Orders involving an increase in the Contract Sum.

(6) Changes in the Work shall be performed under applicable provisions of the Contract Documents and the Contractor shall proceed promptly to perform changes in the Work, unless otherwise directed by the Owner through the Architect.

(7) All change orders must be executed by ACCS prior to the issuance of the Certificate of Substantial Completion.

(8) Liquidated damages are routed as Change Orders for work that the Contractor has failed to substantially complete within the Contract Time. Before the process of applying liquidated damages begins, communication and approval is required from the ACCS Chief Facilities Officer.

(9) All change orders require completion of ACCS Form 2-F Contract Change Order and ACCS Form 2-G Contract Change Order Justification forms. Only Change Orders 10% or greater of the current contract amount require the Owner's legal advisor's signature on the Change Order Justification form.

B DETERMINATION *of* ADJUSTMENT *of the* CONTRACT SUM

The adjustment of the Contract Sum resulting from a change in the Work shall be determined by one of the following methods, or a combination thereof, as selected by the Owner:

(1) Lump Sum. By mutual agreement to a lump sum based on or negotiated from an itemized cost proposal from the Contractor. This amount shall be all-inclusive, covering direct costs, as well as any fees. Contractor shall furnish to the Owner an itemized breakdown of the quantities and prices to be used in estimating the value of any changes that might be ordered. For the purposes of this method, Contractor and Subcontractors, shall furnish, at a minimum, the following on their own letterhead; all material or vendor quotes (with quantities and unit cost), labor hours, labor rates, labor burdens, equipment, and any other relevant information necessary to analyze the quote. Changes which involve a net credit to the Owner shall include fair and reasonable credits for overhead and profit on the deducted work, in no case less than 5%. For the purposes of this method of determining an adjustment of the Contract Sum, "overhead" shall cover the Contractor's indirect costs of the change, such as the cost of bonds, superintendent and other job office

personnel, watchman, joboffice, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

(a) For the Party performing the work, the cost of the work, less any credits, shall have a maximum markup for Overhead and Profit of 10%.

(b) The prime contractor or upper-tier subcontractor's markup on work performed by lower-tier subcontractors shall not exceed 10%. No more than 10% shall be added by each successive lower-tier subcontractor, if applicable, for a maximum of 20%.

(c) Article 19.B.1.a and 19.B.1.b shall also apply to Force Account changes.

(2) Unit Price. By application of Unit Prices included in the Contract or subsequently agreed to by the parties. However, if the character or quantity originally contemplated is materially changed so that application of such unit price to quantities of Work proposed will cause substantial inequity to either party, the applicable unit price shall be equitably adjusted. Each unit price is to include overhead, profit, and all other related costs.

(3) Force Account. By directing the Contractor to proceed with the change in the Work on a "force account" basis under which the Contractor shall be reimbursed for reasonable expenditures incurred by the Contractor and its Subcontractors in performing added Work and the Owner shall receive reasonable credit for any deleted Work. The Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting of the cost of the change together with sufficient supporting data. Unless otherwise stated in the directive, the adjustment of the Contract Sum shall be limited to the following:

(a) costs of labor and supervision, including employee benefits, social security, retirement, unemployment and workers' compensation insurance required by law, agreement, or under Contractor's or Subcontractor's standard personnel policy;

(b) cost of materials, supplies and equipment, including cost of delivery, whether incorporated or consumed;

(c) rental cost of machinery and equipment, not to exceed prevailing local rates if contractor-owned;

(d) costs of premiums for insurance required by the Contract Documents, permit fees, and sales, use or similar taxes related to the change in the Work;

(e) reasonable credits to the Owner for the value of deleted Work, without Contractor or Subcontractor mark-ups; and

C ADJUSTMENT *of the* CONTRACT TIME *due to* CHANGES

(1) Unless otherwise provided in the Contract Documents, the Contract Time shall be equitably adjusted for the performance of a change provided that the Contractor notifies the Architect in writing that the change will increase the time required to complete the Work. Such notice shall be provided no later than:

(a) with the Contractor's cost proposal stating the number of days of extension requested, or

(b) within ten days after the Contractor receives a directive to proceed with a change in advance of submitting a cost proposal, in which case the notice should provide an estimated number of days of extension to be requested, which may be subject to adjustment in the cost proposal.

(2) The Contract Time shall be extended only to the extent that the change affects the time required to complete the entire Work of the Contract, taking into account the concurrent performance of the changed and unchanged Work. All Contract Time extension requests will be considered in relation to the Critical Path of the Construction Schedule. For purposes of this section, the Critical Path of the Construction Schedule determines the sequence of dependent tasks for project completion and identifies the shortest possible duration for completing the project.

D CHANGE ORDER PROCEDURES

(1) If the Owner proposes to make a change in the Work, the Architect will request that the Contractor provide a cost proposal for making the change to the Work. The request shall be in writing and shall adequately describe the proposed change using drawings, specifications, narrative, or a combination thereof. Within 14 days after receiving such a request, or such other time as may be stated in the request, the Contractor shall prepare and submit a written proposal along with the Change Proposal Recap Sheet to the Architect, properly itemized and supported by sufficient substantiating data to facilitate evaluation. The stated time within which the Contractor must submit a proposal may be extended if, within that time, the Contractor makes a written request with reasonable justification thereof.

(2) The Contractor may voluntarily offer a change proposal which, in the Contractor's opinion, will reduce the cost of construction, maintenance, or operation or will improve the cost-effective performance of an element of the Project, in which case the Owner, through the Architect, will accept, reject, or respond otherwise within 21 days after receipt of the proposal, or such other reasonable time as the Contractor may state in the proposal.

(3) If the Contractor's proposal is acceptable to the Owner, or is negotiated to the mutual agreement of the Contractor and Owner, the Architect will prepare an appropriate Contract Change Order for execution. Upon receipt of the fully executed Contract Change Order, the Contractor shall proceed with the change.

(4) In advance of delivery of a fully executed Contract Change Order, the Architect may furnish to the Contractor a written authorization to proceed with an agreed change utilizing the Change Order Justification (ACCS Form 2-G). However, such an authorization shall be effective only if it:

- **(a)** identifies the Contractor's accepted or negotiated proposal for the change,
- **(b)** states the agreed adjustments, if any, in Contract Sum and Contract Time,
- **(c)** states that funds are available to pay for the change, and
- **(d)** is signed by the Owner.

(5) If the Contractor and Owner cannot agree on the amount of the adjustment in the Contract Sum for a change, the Owner, through the Architect, may order the Contractor to proceed with the change on a Force Account basis, but the net cost to the Owner shall not exceed the amount quoted in the Contractor's proposal. Such order shall state that funds are available to pay for the change.

(6) If the Contractor does not promptly respond to a request for a proposal, or the Owner determines that the change is essential to the final product of the Work and that the change must be effected immediately to avoid delay of the Project, the Owner may:

- **(a)** determine with the Contractor a sufficient maximum amount to be authorized for the change and

(b) direct the Contractor to proceed with the change on a Force Account basis pending delivery of the Contractor's proposal, stating the maximum increase in the Contract Sum that is authorized for the change.

(7) Pending agreement of the parties or final resolution of any dispute of the total amount due the Contractor for a change in the Work, amounts not in dispute for such changes in the Work may be included in Applications for Payment accompanied by an interim Change Order indicating the parties' agreement with part of all of such costs or time extension. Once a dispute is resolved, it shall be implemented by preparation and execution of an appropriate Change Order.

Article 20
CLAIMS *for* EXTRA COST *or* EXTRA WORK

A If the Contractor considers any instructions by the Architect, Owner, or public authority having jurisdiction or Independent Code Consultant, to be contrary to the requirements of the Contract Documents and will involve extra work and/or cost under the Contract, the Contractor shall give the Architect written notice thereof within ten days after receipt of such instructions, and in any event before proceeding to execute such work. As used in this Article, "instructions" shall include written or oral clarifications, directions, instructions, interpretations, or determinations.

B The Contractor's notification pursuant to Paragraph 20.A shall state: **(1)** the date, circumstances, and source of the instructions, **(2)** that the Contractor considers the instructions to constitute a change to the Contract Documents and why, and **(3)** an estimate of extra cost and time that may be involved to the extent an estimate may be reasonably made at that time.

C Except for claims relating to an emergency endangering life or property, no claim for extra cost or extra work shall be considered in the absence of prior notice required under Paragraph 20.A.

D Within ten days of receipt of a notice pursuant to Paragraph 20.A, the Architect will respond in writing to the Contractor, stating one of the following:

(1) The cited instruction is rescinded.

(2) The cited instruction is a change in the Work and in which manner the Contractor is to proceed with procedures of Article 19, Changes in the Work.

(3) The cited instruction is reconfirmed, is not considered by the Architect to be a change in the Contract Documents, and the Contractor is to proceed with Work as instructed.

E If the Architect's response to the Contractor is as in Paragraph 20.D(3), the Contractor shall proceed with the Work as instructed. If the Contractor continues to consider the instructions to constitute a change in the Contract Documents, the Contractor shall, within ten days after receiving the Architect's response, notify the Architect in writing that the Contractor intends to submit a claim pursuant to Article 24, Resolution of Claims and Disputes.

Article 21
DIFFERING SITE CONDITIONS

A **DEFINITION**

"Differing Site Conditions" are:

(1) subsurface or otherwise concealed physical conditions at the Project site which differ materially from those indicated in the Contract Documents, or

(2) unknown physical conditions at the Project site which are of an unusual nature, differing materially from conditions ordinarily encountered and generally recognized as inherent in construction activities of the character required by the Contract Documents.

B **PROCEDURES**

If Differing Site Conditions are encountered, then the party discovering the condition shall promptly notify the other party before the condition is disturbed and in no event later than ten days after discovering the condition. Upon such notice and verification that a Differing Site Condition exists, the Architect will, with reasonable promptness and with the Owner's concurrence, make changes in the Drawings and/or Specifications as are deemed necessary to conform to the Differing Site Condition. Any increase or decrease in the Contract Sum or Contract Time that is warranted by the changes will be made as provided under Article 19, Changes in the Work. If the Architect determines a Differing Site Condition has not been encountered, the Architect shall notify the Owner and Contractor in writing, stating the reason for that determination.

Article 22
CLAIMS *for* DAMAGES

If either party to the Contract 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 after the discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

Article 23
DELAYS

A A delay beyond the Contractor's control at any time in the commencement or progress of Work by an act or omission of the Owner, Architect, or any separate contractor or by labor disputes, unusual delay in deliveries, unavoidable casualties, fires, abnormal floods, tornadoes, or other cataclysmic events of nature, may entitle the Contractor to an extension of the Contract Time provided, however, that the Contractor shall, within ten days after the delay first occurs, give written notice to the Architect of the cause of the delay and its probable effect on progress of the entire Work.

B Adverse weather conditions that are more severe than anticipated for the locality of the Work during any given month may entitle the Contractor to an extension of Contract Time provided, however;

(1) the weather conditions had an adverse effect on construction scheduled to be performed during the period in which the adverse weather occurred, which in reasonable sequence would have an effect on completion of the entire Work,

(2) the Contractor shall, within twenty-one days after the end of the month in which the delay occurs, give the Architect written notice of the delay that occurred during that month and its probable effect on progress of the Work, and

(3) within a reasonable time after giving notice of the delay, the Contractor provides the Architect with sufficient data to document that the weather conditions experienced were unusually severe for the locality of the Work during the month in question. Unless otherwise provided in the Contract Documents, data documenting unusually severe weather conditions shall compare actual weather conditions to the average weather conditions for the month in question during the previous five years as recorded by the National Oceanic and Atmospheric Administration (NOAA) or similar record-keeping entities.

C Adjustments, if any, of the Contract Time pursuant to this Article shall be incorporated into the Contract by a Contract Change Order prepared by the Architect and signed by the Contractor, Owner, and other signatories to the Construction Contract or, at closeout of the Contract, by mutual written agreement between the Contractor and Owner. The adjustment of the Contract Time shall not exceed the extent to which the delay extends the time required to complete the entire Work of the Contract.

D The Contractor shall not be entitled to any adjustment of the Contract Sum for damage due to delays claimed pursuant to this Article unless the delay was caused by the Owner or Architect and was either:

(1) the result of bad faith or active interference or

(2) beyond the contemplation of the parties and not remedied within a reasonable time after notification by the Contractor of its presence.

Article 24
RESOLUTION *of* CLAIMS *and* DISPUTES

A **APPLICABILITY *of* ARTICLE**

(1) As used in this Article, "Claims and Disputes" include claims or disputes asserted by the Contractor, its Surety, or Owner arising out of or related to the Contract, or its breach, including without limitation claims seeking, under the provisions of the Contract, equitable adjustment of the Contract Sum or Contract Time and claims and disputes arising between the Contractor (or its Surety) and Owner regarding interpretation of the Contract Documents, performance of the Work, or breach of or compliance with the terms of the Contract.

(2) "Resolution" addressed in this Article applies only to Claims and Disputes arising between the Contractor (or its Surety) and Owner and asserted after execution of the Construction Contract and prior to the date upon which final payment is made. Upon making application for final payment the Contractor may reserve the right to subsequent Resolution of existing Claims by including a list of all Claims, in stated amounts, which remain to be resolved and specifically excluding them from any release of claims executed by the Contractor, and in that event Resolution may occur after final payment is made.

B **CONTINUANCE *of* PERFORMANCE**

An unresolved Claim or Dispute shall not be just cause for the Contractor to fail or refuse to proceed diligently with performance of the Contract or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

C **GOOD FAITH EFFORT *to* SETTLE**

The Contractor and Owner agree that, upon the assertion of a Claim by the other, they will make a good faith effort, with the Architect's assistance and advice, to achieve mutual resolution of the Claim. If mutually agreed, the Contractor and Owner may endeavor to resolve a Claim through mediation. If efforts to settle are not successful, the Claim shall be resolved in accordance with paragraph D below, whichever applies.

D **FINAL RESOLUTION for STATE-FUNDED CONTRACTS**

(1) If the good faith effort to resolve the Claim between the Architect and Contractor has not been reasonably satisfied, the Contractor may make a formal request to the ACCS Chief Facilities Officer to review the project and endeavor to resolve the Claim.

(2) If the Contract is funded in whole or in part with state funds, the final Resolution of Claims and Disputes which cannot be resolved by the Contractor (or its Surety) and Owner shall be by the Chancellor, whose decision shall be final, binding, and conclusive upon the Contractor, its Surety, and the Owner.

(3) When it becomes apparent to the party asserting a Claim (the Claimant) that an impasse to mutual resolution has been reached, the Claimant may request in writing to the Chancellor that the Claim be resolved by decision of a Professional, with Alabama licensing if the profession requires it, appointed by the Chancellor to review and determine the Claim. Such request by the Contractor (or its Surety) shall be submitted through the Owner. Should the Owner fail or refuse to submit the Contractor's request within ten days of receipt of same, the Contractor may forward such request directly to the Chief Facilities Officer. Upon receipt of a request to resolve a Claim, the Chief Facilities Officer will instruct the parties as to procedures to be initiated and followed.

(4) If the respondent to a Claim fails or refuses to participate or cooperate in the Resolution procedures to the extent that the Claimant is compelled to initiate legal proceedings to induce the Respondent to participate or cooperate, the Claimant will be entitled to recover, and may amend its Claim to include, the expense of reasonable attorney's fees so incurred.

Article 25
OWNER'S RIGHT *to* CORRECT DEFECTIVE WORK

If the Contractor fails or refuses to correct Defective Work in a timely manner that will avoid delay of completion, use, or occupancy of the Work or work by the Owner or separate contractors, the Architect may give the Contractor written Notice to Cure the Defective Work within a reasonable, stated time. If within ten days after receipt of the Notice to Cure the Contractor has not proceeded and satisfactorily continued to cure the Defective Work or provided the Architect with written verification that satisfactory positive action is in process to cure the Defective Work, the Owner may, without prejudice to any other remedy available to the Owner, correct the Defective Work and deduct the actual cost of the correction from payment then or thereafter due to the Contractor.

Article 26
OWNER'S RIGHT *to* STOP *and* SUSPEND *the* WORK

A **STOPPING *the* WORK *for* CAUSE**

If the Contractor fails to correct Defective Work or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work, or any part of the Work, until the cause for the Owner's directive has been eliminated; however, the Owner's right to stop the Work shall not be construed as a duty of the Owner to be exercised for the benefit of the Contractor or any other person or entity.

B **SUSPENSION *by the* OWNER *for* CONVENIENCE**

(1) The Owner may, at any time and without cause, direct the Contractor in writing to suspend, delay or interrupt the Work, or any part of the Work, for a period of time as the Owner may determine.

(2) The Contract Sum and Contract Time shall be adjusted, pursuant to Article 19, for reasonable increases in the cost and time caused by an Owner-directed suspension, delay or interruption of Work for the Owner's convenience. However, no adjustment to the Contract Sum shall be made to the extent that the same or concurrent Work is, was or would have been likewise suspended, delayed or interrupted for other reasons not caused by the Owner.

Article 27
OWNER'S RIGHT *to* TERMINATE CONTRACT

A **TERMINATION *by the* OWNER *for* CAUSE**

(1) Causes: The Owner may terminate the Contractor's right to complete the Work, or any designated portion of the Work, if the Contractor:

(a) should be adjudged bankrupt, or should make a general assignment for the benefit of the Contractor's creditors, or if a receiver should be appointed on account of the Contractor's insolvency to the extent termination for these reasons is permissible under applicable law;

(b) refuses or fails to prosecute the Work, or any part of the Work, with the diligence that will insure its completion within the Contract Time, including any extensions, or fails to complete the Work within the Contract Time;

(c) refuses or fails to perform the Work, including prompt correction of Defective Work, in a manner that will insure that the Work, when fully completed, will be in accordance with the Contract Documents;

(d) fails to pay for labor or materials supplied for the Work or to pay Subcontractors in accordance with the respective Subcontract;

(e) persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction, or the instructions of the Architect or Owner; or

(f) is otherwise guilty of a substantial breach of the Contract.

(2) Procedure for Unbonded Construction Contracts (Generally, contracts less than $100,000):

(a) Notice to Cure: In the presence of any of the above conditions the Architect may give the Contractor written notice to cure the condition within a reasonable, stated time, but not less than ten days after the Contractor receives the notice.

(b) Notice of Termination: If, at the expiration of the time stated in the Notice to Cure, the Contractor has not proceeded and satisfactorily continued to cure the condition or provided the Architect with written verification that satisfactory positive action is in process to cure the condition, the Owner may, without prejudice to any other rights or remedies of the Owner, give the Contractor written notice that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the written Notice of Termination.

(c) If the Contractor satisfies a Notice to Cure, but the condition for which the notice was first given reoccurs, the Owner may give the Contractor a seven day Notice of Termination without giving the Contractor another Notice to Cure.

(d) At the expiration of the seven days of the termination notice, the Owner may:

.1 take possession of the site, of all materials and equipment stored on and off site, and of all Contractor-owned tools, construction equipment and machinery, and facilities located at the site, and

.2 finish the Work by whatever reasonable method the Owner may deem expedient.

(e) The Contractor shall not be entitled to receive further payment under the Contract until the Work is completed.

(f) If the Owner's cost of completing the Work, including correction of Defective Work, compensation for additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees due to the default and termination, is less than the unpaid balance of the Contract Sum, the excess balance less liquidated damages for delay shall be paid to the Contractor. If such cost to the Owner including attorney's fees, plus liquidated damages, exceeds the unpaid balance of the Contract Sum, the Contractor shall pay the difference to the Owner. Final Resolution of any claim or Dispute involving the termination or any amount due any party as a result of the termination shall be pursuant to Article 24.

(g) Upon the Contractor's request, the Owner shall furnish to the Contractor a detailed accounting of the Owner's cost of completing the Work.

(3) Procedure for Bonded Construction Contracts (Generally, contracts over $100,,000):

(a) Notice to Cure: In the presence of any of the above conditions the Architect may give the Contractor and its Surety written Notice to Cure the condition within a reasonable, stated time, but not less than ten days after the Contractor receives the notice.

(b) Notice of Termination: If, at the expiration of the time stated in the Notice to Cure, the Contractor has not proceeded and satisfactorily continued to cure the condition or provided the Architect with written verification that satisfactory positive action is in process to cure the condition, the Owner may, without prejudice to any other rights or remedies of the Owner, give the Contractor and its Surety written

notice declaring the Contractor to be in default under the Contract and stating that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the written Notice of Termination.

(c) If the Contractor satisfies a Notice to Cure, but the condition for which the notice was first given reoccurs, the Owner may give the Contractor a Notice of Termination without giving the Contractor another Notice to Cure.

(d) Demand on the Performance Bond: With the Notice of Termination the Owner shall give the Surety a written demand that, upon the effective date of the Notice of Termination, the Surety promptly fulfill its obligation to take charge of and complete the Work in accordance with the terms of the Performance Bond.

(e) Surety Claims: Upon receiving the Owner's demand on the Performance Bond, the Surety shall assume all rights and obligations of the Contractor under the Contract. However, the Surety shall also have the right to assert "Surety Claims" to the Owner, which are defined as claims relating to acts or omissions of the Owner or Architect prior to termination of the Contractor which may have prejudiced its rights as Surety or its interest in the unpaid balance of the Contract Sum. If the Surety wishes to assert a Surety Claim, it shall give the Owner, through the Architect, written notice within twenty-one days after first recognizing the condition giving rise to the Surety Claim. The Surety Claim shall then be submitted to the Owner, through the Architect, no later than sixty days after giving notice thereof, but no such Surety Claims shall be considered if submitted after the date upon which final payment becomes due. Final resolution of Surety Claims shall be pursuant to Article 24, Resolution of Claims and Disputes. The presence or possibility of a Surety Claim shall not be just cause for the Surety to fail or refuse to take charge of and complete the Work or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

(f) Payments to Surety: The Surety shall be paid for completing the Work in accordance with the Contract Documents as if the Surety were the Contractor. The Owner shall have the right to deduct from payments to the Surety any reasonable costs incurred by the Owner, including compensation for additional architectural, engineering, managerial, and administrative services, and attorneys' fees as necessitated by termination of the Contractor and completion of the Work by the Surety. No further payments shall be made to the Contractor by the Owner. The Surety shall be solely responsible for any accounting to the Contractor for the portion of the Contract Sum paid to Surety by Owner or for the costs and expenses of completing the Work.

(4) Wrongful Termination: If any notice of termination by the Owner for cause, made in good faith, is determined to have been wrongly given, such termination shall be effective and compensation therefore determined as if it had been a termination for convenience pursuant to Paragraph B below.

B **TERMINATION** *by the* **OWNER** *for* **CONVENIENCE**

(1) The Owner may, without cause and at any time, terminate the performance of Work under the Contract in whole, or in part, upon determination by the Owner that such termination is in the Owner's best interest. Such termination is referred to herein as Termination for Convenience.

(2) Upon receipt of a written notice of Termination for Convenience from the Owner, the Contractor shall:

(a) stop Work as specified in the notice;

(b) enter into no further subcontracts or purchase orders for materials, services, or facilities, except as may be necessary for Work directed to be performed prior to the effective date of the termination or to complete Work that is not terminated;

(c) terminate all existing subcontracts and purchase orders to the extent they relate to the terminated Work;

(d) take such actions as are necessary, or directed by the Architect or Owner, to protect, preserve, and make safe the terminated Work; and

(e) complete performance of the Work that is not terminated.

(3) In the event of Termination for Convenience, the Contractor shall be entitled to receive payment for the Work performed prior to its termination, including materials and equipment purchased and delivered for incorporation into the terminated Work, and any reasonable costs incurred because of the termination. Such payment shall include reasonable mark-up of costs for overhead and profit, not to exceed the limits stated in Article 19, Changes in the Work. The Contractor shall be entitled to receive payment for reasonable anticipated overhead ("home office") and shall not be entitled to receive payment for any profits anticipated to have been gained from the terminated Work. A proposal for decreasing the Contract Sum shall be submitted to the Architect by the Contractor in such time and detail, and with such supporting documentation, as is reasonably directed by the Owner. Final modification of the Contract shall be by Contract Change Order pursuant to Article 19. Any Claim or Dispute involving the termination or any amount due a party as a result shall be resolved pursuant to Article 24.

Article 28
CONTRACTOR'S RIGHT *to* SUSPEND *or* TERMINATE *the* CONTRACT

A SUSPENSION *by the* OWNER

If all of the Work is suspended or delayed for the Owner's convenience or under an order of any court, or other public authority, for a period of sixty days, through no act or fault of the Contractor or a Subcontractor, or anyone for whose acts they may be liable, then the Contractor may give the Owner a written Notice of Termination which allows the Owner fourteen days after receiving the Notice in which to give the Contractor appropriate written authorization to resume the Work. Absent the Contractor's receipt of such authorization to resume the Work, the Contract shall terminate upon expiration of this fourteen day period and the Contractor will be compensated by the Owner as if the termination had been for the Owner's convenience pursuant to Article 27.B.

B NONPAYMENT

The Owner's failure to pay the undisputed amount of an Application for Payment within sixty days after receiving it from the Architect (Certified pursuant to Article 30) shall be just cause for the Contractor to give the Owner fourteen days' written notice that the Work will be suspended pending receipt of payment but that the Contract shall terminate if payment is not received within fourteen days (or a longer period stated by the Contractor) of the expiration of the fourteen day notice period.

(1) If the Work is then suspended for nonpayment, but resumed upon receipt of payment, the Contractor will be entitled to compensation as if the suspension had been by the Owner pursuant to Article 26, Paragraph B.

(2) If the Contract is then terminated for nonpayment, the Contractor will be entitled to compensation as if the termination had been by the Owner pursuant to Article 27, Paragraph B.

Article 29
PROGRESS PAYMENTS

A FREQUENCY *of* PROGRESS PAYMENTS
Unless otherwise provided in the Contract Documents, the Owner will make payments to the Contractor as the Work progresses based on monthly estimates prepared and certified by the Contractor, approved and certified by the Architect, and approved by the Owner and other authorities whose approval is required.

B SCHEDULE *of* VALUES
Within twenty-four (24) hours after the Bid Opening, the Contractor shall submit to the Architect ACCS Form 6-E, Schedule of Values, which is a breakdown of the Contract Sum showing the value of the various parts of the Work for billing purposes. The Schedule of Values shall divide the Contract Sum into as many parts ("line items") as the Architect and Owner determine necessary to permit evaluation and to show amounts attributable to Subcontractors. The Contractor's overhead and profit are to be proportionately distributed throughout the line items of the Schedule of Values. Upon approval, the Schedule of Values shall be used as a basis for monthly Applications for Payment, unless it is later found to be in error. Approved change order amounts shall be added to or incorporated into the Schedule of Values as mutually agreed by the Contractor and Architect.

C APPLICATIONS *for* PAYMENTS
(1) Based on the approved Schedule of Values, each Application and Certificate for Payment shall show the Contractor's estimate of the value of Work performed in each line item as of the end of the billing period. The Contractor's cost of materials and equipment not yet incorporated into the Work, but delivered and suitably stored on the site, may be considered in monthly Applications for Payment. One payment application per month may be submitted. Each Application and Certificate for Payment shall match to the penny and be accompanied by an attached Schedule of Values.

(2) The Contractor's estimate of the value of Work performed and stored materials must represent such reasonableness as to warrant certification by the Architect to the Owner in accordance with Article 30. Each monthly Application for Payment shall be supported by such data as will substantiate the Contractor's right to payment, including without limitation copies of requisitions from subcontractors and material suppliers.

(3) If no other date is stated in the Contract Documents or agreed upon by the parties, each Application for Payment shall be submitted to the Architect on or about the first day of each month and payment shall be issued to the Contractor within thirty days after an Application for Payment is Certified pursuant to Article 30 and delivered to the Owner.

(4) Application and Certificate for Payment shall be electronically submitted to ACCS Facilities Division for review following the Contractor's, Notary's, Architect's and Owner's signatures.

D MATERIALS STORED OFF SITE

Unless otherwise provided in the Contract Documents, the Contractor's cost of materials and equipment to be incorporated into the Work, which are stored off the site, may also be considered in monthly Applications for Payment under the following conditions:

(1) the contractor has received written approval from the Architect and Owner to store the materials or equipment off site in advance of delivering the materials to the off site location;

(2) a Certificate of Insurance is furnished to the Architect evidencing that a special insurance policy, or rider to an existing policy, has been obtained by the Contractor providing all-risk property insurance coverage, specifically naming the materials or equipment stored, and naming the Owner as an additionally insured party;

(3) the Architect is provided with a detailed inventory of the stored materials or equipment and the materials or equipment are clearly marked in correlation to the inventory to facilitate inspection and verification of the presence of the materials or equipment by the Architect or Owner;

(4) the materials or equipment are properly and safely stored in a bonded warehouse, or a facility otherwise approved in advance by the Architect and Owner; and

(5) 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.

E RETAINAGE

(1) Retainage for ACCS Projects shall be governed by Title 39 of the Alabama Code.

(2) "Retainage" is defined as that money belonging to the contractor which has been retained by ACCS conditioned on final completion and acceptance of all work in connection with a project or projects by the contractor. Retainage will not be reduced. Full retainage will only be released with the final payment after completion of all punch list items, receipt of Certificate of Occupancy from AHJ, submittal of all warranties, releases of claims are received, surety consent to final payment received, submittal of record documents and all other closeout documents required by contract. Retainage shall not be relied upon by Contractor (or Surety) to cover or off-set unearned monies attributable to uncompleted or uncorrected Work.

(3) In making progress payments the Owner shall retain five percent of the estimated amount of work done and the value of materials stored on the site or suitably stored and insured off-site, and after 50 percent completion has been accomplished, no further retainage shall be withheld. The retainage as set out above shall be held until final completion and acceptance of all work covered by the contract.

F CONTRACTOR'S CERTIFICATION

(1) Each Application for Payment shall bear the Contractor's notarized certification that, to the best of the Contractor's knowledge, information, and belief, the Work covered by the Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payments were issued and payments received from the Owner and that the current payment shown in the Application for Payment has not yet been received.

(2) By making this certification the Contractor represents to the Architect and Owner that, upon receipt of previous progress payments from the Owner, the Contractor has promptly paid each Subcontractor, in accordance with the terms of its agreement with the Subcontractor, the amount due the Subcontractor from the amount included in the progress payment on account of the Subcontractor's Work and stored materials. The Architect and Owner may advise Subcontractors and suppliers regarding percentages of completion or amounts requested and/or approved in an Application for Payment on account of the Subcontractor's Work and stored materials.

G **PAYMENT ESTABLISHES OWNERSHIP**

All material and Work covered by progress payments shall become the sole property of the Owner, but the Contractor shall not be relieved from the sole responsibility for the care and protection of material and Work upon which payments have been made and for the restoration of any damaged material and Work.

Article 30
CERTIFICATION *and* APPROVALS *for* PAYMENT

A The Architect's review, approval, and certification of Applications for Payment shall be based on the Architect's general knowledge of the Work obtained through site visits and the information provided by the Contractor with the Application. The Architect shall not be required to perform exhaustive examinations, evaluations, or estimates of the cost of completed or uncompleted Work or stored materials to verify the accuracy of amounts requested by the Contractor, but the Architect shall have the authority to adjust the Contractor's estimate when, in the Architect's reasonable opinion, such estimates are overstated or understated.

Within seven days after receiving the Contractor's monthly Application for Payment, or such other time as may be stated in the Contract Documents, the Architect will take one of the following actions:

(1) The Architect will approve and certify the Application as submitted and forward it to the Owner as a Certification for Payment for approval by the Owner (and other approving authorities, if any) and payment.

(2) If the Architect takes exception to any amounts claimed by the Contractor and the Contractor and Architect cannot agree on revised amounts, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to certify to the Owner, transmitting a copy of same to the Contractor.

(3) To the extent the Architect determines may be necessary to protect the Owner from loss on account of any of the causes stated in Article 31, the Architect may subtract from the Contractor's estimates and will issue a Certificate for Payment to the Owner, with a copy to the Contractor, for such amount as the Architect determines is properly due and notify the Contractor and Owner in writing of the Architect's reasons for withholding payment in whole or in part.

B Neither the Architect's issuance of a Certificate for Payment nor the Owner's resulting progress payment shall be a representation to the Contractor that the Work in progress or completed at that time is accepted or deemed to be in conformance with the Contract Documents.

C The Architect shall not be required to determine that the Contractor has promptly or fully paid Subcontractors and suppliers or how or for what purpose the Contractor has used monies paid under the Construction Contract. However, the Architect may, upon request and if practical, inform any Subcontractor or supplier of the amount, or percentage of completion, approved or paid to the Contractor on account of the materials supplied or the Work performed by the Subcontractor.

Article 31
PAYMENTS WITHHELD

A The Architect may nullify or revise a previously issued Certificate for Payment prior to Owner's payment thereunder to the extent as may be necessary in the Architect's opinion to protect the Owner from loss on account of any of the following causes not discovered or fully accounted for at the time of the certification or approval of the Application for Payment:

(1) Defective Work;

(2) filed, or reasonable evidence indicating probable filing of, claims arising out of the Contract by other parties against the Contractor;

(3) the Contractor's failure to pay for labor, materials or equipment or to pay Subcontractors;

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

(5) damage suffered by the Owner or another contractor caused by the Contractor, a Subcontractor, or anyone for whose acts they may be liable;

(6) reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance is insufficient to cover applicable liquidated damages; or

(7) the Contractor's persistent failure to conform to the requirements of the Contract Documents.

B If the Owner deems it necessary to withhold payment pursuant to preceding Paragraph A, the Owner will notify the Contractor and Architect in writing of the amount to be withheld and the reason for same.

C The Architect shall not be required to withhold payment for completed or partially completed Work for which compliance with the Contract Documents remains to be determined by Specified Inspections or Final Inspections to be performed in their proper sequence. However, if Work for which payment has been approved, certified, or made under an Application for Payment is subsequently determined to be Defective Work, the Architect shall determine an appropriate amount that will protect the Owner's interest against the Defective Work.

(1) If payment has not been made against the Application for Payment first including the Defective Work, the Architect will notify the Owner and Contractor of the amount to be withheld from the payment until the Defective Work is brought into compliance with the Contract Documents.

(2) If payment has been made against the Application for Payment first including the Defective Work, the Architect will withhold the appropriate amount from the next Application for Payment submitted after the determination of noncompliance, such amount to then be withheld until the Defective Work is brought into compliance with the Contract Documents.

D The amount withheld will be paid with the next Application for Payment certified and approved after the condition for which the Owner has withheld payment is removed or otherwise resolved to the Owner's satisfaction.

E The Owner shall have the right to withhold from payments due the Contractor under this Contract an amount equal to any amount which the Contractor owes the Owner under another contract.

Article 32
PRE-CLOSEOUT REVIEW *and* SUBSTANTIAL COMPLETION

A Pre-Closeout Review is the stage in the progress of the Work when the Work or designated portion of the Work is sufficiently complete and the remaining punch list items can be completed and reinspected within thirty (30) days.

B The Contractor shall notify the Architect in writing when the punch list is complete, and it considers the Work, or a portion of the Work which the Owner has agreed to accept separately, to be complete and ready for a Final Inspection pursuant to Article 16.

C Substantial Completion is achieved and a Final Inspection, as specified in Article 16, is appropriate only when all punch list items are completed and all change orders have been executed by ACCS. After the issuance of the Certificate of Substantial Completion, the Owner may occupy or utilize the Work or designated portion of the Work for its intended use. Upon receipt of the Contractor's notice for a Final Inspection, the Architect will advise the Contractor in writing of any conditions of the Work which the Architect or Owner is aware do not constitute Substantial Completion, otherwise, a Final Inspection will proceed within a reasonable time after the Contractor's notice is given.

D **CERTIFICATE of SUBSTANTIAL COMPLETION**

(1) When the Work or a designated portion of the Work is complete, the Architect will prepare and sign a Certificate of Substantial Completion to be signed in order by the Contractor and Owner.

(2) When signed by all parties, the Certificate of Substantial Completion shall establish the Date of Substantial Completion which is the date upon which:

(a) the Work, or designated portion of the Work, is accepted by the Architect and Owner,

(b) the Contractor's one-year and special warranties for the Work covered by the Certificate commence, unless stated otherwise in the Certificate (the one-year warranty for punch list items completed or corrected after the period allowed in the Certificate shall commence on the date of their Final Acceptance), and

(c) Owner becomes responsible for building security, maintenance, utility services, and insurance, unless stated otherwise in the Certificate.

(3) If the Work or designated portion covered by a ACCS Form 6-K, Certificate of Substantial Completion, includes roofing work, the General Contractor's (5-year) Roofing Guarantee form must be executed by the Contractor and attached to the Certificate of Substantial Completion. If the Contract Documents specify any other roofing warranties to be provided by the roofing manufacturer, Subcontractor, or Contractor, they must also be attached to the Certificate of Substantial Completion. Failure to do so voids any Certificate of Substantial Completion. This requirement cannot be waived.

(4) Other attachments to the Certificate of Substantial Completion shall include the completed Punch List, documentation from the AHJ of their review and approval, an executed Pre-Close out Meeting Checklist, and a Change Order log showing that there are no outstanding change orders.

E The Date of Substantial Completion of the Work, as set in the Certificate of Substantial Completion of the Work or of the last completed portion of the Work, establishes the extent to which the Contractor is liable for Liquidated Damages, if any; however, should the Contractor fail to complete all closeout items within forty-five days, or such other time as may be stated in the respective Certificate of Substantial Completion, the Contractor shall bear any expenses, including additional Architectural services and expenses, incurred by the Owner as a result of such failure to complete closeout items in a timely manner.

F Nothing herein, including paragraph E above, shall limit or waive the Owner's rights under Article 27, including but not limited to issuance of Notices to Cure or Notice of Termination issued to Contractors and Sureties, to obtain completion, correction, or repair of any remaining unfinished Work ("punch list" items).

Article 33
OCCUPANCY *or* USE PRIOR *to* COMPLETION

A **UPON SUBSTANTIAL COMPLETION**

Prior to completion of the entire Work, the Owner may occupy or begin utilizing any designated portion of the Work on the agreed Date of Substantial Completion of that portion of the Work.

B **BEFORE SUBSTANTIAL COMPLETION**

(1) The Owner shall not occupy or utilize any portion of the Work before Substantial Completion of that portion has been achieved.

(2) The Owner may deliver furniture and equipment and store, or install it in place ready for occupancy and use, in any designated portion of the Work before it is substantially completed under the following conditions:

(a) The Owner's storage or installation of furniture and equipment will not unreasonably disrupt or interfere with the Contractor's completion of the designated portion of the Work.

(b) The Contractor consents to the Owner's planned action (such consent shall not be unreasonably withheld).

(c) The Owner shall be responsible for insurance coverage of the Owner's furniture and equipment, and the Contractor's liability shall not be increased.

(d) The Contractor, Architect, and Owner will jointly inspect and record the condition of the Work in the area before the Owner delivers and stores or installs furniture and equipment; the Owner will equitably compensate the Contractor for making any repairs to the Work that may subsequently be required due to the Owner's delivery and storage or installation of furniture and equipment.

(e) The Owner's delivery and storage or installation of furniture and equipment shall not be deemed an acceptance of any Work not completed in accordance with the requirements of the Contract Documents.

Article 34
FINAL PAYMENT *and* PROJECT CLOSEOUT

A PREREQUISITES *to* FINAL PAYMENT

The following requirements must be accomplished before Owner issues Final Payment:

(1) Full execution of a Certificate of Substantial Completion for the Work, or each designated portion of the Work.

(2) Final Acceptance of the Work.

(3) Final building cleaning completed and accepted by Architect and Owner.

(4) Final punch list completed, reinspected and accepted by Architect and Owner.

(5) The Contractor's completion, to the satisfaction of the Architect and Owner, of all documentary requirements of the Contract Documents; such as delivery of "as-built" documents, operating and maintenance manuals, owner training videos, warranties (Contractor's One-Year, General Contractor's Five-Year Roofing, etc.), schedule of attic stock including quantity, label, and storage location, etc.

(6) Delivery to the Owner of a final Application for Payment, prepared by the Contractor and approved and certified by the Architect. The Architect will prepare the Final Payment Checklist and forward it to the Owner along with the final Application for Payment.

(7) Completion of an Advertisement for Completion pursuant to Paragraph C below.

(8) Delivery by the Contractor to the Owner through the Architect of a Release of Claims and such other documents as may be required by Owner, satisfactory in form to the Owner pursuant to Paragraph D below

(9) Consent of Surety to Final Payment, if any, to Contractor. This Consent of Surety is required for projects which have Payment and Performance Bonds.

(10) Delivery by the Contractor to the Architect and Owner of other documents, if any, required by the Contract Documents as prerequisites to Final Payment.

B FINAL ACCEPTANCE *of the* WORK

"Final Acceptance of the Work" shall be achieved when all "punch list" items recorded with the Certificate(s) of Substantial Completion are accounted for by either: (1) their completion or correction by the Contractor and acceptance by the Architect, Owner, and AHJ if applicable, or (2) their resolution under Article 18, Deductions for Uncorrected Work.

C ADVERTISEMENT *for* COMPLETION

(1) If the Contract Sum is $100,000 or less, there is no requirement for Advertisement for Completion.

(2) If the Contract Sum is more than $100,000: The Contractor, immediately after being notified by the Architect that all other requirements of the Contract have been completed, shall give public notice of completion of the Contract by having an Advertisement for Completion, similar to the sample contained in the Project Manual, published for a period of three successive weeks in some newspaper of general circulation published within the city or county where the Work was performed. Proof of publication of the Advertisement for Completion shall be made by the Contractor to the Architect by affidavit of the publisher,

in duplicate, and a printed copy of the Advertisement for Completion published, in duplicate. If no newspaper is published in the county where the work was done, the notice may be given by posting at the Court House for thirty days and proof of same made by Probate Judge or Sheriff and the Contractor. Final payment shall not be due until thirty days after this public notice is completed.

D RELEASE *of* CLAIMS

The Release of Claims and other documents referenced in Paragraph A(6) above are as follows:

(1) A release executed by Contractor of all claims and claims of lien against the Owner arising under and by virtue of the Contract, other than such claims of the Contractor, if any, as may have been previously made in writing and as may be specifically excepted by the Contractor from the operation of the release in stated amounts to be set forth therein.

(2) An affidavit under oath, if required, stating that so far as the Contractor has knowledge or information, there are no claims or claims of lien which have been or will be filed by any Subcontractor, Supplier or other party for labor or material for which a claim or claim of lien could be filed.

(3) A release, if required, of all claims and claims of lien made by any Subcontractor, Supplier or other party against the Owner or unpaid Contract funds held by the Owner arising under or related to the Work on the Project; provided, however, that if any Subcontractor, Supplier or others refuse to furnish a release of such claims or claims of lien, the Contractor may furnish a bond executed by Contractor and its Surety to the Owner to provide an unconditional obligation to defend, indemnify and hold harmless the Owner against any loss, cost or expense, including attorney's fees, arising out of or as a result of such claims, or claims of lien, in which event Owner may make Final Payment notwithstanding such claims or claims of lien. If Contractor and Surety fail to fulfill their obligations to Owner under the bond, the Owner shall be entitled to recover damages as a result of such failure, including all costs and reasonable attorney's fees incurred to recover such damages.

E EFFECT *of* FINAL PAYMENT

(1) The making of Final Payment shall constitute a waiver of Claims by the Owner except those arising from:

- **(a)** liens, claims, security interests or encumbrances arising out of the Contract and unsettled;
- **(b)** failure of the Work to comply with the requirements of the Contract Documents;
- **(c)** terms of warranties or indemnities required by the Contract Documents, or
- **(d)** latent defects.

(2) Acceptance of Final Payment by the Contractor shall constitute a waiver of claims by Contractor except those previously made in writing, identified by Contractor as unsettled at the time of final Application for Payment, and specifically excepted from the release provided for in Paragraph D(1), above.

Article 35
CONTRACTOR'S WARRANTY

A GENERAL WARRANTY

The Contractor warrants to the Owner and Architect that all materials and equipment furnished under the Contract will be of good quality and new, except such materials as may be expressly provided or allowed in

the Contract Documents to be otherwise, and that none of the Work will be Defective Work as defined in Article 1.

B ONE-YEAR WARRANTY

(1) If, within one year after the date of Substantial Completion of the Work or each designated portion of the Work (or otherwise as agreed upon in a mutually-executed Certificate of Substantial Completion), any of the Work is found to be Defective Work, the Contractor shall promptly upon receipt of written notice from the Owner or Architect, and without expense to either, replace or correct the Defective Work to conform to the requirements of the Contract Documents, and repair all damage to the site, the building and its contents which is the result of Defective Work or its replacement or correction.

(2) The one-year warranty for punch list items shall begin on the Date of Substantial Completion if they are completed or corrected within the time period allowed in the Certificate of Substantial Completion in which they are recorded. The one-year warranty for punch list items that are not completed or corrected within the time period allowed in the Certificate of Substantial Completion, and other Work performed after Substantial Completion, shall begin on the date of Final Acceptance of the Work. The Contractor's correction of Work pursuant to this warranty does not extend the period of the warranty. The Contractor's one-year warranty does not apply to defects or damages due to improper or insufficient maintenance, improper operation, or wear and tear during normal usage.

(3) Upon recognizing a condition of Defective Work, the Owner shall promptly notify the Contractor of the condition. If the condition is causing damage to the building, its contents, equipment, or site, the Owner shall take reasonable actions to mitigate the damage or its continuation, if practical. If the Contractor fails to proceed promptly to comply with the terms of the warranty, or to provide the Owner with satisfactory written verification that positive action is in process, the Owner may have the Defective Work replaced or corrected and the Contractor and the Contractor's Surety shall be liable for all expense incurred.

(4) Year-end Inspection(s): An inspection of the Work, or each separately completed portion thereof, is required near the end of the Contractor's one-year warranty period(s). The inspection must be scheduled with the Owner, Architect, and AHJ or an Independent Code Consultant, where applicable. The subsequent delivery of the Architect's report of a Year-end Inspection will serve as confirmation that the Contractor was notified of Defective Work found within the warranty period.

(5) The Contractor's warranty of one year is in addition to, and not a limitation of, any other remedy stated herein or available to the Owner under applicable law.

C GENERAL CONTRACTOR'S ROOFING GUARANTEE

(1) In addition to any other roof related warranties or guarantees that may be specified in the Contract Documents, the roof and associated work shall be guaranteed by the General Contractor against leaks and defects of materials and workmanship for a period of five (5) years, starting on the Date of Substantial Completion of the Project as stated in the Certificate of Substantial Completion. This guarantee for punch list items shall begin on the Date of Substantial Completion if they are completed or corrected within the time period allowed in the Certificate of Substantial Completion in which they are recorded. The guarantee for punch list items that are not completed or corrected within the time period allowed in the Certificate of Substantial Completion shall begin on the date of Final Acceptance of the Work.

(2) The "General Contractor's Roofing Guarantee", ACCS Form 6-L included in the Project Manual, shall be executed in triplicate, signed by the appropriate party and submitted to the Architect for submission with the Certificate of Substantial Completion to the Owner.

(3) This guarantee does not include costs which might be incurred by the General Contractor in making visits to the site requested by the Owner regarding roof problems that are due to lack of proper maintenance (keeping roof drains and/or gutters clear of debris that cause a stoppage of drainage which results in water ponding, overflowing of flashing, etc.), or damages caused by vandalism or misuse of roof areas. Should the contractor be required to return to the job to correct problems of this nature that are determined not to be related to faulty workmanship and materials in the installation of the roof, payment for actions taken by the Contractor in response to such request will be the responsibility of the Owner. A detailed written report shall be made by the General Contractor on each of these 'Service Calls' with copies to the Architect and Owner.

D **SPECIAL WARRANTIES**

(1) The Contractor shall deliver to the Owner through the Architect all special or extended warranties required by the Contract Documents from the Contractor, Subcontractors, and suppliers.

(2) The Contractor and the Contractor's Surety shall be liable to the Owner for such special warranties during the Contractor's one-year warranty; thereafter, the Contractor's obligations relative to such special warranties shall be to provide reasonable assistance to the Owner in their enforcement.

E **ASSUMPTION of GUARANTEES *of* OTHERS**

If the Contractor disturbs, alters, or damages any work guaranteed under a separate contract, thereby voiding the guarantee of that work, the Contractor shall restore the work to a condition satisfactory to the Owner and shall also guarantee it to the same extent that it was guaranteed under the separate contract.

Article 36
INDEMNIFICATION AGREEMENT

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Architect, Architect's consultants, ACCS Facilities Division, and their agents, employees, and consultants (hereinafter collectively referred to as the "Indemnitees") from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of, related to, 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, including loss of use resulting therefrom, and is caused in whole or in part by 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 such claim, damage, loss or expense is caused in part, or is alleged but not legally established to have been caused in whole or in part by the negligence or other fault of a party indemnified hereunder.

(1) This indemnification shall extend to all claims, damages, losses and expenses for injury or damage to adjacent or neighboring property, or persons injured thereon, that arise out of, relate to, or result from performance of the Work.

(2) This indemnification does not extend to the liability of the Architect, or the Architect's Consultants,

agents, or employees, arising out of (1) the preparation or approval of maps, shop drawings, opinions, reports, surveys, field orders, Change Orders, drawings or specifications, or (2) the giving of or the failure to give directions or instructions, provided such giving or failure to give instructions is the primary cause of the injury or damage.

(3) This indemnification does not apply to the extent of the sole negligence of the Indemnitees.

Article 37
CONTRACTOR'S *and* SUBCONTRACTORS' INSURANCE

(Provide entire Article 37 to Contractor's insurance representative.)

A GENERAL

(1) RESPONSIBILITY. The Contractor shall be responsible to the Owner from the time of the signing of the Construction Contract or from the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from any negligent act or omission or breach, failure or other default regarding the work by the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of who may be the owner of the property.

(2) PROOF OF INSURANCE. The Contractor shall be responsible for providing proof of the insurance coverage required in this Article. Failure to provide proof of the insurance required in this Article will prevent a construction contract from being executed and may result in the Contractor's bid being deemed non-responsive. After execution of a Construction Contract, failure to provide proof of insurance required in this Article will prevent payment of all pending pay applications, will immediately result in a Project wide stop work order, and will result in termination of the Construction Contract if proof is not timely provided. If ACCS cannot determine whether insurance requirements have been met through the Contractor's Certificate of Insurance submission, it shall be the Contractor's responsibility to provide additional documentation that shows these insurance requirements are satisfied.

(3) INSURANCE PROVIDERS. Each of the insurance coverages required below shall be issued by an insurer licensed by the Insurance Commissioner to transact the business of insurance in the State of Alabama for the applicable line of insurance, and such insurer (or, for qualified self-insureds or group self-insureds, a specific excess insurer providing statutory limits) must have a Best Policyholders Rating of "A-" or better and a financial size rating of Class V or larger.

(4) NOTIFICATION ENDORSEMENT. Each policy shall be endorsed to provide that the insurance company agrees that the policy shall not be canceled, changed, allowed to lapse or allowed to expire for any reason until thirty days after the Owner has received written notice by certified mail as evidenced by return receipt or until such time as other insurance coverage providing protection equal to protection called for in the Contract Documents shall have been received, accepted and acknowledged by the Owner. Such notice shall be valid only as to the Project as shall have been designated by Project Name and Number in said notice.

(a.) If the Contractor's insurance carrier will not provide a 30 day cancellation notice for non-payment of premium, Contractor agrees that the following must be added to the Construction Contract:

.1 Contractor or its insurance broker or other insurance representative will provide ACCS 30 day written notice by certified mail as evidenced by return receipt of any reasonably expected or known failure to make any premium payment(s) that could result in cancellation of any policy for non-payment of premium.

.2 Contractor will provide proof of premium payment(s) with each Pay app submitted.

.3 Contractor will provide proof of premium payment(s) if ever requested by ACCS. Contractor also understands that failure to provide proof of premium payment will prevent payment of all pending pay apps, will immediately result in a Project wide stop work order, and will result in termination of the Construction contract if proof is not timely provided.

(5) INSURANCE CERTIFICATES. The Contractor shall procure the insurance coverages identified below, or as otherwise required in the Contract Documents, at the Contractor's own expense, and to evidence that such insurance coverages are in effect, the Contractor shall furnish the Owner an insurance certificate(s) acceptable to the Owner and listing the Owner as the certificate holder. The insurance certificate(s) must be delivered to the Owner with the Construction Contract and Bonds for final approval and execution of the Construction Contract.

A replacement certificate must be provided to ACCS Facilities Division and the College accounting office at least 10 calendar days prior to the expiration of any policy. All renewed or replaced policies must meet the insurance requirements of ACCS.

The insurance certificate must provide the following:

(a) Name and address of authorized agent of the insurance company
(b) Name and address of insured
(c) Name of insurance company or companies
(d) Description of policies
(e) Policy Number(s)
(f) Policy Period(s)
(g) Limits of liability
(h) Name and address of Owner as certificate holder
(i) Project Name and Number, if any
(j) Signature of authorized agent of the insurance company
(k) Telephone number of authorized agent of the insurance company
(l) Mandatory thirty day notice of cancellation / non-renewal / change

(6) MAXIMUM DEDUCTIBLE. Self-insured retention, except for qualified self-insurers or group self-insurers, in any policy shall not exceed $25,000.00.

B INSURANCE COVERAGES

Unless otherwise provided in the Contract Documents, the Contractor shall purchase the types of insurance coverages with liability limits not less than as follows:

(1) WORKERS' COMPENSATION *and* **EMPLOYER'S LIABILITY INSURANCE**

(a) Workers' Compensation coverage shall be provided in accordance with the statutory coverage required in Alabama. A group insurer must submit a certificate of authority from the Alabama Department of Industrial Relations approving the group insurance plan. A self-insurer must submit a certificate from the Alabama Department of Industrial Relations stating the Contractor qualifies to pay its own workers' compensation claims.

(b) Employer's Liability Insurance limits shall be at least:
.1 Bodily Injury by Accident - $1,000,000 each accident
.2 Bodily Injury by Disease - $1,000,000 each employee

(2) COMMERCIAL GENERAL LIABILITY INSURANCE

(a) Commercial General Liability Insurance, written on an ISO Occurrence Form (current edition as of the date of Advertisement for Bids) or equivalent, shall include, but need not be limited to, coverage for bodily injury and property damage arising from premises and operations liability, products and completed operations liability, blasting and explosion, collapse of structures, underground damage, personal injury liability and contractual liability. The Commercial General Liability Insurance shall provide at minimum the following limits:

Coverage Limit
.1 General Aggregate $2,000,000.00 per Project
.2 Products, Completed Operations Aggregate $2,000,000.00 per Project
.3 Personal and Advertising Injury $1,000,000.00 per Occurrence
.4 Each Occurrence $1,000,000.00

(b) Additional Requirements for Commercial General Liability Insurance:

.1 The policy shall name the Owner, Architect, ACCS, and their agents, consultants and employees as additional insureds, state that this coverage shall be primary insurance for the additional insureds; and contain no exclusions of the additional insureds relative to job accidents.
.2 The policy must include separate per project aggregate limits.

(3) COMMERCIAL BUSINESS AUTOMOBILE LIABILITY INSURANCE

(a) Commercial Business Automobile Liability Insurance which shall include coverage for bodily injury and property damage arising from the operation of any owned, non-owned or hired automobile. The Commercial Business Automobile Liability Insurance Policy shall provide not less than $1,000,000 Combined Single Limits for each occurrence.

(b) The policy shall name the Owner, Architect, ACCS, and their agents, consultants, and employees as additional insureds.

(4) COMMERCIAL UMBRELLA LIABILITY INSURANCE

(a) Commercial Umbrella Liability Insurance to provide excess coverage above the Commercial General Liability, Commercial Business Automobile Liability and the Workers' Compensation and Employer's Liability to satisfy the minimum limits set forth herein.

(b) Minimum Commercial/Excess Umbrella Limits of:
.1 $5,000,000 per Occurrence
.2 $5,000,000 Aggregate

(c) Additional Requirements for Commercial Umbrella Liability Insurance:
.1 The policy shall name the Owner, Architect, ACCS, and their agents, consultants, and employees as additional insureds.
.2 The policy must be on an "occurrence" basis.

(5) BUILDER'S RISK INSURANCE

(a) The general contractor is required to purchase builder's risk coverage. Coverage should be "all-risk" including, but not limited to, the following perils: fire, windstorm, hail, water damage, flood, mold, earth movement (also known as "earthquake"), vehicle or equipment collision, paint overspray, collapse, vandalism and lightning. Coverage must be on a replacement cost basis. The carrier must be A- rated or better by AM Best and admitted in the State of Alabama. The coverage period must start on the first day of construction and must extend a minimum of 30 days after receipt of the Certificate of Substantial Completion. Property must be insured while in transit, while stored at an off-site location, while on the construction site but not yet attached to the building and after being attached to the building. The general contractor is responsible for absorbing the deductible in the event of a loss, and the deductible cannot exceed $10,000. ACCS must be included on the policy as both an additional named insured and a loss payee. An Evidence of Property Insurance certificate must be provided showing both additional named insured and loss payee status, coverages and limits prior to the start of construction. Coverage limits must be as follows:

.1 Hard Costs: insured to full value
.2 Soft Costs: insured to full value
.3 Furniture and Fixtures: insured to the full value of items being purchased and/or installed by the contractor under the construction contract.
.4 Business Interruption: $100,000

(b) On information technology projects or any other project approved in writing by the ACCS Chief of Facilities, an Installation Floater policy may be approved in place of a Builder's Risk policy described above. Coverage should be "all-risk." The Installation Floater policy must have a minimum policy limit to cover all material, equipment, or other property for which the Contractor is legally liable. The presumed minimum policy limit shall be $2 Million unless a higher or lower limit is approved in writing prior to the opening of bids by the ACCS Facilities Division. With its COI, Contractor shall submit documentation from its insurance broker or agent confirming that ACCS's Installation Floater insurance requirements are met by Contractor's policy.

C SUBCONTRACTORS' INSURANCE

(1) WORKERS' COMPENSATION *and* **EMPLOYER'S LIABILITY INSURANCE.** The Contractor shall require each Subcontractor to obtain and maintain Workers' Compensation and Employer's Liability Insurance coverages as described in preceding Paragraph B, or to be covered by the Contractor's Workers' Compensation and Employer's Liability Insurance while performing Work under the Contract.

(2) LIABILITY INSURANCE. The Contractor shall require each Subcontractor to obtain and maintain adequate General Liability, Automobile Liability, and Umbrella Liability Insurance coverages similar to those described in preceding Paragraph B. Such coverage shall be in effect at all times that a Subcontractor is performing Work under the Contract.

(3) ENFORCEMENT RESPONSIBILITY. The Contractor shall have responsibility to enforce its Subcontractors' compliance with these or similar insurance requirements; however, the Contractor shall, upon request, provide the Architect or Owner acceptable evidence of insurance for any Subcontractor.

D TERMINATION *of* OBLIGATION *to* INSURE

Unless otherwise expressly provided in the Contract Documents, the obligation to insure as provided herein shall continue as follows:

(1) BUILDER'S RISK INSURANCE. The obligation to insure under Subparagraph B(5) shall remain in effect until the Date of Substantial Completion as shall be established in the Certificate of Substantial Completion. In the event that multiple Certificates of Substantial Completion covering designated portions of the Work are issued, Builder's Risk coverage shall remain in effect until the Date of Substantial Completion as shall be established in the last issued Certificate of Substantial Completion. However, in the case that the Work involves separate buildings, Builder's Risk coverage of each separate building may terminate on the Date of Substantial Completion as established in the Certificate of Substantial Completion issued for each building.

(2) PRODUCTS *and* COMPLETED OPERATIONS. The obligation to carry Products and Completed Operations coverage specified under Subparagraph B(2) shall remain in effect for two years after the Date(s) of Substantial Completion.

(3) ALL OTHER INSURANCE. The obligation to carry other insurance coverages specified under Subparagraphs B(1) through B(4) and Paragraph C shall remain in effect after the Date(s) of Substantial Completion until such time as all Work required by the Contract Documents is completed. Equal or similar insurance coverages shall remain in effect if, after completion of the Work, the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, returns to the Project to perform warranty or maintenance work pursuant to the terms of the Contract Documents.

E 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 performing construction or operations related to the Project, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss. But said waiver shall apply only to the extent the loss or damage is covered by builder's risk insurance applicable to the Work or to other property located within or adjacent to the Project, except such rights as they may have to proceeds of such insurance held by the Owner or Contractor as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors, if any, and the subcontractor, sub-subcontractors, suppliers, 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 the 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. The waivers provided for in this paragraph shall not be applicable to loss or damage that occurs after final acceptance of the Work.

Article 38
PERFORMANCE *and* PAYMENT BONDS

A GENERAL

Upon signing and returning the Construction Contract to the Owner for final approval and execution, the Contractor shall, at the Contractor's expense, furnish to the Owner a Performance Bond and a Payment Bond (P&P Bonds), ACCS Form 2-C and 2-D, as contained in the Project Manual, each in a penal sum equal to 100% of the Contract Sum. Each bond shall be on the form contained in the Project Manual, shall be executed by a surety company (Surety) acceptable to the Owner and duly authorized and qualified to make such bonds in

the State of Alabama in the required amount. There shall be six original P&P Bonds submitted with original signatures for each of the six contracts required. The P&P bonds must be signed either on the same day or after the construction contract date. Each P&P Bond shall have attached thereto an original power of attorney (POA) of the signing official. The POA signature date must be the same day as the P&P Bond's signature date. All signatures must be present.

The provisions of this Article are not applicable to this Contract if the Contract Sum is less than $100,000, unless bonds are required for this Contract in the Supplemental General Conditions.

B **PERFORMANCE BOND**

Through the Performance Bond, the Surety's obligation to the Owner shall be to assure the prompt and faithful performance of the Contract and Contract Change Orders. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. In case of default on the part of the Contractor, the Surety shall take charge of and complete the Work in accordance with the terms of the Performance Bond. Any reasonable expenses incurred by the Owner as a result of default on the part of the Contractor, including architectural, engineering, administrative, and legal services, shall be recoverable under the Performance Bond.

C **PAYMENT BOND**

Through the Payment Bond the Surety's obligation to the Owner shall be to guarantee that the Contractor and its Subcontractors shall promptly make payment to all persons supplying labor, materials, or supplies for, or in, the prosecution of the Work, including the payment of reasonable attorneys fees incurred by successful claimants or plaintiffs in civil actions on the Bond. Any person or entity indicating that they have a claim of nonpayment under the Bond shall, upon written request, be promptly furnished a certified copy of the Bond and Construction Contract by the Contractor, Architect, Owner, or ACCS, whomever is recipient of the request.

D **CHANGE ORDERS**

The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

E **EXPIRATION**

The obligations of the Contractor's performance bond surety shall be coextensive with the contractor's performance obligations under the Contract Documents; provided, however, that the surety's obligation shall expire at the end of the one-year warranty period(s) of Article 35.

Article 39
ASSIGNMENT

The Contractor shall not assign the Contract or sublet it as a whole nor assign any moneys due or to become due to the Contractor thereunder without the previous written consent of the Owner (and of the Surety, in the case of a bonded Construction Contract). As prescribed by the Public Works Law, the Contract shall in no event be assigned to an unsuccessful bidder for the Contract whose bid was rejected because the bidder was not a responsible or responsive bidder.

Article 40
CONTRACTION *by* OWNER *or* SEPARATE CONTRACTORS

A OWNER'S RESERVATION *of* RIGHT

(1) The Owner reserves the right to self-perform, or to award separate contracts for, other portions of the Project and other Project related construction and operations on the site. The contractual conditions of such separate contracts shall be substantially similar to those of this Contract, including insurance requirements and the provisions of this Article. If the Contractor considers such actions to involve delay or additional cost under this Contract, notifications and assertion of claims shall be as provided in Article 20 and Article 23.

(2) When separate contracts are awarded, the term "Contractor" in the separate Contract Documents shall mean the Contractor who executes the respective Construction Contract.

B COORDINATION

Unless otherwise provided in the Contract Documents, the Owner shall be responsible for coordinating the activities of the Owner's forces and separate contractors with the Work of the Contractor. The Contractor shall cooperate with the Owner and separate contractors, shall participate in reviewing and comparing their construction schedules relative to that of the Contractor when directed to do so, and shall make and adhere to any revisions to the construction schedule resulting from a joint review and mutual agreement.

C CONDITIONS APPLICABLE *to* WORK PERFORMED *by* OWNER

Unless otherwise provided in the Contract Documents, when the Owner self-performs construction or operations related to the Project, the Owner shall be subject to the same obligations to Contractor as Contractor would have to a separate contractor under the provision of this Article 40.

D MUTUAL RESPONSIBILITY

(1) The Contractor shall reasonably accommodate the required introduction and storage of materials and equipment and performance of activities by the Owner and separate contractors and shall connect and coordinate the Contractor's Work with theirs as required by the Contract Documents.

(2) By proceeding with an element or portion of the Work that is applied to or performed on construction by the Owner or a separate contractor, or which relies upon their operations, the Contractor accepts the condition of such construction or operations as being suitable for the Contractor's Work, except for conditions that are not reasonably discoverable by the Contractor. If the Contractor discovers any condition in such construction or operations that is not suitable for the proper performance of the Work, the Contractor shall not proceed, but shall instead promptly notify the Architect in writing of the condition discovered.

(3) The Contractor shall reimburse the Owner for any costs incurred by a separate contractor and payable by the Owner because of acts or omissions of the Contractor. Likewise, the Owner shall be responsible to the Contractor for any costs incurred by the Contractor because of the acts or omissions of a separate contractor.

(4) The Contractor shall not cut or otherwise alter construction by the Owner or a separate contractor without the written consent of the Owner and separate contractor; such consent shall not be unreasonably withheld. Likewise, the Contractor shall not unreasonably withhold its consent allowing the Owner or a

separate contractor to cut or otherwise alter the Work.

(5) The Contractor shall promptly remedy any damage caused by the Contractor to the construction or property of the Owner or separate contractors.

Article 41
SUBCONTRACTS

A AWARD *of* SUBCONTRACTS *and* OTHER CONTRACTS *for* PORTIONS *of the* WORK

(1) Unless otherwise provided in the Contract Documents, when delivering the executed Construction Contract, bonds, and evidence of insurance to the Architect, the Contractor shall also submit a listing of Subcontractors proposed for each principal portion of the Work and fabricators or suppliers proposed for furnishing materials or equipment fabricated to the design of the Contract Documents. This listing shall be in addition to any naming of Subcontractors, fabricators, or suppliers that may have been required in the bid process. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any Subcontractor, fabricator, or supplier proposed by the Contractor. The issuance of the Notice to Proceed in the absence of such objection by the Owner shall constitute notice that no reasonable objection to them is made.

(2) The Contractor shall not contract with a proposed Subcontractor, fabricator, or supplier to whom the Owner has made reasonable and timely objection. Except in accordance with prequalification procedures as may be contained in the Contract Documents, through specified qualifications, or on the grounds of reasonable objection, the Owner may not restrict the Contractor's selection of Subcontractors, fabricators, or suppliers.

(3) Upon the Owner's reasonable objection to a proposed Subcontractor, fabricator, or supplier, the Contractor shall promptly propose another to whom the Owner has no reasonable objection. If the proposed Subcontractor, fabricator, or supplier to whom the Owner made reasonable objection was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be equitably adjusted by Contract Change Order for any resulting difference if the Contractor has acted promptly and responsively in this procedure.

(4) The Contractor shall not change previously selected Subcontractors, fabricators, or suppliers without notifying the Architect and Owner in writing of proposed substitute Subcontractors, fabricators, or suppliers. If the Owner does not make a reasonable objection to a proposed substitute within three working days, the substitute shall be deemed approved.

B SUBCONTRACTUAL RELATIONS

(1) The Contractor agrees to bind every Subcontractor and material supplier (and require every Subcontractor to so bind its subcontractors and material suppliers) to all the provisions of the Contract Documents as they apply to the Subcontractor's and material supplier's portion of the Work.

(2) Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the Owner, nor to create a duty of the Architect, Owner, or Director to resolve disputes between or among the Contractor or its Subcontractors and suppliers or any other duty to such Subcontractors or suppliers.

Article 42
ARCHITECT'S STATUS

A The Architect is an independent contractor performing, with respect to this Contract, pursuant to an agreement executed between the Owner and the Architect. The Architect has prepared the Drawings and Specifications and assembled the Contract Document and is, therefore, charged with their interpretation and clarification as described in the Contract Documents. As a representative of the Owner, the Architect will endeavor to guard the Owner against variances from the requirements of the Contract Documents by the Contractor. On behalf of the Owner, the Architect will administer the Contract as described in the Contract Documents during construction and the Contractor's one-year warranty.

So as to maintain continuity in administration of the Contract and performance of the Work, and to facilitate complete documentation of the project record, all communications between the Contractor and Owner regarding matters of or related to the Contract shall be directed through the Architect, unless direct communication is otherwise required to provide a legal notification. Unless otherwise authorized by the Architect, communications by and with the Architect's consultants shall be through the Architect. Unless otherwise authorized by the Contractor, communications by and with Subcontractors and material suppliers shall be through the Contractor.

B **ARCHITECT'S AUTHORITY**

Subject to other provisions of the Contract Documents, the following summarizes some of the authority vested in the Architect by the Owner with respect to the Construction Contract and as further described or conditioned in other Articles of these General Conditions of the Contract.

(1) The Architect is authorized to:

(a) approve "minor" deviations through the use of Architect's Supplemental Instruction (ASI), as defined in Article 9, Submittals,

(b) make "minor" changes, through the use of Architect's Supplemental Instruction (ASI), in the Work as defined in Article 19, Changes in the Work,

(c) reject or require the correction of Defective Work,

(d) require the Contractor to stop the performance of Defective Work,

(e) adjust an Application for Payment by the Contractor pursuant to Article 30, Certification and Approval of payments, and

(f) issue Notices to Cure pursuant to Article 27.

(2) The Architect is not authorized to:

(a) revoke, alter, relax, or waive any requirements of the Contract Documents (other than "minor" deviations and changes) without concurrence of the Owner,

(b) finally approve or accept any portion of the Work without concurrence of the Owner,

(c) issue instructions contrary to the Contract Documents,

(d) issue Notice of Termination or otherwise terminate the Contract, or

(e) require the Contractor to stop the Work except only to avoid the performance of Defective Work.

C **LIMITATIONS *of* RESPONSIBILITIES**

(1) The Architect shall not be responsible to Contractors or to others for supervising or coordinating the performance of the Work or for the Construction Methods or safety of the Work, unless the Contract Documents give other specific instructions concerning these matters.

(2) The Architect will not be responsible to the Contractor (nor the Owner) for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents or for acts or omissions of the Contractor, a Subcontractor, or anyone for whose acts they may be liable. However, the Architect will report to the Owner and Contractor any Defective Work recognized by the Architect.

(3) The Architect will endeavor to secure faithful performance by Owner and Contractor, and the Architect will not show partiality to either or be liable to either for results of interpretations or decisions rendered in good faith.

(4) The Contractor's remedies for additional time or expense arising out of or related to this Contract, or the breach thereof, shall be solely as provided for in the Contract Documents. The Contractor shall have no claim or cause of action against the Owner, Architect, or its consultants for any actions or failures to act, whether such claim may be in contract, tort, strict liability, or otherwise, it being the agreement of the parties that the Contractor shall make no claim against the Owner or any agents of the Owner, including the Architect or its consultants, except as may be provided for claims or disputes submitted in accordance with Article 24. The Architect and Architect's consultants shall be considered third party beneficiaries of this provision of the Contract and entitled to enforce same.

D **ARCHITECT'S DECISIONS**

Decisions by the Architect shall be in writing The Architect's decisions on matters relating to aesthetic effect will be final and binding if consistent with the intent expressed in the Contract Documents. The Architect's decisions regarding disputes arising between the Contractor and Owner shall be advisory.

Article 43
CASH ALLOWANCES

A All allowances stated in the Contract Documents shall be included in the Contract Sum. Items covered by allowances shall be supplied by the Contractor as directed by the Architect or Owner and the Contractor shall afford the Owner the economy of obtaining competitive pricing from responsible bidders for allowance items unless other purchasing procedures are specified in the Contract Documents.

B Unless otherwise provided in the Supplementary Conditions of the Contract Documents:

(1) allowances shall cover the cost to the Contractor of materials and equipment delivered to the Project site and all applicable taxes, less applicable trade discounts;

(2) the Contractor's costs for unloading, storing, protecting, and handling at the site, labor, installation, overhead, profit, subcontractor overhead and profit, and other expenses related to materials or equipment covered by an allowance shall be included in the Contract Sum but not in the allowances;

(3) if required, the Contract Sum shall be adjusted by Change Order to reflect the actual costs of an allowance.

C Any selections of materials or equipment required of the Architect or Owner under an allowance shall be made in sufficient time to avoid delay of the Work.

Article 44
PERMITS, LAWS, *and* REGULATIONS

A **PERMITS, FEES AND NOTICES**

(1) Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses, and inspections (including all AHJ fees) necessary for proper execution and completion of the Work which are customarily secured after award of the Construction Contract and which are in effect on the date of receipt of bids.

(2) The Contractor shall comply with and give notices required by all laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

B **TAXES**

Unless stated otherwise in the Contract Documents, materials incorporated into the Work are exempt from sales and use tax pursuant to Section 40-9-33, Code of Alabama, 1975 as amended. The Owner, Contractor and its subcontractors shall be responsible for complying with rules and regulations of the Sales, Use, & Business Tax Division of the Alabama Department of Revenue regarding certificates and other qualifications necessary to claim such exemption when making qualifying purchases from vendors. The Contractor shall pay all applicable taxes that are not covered by the exemption of Section 40-9-33 and which are imposed as of the date of receipt of bids, including those imposed as of the date of receipt of bids but scheduled to go into effect after that date.

C **COMPENSATION** *for* **INCREASES**

The Contractor shall be compensated for additional costs incurred because of increases in tax rates imposed after the date of receipt of bids.

D **ALABAMA IMMIGRATION LAW**

Per ACT 2011-535 as codified in Title 31, Chapter 13 of the Code of Alabama, 1975, as amended:
The contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.

E **ALABAMA BOYCOTT LAW**

Per Act 2016-312as codified in Title 41, Chapter 16, Article 1, of the Code of Alabama, 1975, as amended:
The contracting parties affirm, for the duration of the agreement, that they are not currently engaged in, and will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state can enjoy open trade.

F **ACCOUNTING** *of* **SALES TAX EXEMPT PROJECTS**

Per Act 2013-205 as codified in Title 40, Chapter 9, Article 1, of the Code of Alabama, 1975, as amended:
In bidding the work on a tax exempt project, the bid form shall provide an accounting for the tax savings.

Article 45
ROYALTIES, PATENTS, *and* COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend, indemnify and hold harmless the Owner, Architect, Architect's consultants, and their agents, employees, and consultants from and against all claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of, related to, or resulting from all suits or claims for infringement of any patent rights or copyrights arising out of the inclusion of any patented or copyrighted materials, methods, or systems selected by the Contractor and used during the execution of or incorporated into the Work. This indemnification does not apply to any suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods, or systems specified in the Contract Documents. However, if the Contractor has information that a specified material, method, or system is or may constitute an infringement of a patent or copyright, the Contractor shall be responsible for any resulting loss unless such information is promptly furnished to the Architect.

Article 46
USE *of the* SITE

A The Contractor shall confine its operations at the Project site to areas permitted by the Owner and by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials, equipment, employees' vehicles, or debris. The Contractor's operations at the site shall be restricted to the sole purpose of constructing the Work, use of the site as a staging, assembly, or storage area for other business which the Contractor may undertake shall not be permitted.

B Unless otherwise provided in the Contract Documents, temporary facilities, such as storage sheds, shops, and offices may be erected on the Project site with the approval of the Architect and Owner. Such temporary buildings and/or utilities shall remain the property of the Contractor, and be removed at the Contractor's expense upon completion of the Work, unless the Owner authorizes their abandonment without removal.

Article 47
CUTTING *and* PATCHING

A The Contractor shall be responsible for all cutting, fitting, or patching that may be required to execute the Work to the results indicated in the Contract Documents or to make its parts fit together properly.

B Any cutting, patching, or excavation by the Contractor shall be supervised and performed in a manner that will not endanger persons nor damage or endanger the Work or any fully or partially completed construction of the Owner or separate contractors.

Article 48
IN-PROGRESS *and* FINAL CLEANUP

A **IN-PROGRESS CLEAN-UP**

(1) The Contractor shall at all times during the progress of the Work keep the premises and surrounding area free from rubbish, scrap materials and debris resulting from the Work. Trash and combustible materials shall not be allowed to accumulate inside buildings or elsewhere on the premises. At no time shall any rubbish be thrown from window openings. Burning of trash and debris on site is not permitted.

(2) The Contractor shall make provisions to minimize and confine dust and debris resulting from construction activities.

B **FINAL CLEAN-UP**

(1) Before Substantial Completion or Final Acceptance is achieved, the Contractor shall have removed from the Owner's property all construction equipment, tools, and machinery; temporary structures and/or utilities including the foundations thereof (except such as the Owner permits in writing to remain); rubbish, debris, and waste materials; and all surplus materials, leaving the site clean and true to line and grade, and the Work in a safe and clean condition, ready for use and operation.

(2) In addition to the above, and unless otherwise provided in the Contract Documents, the Contractor shall be responsible for the following special cleaning for all trades as the Work is completed:

(a) Cleaning of all painted, enameled, stained, or baked enamel work: Removal of all marks, stains, finger prints and splatters from such surfaces.

(b) Cleaning of all glass: Cleaning and removing of all stickers, labels, stains, and paint from all glass, and the washing and polishing of same on interior and exterior.

(c) Cleaning or polishing of all hardware: Cleaning and polishing of all hardware.

(d) Cleaning all tile, floor finish of all kinds: Removal of all splatters, stains, paint, dirt, and dust, the washing and polishing of all floors as recommended by the manufacturer or required by the Architect.

(e) Cleaning of all manufactured articles, materials, fixtures, appliances, and equipment: Removal of all stickers, rust stains, labels, and temporary covers, and cleaning and conditioning of all manufactured articles, material, fixtures, appliances, and electrical, heating, and air conditioning equipment as recommended or directed by the manufacturers, unless otherwise required by the Architect; blowing out or flushing out of all foreign matter from all equipment, piping, tanks, pumps, fans, motors, devices, switches, panels, fixtures, boilers, sanitizing potable water systems; and freeing identification plates on all equipment of excess paint and the polishing thereof.

C **OWNER'S RIGHT *to* CLEAN-UP**

If the Contractor fails to comply with these clean-up requirements and then fails to comply with a written directive by the Architect to clean-up the premises within a specified time, the Architect or Owner may implement appropriate clean-up measures and the cost thereof shall be deducted from any amounts due or to become due the Contractor.

Article 49
LIQUIDATED DAMAGES

A Time is the essence of the Contract. Any delay in the completion of the Work required by the Contract Documents may cause inconvenience to the public and loss and damage to the Owner including but not limited to interest and additional administrative, architectural, inspection and supervision charges. By executing the Construction Contract, the Contractor agrees that the Contract Time is sufficient for the achievement of Substantial Completion.

B The Contract Documents may provide in the Construction Contract or elsewhere for a certain dollar amount for which the Contractor and its Surety (if any) will be liable to the Owner as liquidated damages for each calendar day after expiration of the Contract Time that the Contractor fails to achieve Substantial

Completion of the Work. If such daily liquidated damages are provided for, Owner and Contractor, and its Surety, agree that such amount is reasonable and agree to be bound thereby.

C If a daily liquidated damage amount is not otherwise provided for in the Contract Documents, a time charge equal to six percent interest per annum on the total Contract Sum may be made against the Contractor for the entire period after expiration of the Contract Time that the Contractor fails to achieve Substantial Completion of the Work.

D In addition to the amount of liquidated damages under either paragraph B or C above, additional liquidated damages for days beginning at ten (10) days thereafter shall be an additional $200/day for the Owner's nominal reimbursement to the Architect for continued work on the project.

E The amount of liquidated damages due under either paragraph B or C, above, may be deducted by the Owner from the moneys otherwise due the Contractor in the Final Payment, not as a penalty, but as liquidated damages sustained, or the amount may be recovered from Contractor or its Surety. If part of the Work is substantially completed within the Contract Time and part is not, the stated charge for liquidated damages shall be equitably prorated to that portion of the Work that the Contractor fails to substantially complete within the Contract Time. It is mutually understood and agreed between the parties hereto that such amount is reasonable as liquidated damages.

F Liquidated Damages use ACCS Form 2-F and are routed as Change Orders for work that the contractor has failed to substantially complete within the Contract Time. Before the process of applying liquidated damages begins, communication and approval is required from the ACCS Chief Facilities Officer. The Contractor's signature is not required for Liquidated Damages using ACCS Form 2-F.

Article 50
USE *of* FOREIGN MATERIALS

A In the performance of the Work the Contractor agrees to use materials, supplies, and products manufactured, mined, processed or otherwise produced in the United States or its territories, if same are available at reasonable and competitive prices and are not contrary to any sole source specification implemented under the Public Works Law.

B In the performance of the Work the Contractor agrees to use steel produced in the United States if the Contract Documents require the use of steel and do not limit its supply to a sole source pursuant to the Public Works Law. If the Owner decides that the procurement of domestic steel products becomes impractical as a result of national emergency, national strike, or other cause, the Owner shall waive this restriction.

C If domestic steel or other domestic materials, supplies, and products are not used in accordance with preceding Paragraphs A and B, the Contract Sum shall be reduced by an amount equal to any savings or benefits realized by the Contractor.

D This Article applies only to Public Works projects financed entirely by the State of Alabama or any political subdivision of the state.

Article 51

PROJECT SIGN

A project sign is not required for ACCS projects unless specifically indicated in the drawings or project manual.

END OF GENERAL CONDITIONS OF THE CONTRACT

FACILITIES DIVISION

ACCS FORM 2-C

PERFORMANCE BOND

7 **SURETY'S BOND NUMBER:**	

1 The **PRINCIPAL** (Company name and address of Contractor as appears in the Construction Contract)

NAME:	
Address:	

2 The **SURETY** (Company name and primary place of business)

NAME:	
Address:	

3 The **OWNER:** THE ALABAMA COMMUNITY COLLEGE SYSTEM ON BEHALF OF:

Address:	

4 The **PENAL SUM** of this Bond (the Contract Sum):

5 **DATE** of the Construction Contract:

6 The **PROJECT:** (Same as appears in the Construction Contract)

1. WE, THE PRINCIPAL (hereinafter "Contractor") AND THE SURETY, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the Penal Sum stated above for the performance of the Contract, and Contract Change Orders, in accord with the requirements of the Contract Documents, which are incorporated herein by reference. If the Contractor performs the Contract, and Contract Change Orders, in accordance with the Contract Documents, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

2. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

3. Whenever the Architect gives the Contractor and the Surety, at their addresses stated above, a written Notice to Cure a condition for which the Contract may be terminated in accordance with the Contract Documents, the Surety may, within the time stated in the notice, cure or provide the Architect with written verification that satisfactory positive action is in process to cure the condition.

4. The Surety's obligation under this Bond becomes effective after the Contractor fails to satisfy a Notice to Cure and the Owner:

(a) gives the Contractor and the Surety, at their addresses stated above, a written Notice of Termination declaring the Contractor to be in default under the Contract and stating that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the notice; and

(b) gives the Surety a written demand that, upon the effective date of the Notice of Termination, the Surety promptly fulfill its obligation under this Bond.

5. In the presence of the conditions described in Paragraph 4, the Surety shall, at its expense:

(a) On the effective date of the Notice of Termination, take charge of the Work and be responsible for the safety, security, and protection of the Work, including materials and equipment stored on and off the Project site, and

(b) Within twenty-one days after the effective date of the Notice of Termination, proceed, or provide the Owner with written verification that satisfactory positive action is in process to facilitate proceeding promptly, to complete the Work in accordance with the Contract Documents, either with the Surety's resources or through a contract between the Surety and a qualified contractor to whom the Owner has no reasonable objection.

6. As conditions precedent to taking charge of and completing the Work pursuant to Paragraph 5, the Surety shall neither require, nor be entitled to, any agreements or conditions other than those of this Bond and the Contract Documents. In taking charge of and completing the Work, the Surety shall assume all rights and obligations of the Contractor under the Contract Documents; however, the Surety shall also have the right to assert "Surety Claims" to the Owner in accordance with the Contract Documents. The presence or possibility of a Surety Claim shall not be just cause for the Surety to fail or refuse to promptly take charge of and complete the Work or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

7. By accepting this Bond as a condition of executing the Construction Contract, and by taking the actions described in Paragraph 4, the Owner agrees that:

(a) the Owner shall promptly advise the Surety of the unpaid balance of the Contract Sum and, upon request, shall make available or furnish to the Surety, at the cost of reproduction, any portions of the Project Record, and

(b) as the Surety completes the Work, or has it completed by a qualified contractor, the Owner shall pay the Surety, in accordance with terms of payment of the Contract Documents, the unpaid balance of the Contract Sum, less any amounts that may be or become due the Owner from the Contractor under the Construction Contract or from the Contractor or the Surety under this Bond.

8. In the presence of the conditions described in Paragraph 4, the Surety's obligation includes responsibility for the correction of Defective Work, liquidated damages, and reimbursement of any reasonable expenses incurred by the Owner as a result of the Contractor's default under the Contract, including architectural, engineering, administrative, and legal services.

9. Nothing contained in this Bond shall be construed to mean that the Surety shall be liable to the Owner for an amount exceeding the Penal Sum of this Bond, except in the event that the Surety should be in default under the Bond by failing or refusing to take charge of and complete the Work pursuant to Paragraph 5. If the Surety should fail or refuse to take charge of and complete the Work, the Owner shall have the authority to take charge of and complete the Work, or have it completed, and the following costs to the Owner, less the unpaid balance of the Contract Sum, shall be recoverable under this Bond:

(a) the cost of completing the Contractor's responsibilities under the Contract, including correction of Defective Work;

(b) additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees incident to completing the Work;

(c) interest on, and the cost of obtaining, funds to supplement the unpaid balance of the Contract Sum as may be necessary to cover the foregoing costs;

(d) the fair market value of any reductions in the scope of the Work necessitated by insufficiency of the unpaid balance of the Contract Sum and available supplemental funds to cover the foregoing costs; and

(f) additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees incident to ascertaining and collecting the Owner's losses under the Bond.

10. All claims and disputes arising out of or related to this bond, or its breach, shall be resolved in accordance with Article 24, General Conditions of the Contract.

8 **SIGNED AND SEALED** this -Day- of -Month- -Year-

9 **SURETY:**

_____
SURETY COMPANY NAME

BY: _____
SIGNEE'S PRINTED NAME

TITLE: _____
SIGNEE'S TITLE

10 **CONTRACTOR** as **PRINCIPAL:**

_____
CONTRACTOR COMPANY NAME

BY: _____
SIGNEE'S PRINTED NAME

TITLE: _____
SIGNEE'S TITLE

11 **NOTE:** Original power of attorney for the Surety's signatory shall be furnished with the original bond form to be attached to each of the contract forms per project.

FACILITIES DIVISION

ACCS FORM 2-D

PAYMENT BOND

7 **SURETY'S BOND NUMBER:**	

1 The **PRINCIPAL** (Company name and address of Contractor as appears in the Construction Contract)

NAME:	
Address:	

2 The **SURETY** (Company name and primary place of business)

NAME:	
Address:	

3 The **OWNER:** THE ALABAMA COMMUNITY COLLEGE SYSTEM ON BEHALF OF:

Address:	

4 The **PENAL SUM** of this Bond (the Contract Sum):

5 **DATE** of the Construction Contract:

6 The **PROJECT:** (Same as appears in the Construction Contract)

1. WE, THE PRINCIPAL (hereinafter "Contractor") AND THE SURETY, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the Penal Sum stated above to promptly pay all persons supplying labor, materials, or supplies for or in the prosecution of the Contract, which is incorporated herein by reference, and any modifications thereof by Contract Change Orders. If the Contractor and its Subcontractors promptly pay all persons supplying labor, materials, or supplies for or in the prosecution of the Contract and Contract Change Orders, then this obligation shall be null and void; otherwise to remain and be in full force and effect.

2. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

3. Any person that has furnished labor, materials, or supplies for or in the prosecution of the Contract and Contract Change Orders for which payment has not been timely made may institute a civil action upon this Bond and have their rights and claims adjudicated in a civil action and judgment entered thereon. Notwithstanding the foregoing, a civil action may not be instituted on this bond until 45 days after written notice to the Surety of the amount claimed to be due and the nature of the claim. The civil action must commence not later than one year from the date of final settlement of the Contract. The giving of notice by registered or certified mail, postage prepaid, addressed to the Surety at any of its places of business or offices shall be deemed sufficient. In the event the Surety or Contractor fails to pay the claim in full within 45 days from the mailing of the notice, then the person or persons may recover from the Contractor and Surety, in addition to the amount of the claim, a reasonable attorney's fee based on the result, together with interest on the claim from the date of the notice.

4. Every person having a right of action on this bond shall, upon written application to the Owner indicating that labor, material, or supplies for the Work have been supplied and that payment has not been made, be promptly furnished a certified copy of this bond and the Construction Contract. The claimant may bring a civil action in the claimant's name on this Bond against the Contractor and the Surety, or either of them, in the county in which the Work is to be or has been performed or in any other county where venue is otherwise allowed by law.

5. This bond is furnished to comply with Code of Alabama, §39-1-1, and all provisions thereof shall be applicable to civil actions upon this bond.

6. All claims and disputes between Owner and either the Contractor or Surety arising out of or related to this bond, or its breach, shall be resolved in accordance with Article 24, General Conditions of the Contract.

8 **SIGNED AND SEALED** this -Day- of -Month- -Year-

9 **SURETY:**

_____
SURETY COMPANY NAME

BY: _____
SIGNEE'S PRINTED NAME

TITLE: _____
SIGNEE'S TITLE

10 **CONTRACTOR** as **PRINCIPAL:**

_____
CONTRACTOR COMPANY NAME

BY: _____
SIGNEE'S PRINTED NAME

TITLE: _____
SIGNEE'S TITLE

11 **NOTE:** Original power of attorney for the Surety's signatory shall be furnished with the original bond form to be attached to each of the contract forms per project.

FACILITIES MANAGEMENT

ACCS FORM 2-E

ACKNOWLEDGEMENT OF UNDERSTANDING FOR USE OF ALLOWANCES AND CHANGE ORDERS

ACCS PROJECT #:	
PROJECT NAME:	
DESIGN PROFESSIONAL:	
CONTRACTOR:	
COLLEGE:	

DEFINITIONS:

ALLOWANCES: Specific line items in the contract with a predetermined amount of money that acts as "placeholders" for materials, labor, equipment or services not yet finalized or selected.

CHANGE ORDER: Formal, written agreement between the Alabama Community College System (ACCS) and the Contractor that modifies the original contract's scope of work, total amount, cost, or time.

1. Any use of **Allowances** will be documented through a **Change Order**.
   a. The use of **Allowances** will need the approval of the Design Professional and ACCS.
   b. College approval for the use of **Allowances** requires ACCS and Design Professional authorization before any work is performed.

2. Failure to follow the **Change Order** process, and to do the work without approval of the Design Professional and ACCS, will result in a forfeiture of payment for that work performed.

3. Failure of the Design Professional to process **Change Order** requests, as stipulated in the General Conditions of the Contract, may forfeit the cost of the work, in calculating the design fee, and may result in the Design Professional being liable to pay for the work performed by the Contractor.

SIGNATURES:

DESIGN PROFESSIONAL: _____ DATE: _____

CONTRACTOR: _____ DATE: _____

ACCS REGIONAL FACILITIES DIRECTOR: _____ DATE: _____

COLLEGE DESIGNATED REPRESENTATIVE: _____ DATE: _____

FACILITIES DIVISION

ACCS FORM 2-F

***NOTE: Any Change Orders without documented ACCS Facilities Division approval will be at the expense of the Architect and/or the Contractor.**

CONTRACT CHANGE ORDER

ACCS PROJECT#:	
CHANGE ORDER#:	
DATE:	

PROJECT:

TO: <Contractor Company Name>

Address:	

TERMS: You are hereby authorized, subject to the provisions of your Contract for this project, to make the following changes thereto in accordance with your proposal(s) dated:

FURNISH the necessary labor, materials, and equipment to:
(Description of work to be done or changes to be made. If the description is continued in an attachment, identify the attachment below.)

Review/Initial of Regional Facilities Director _____

ACCS FORM 2-F

ORIGINAL CONTRACT SUM:		ORIGINAL SUBSTANTIAL COMPLETION DATE:	
NET TOTAL OF PREVIOUS CHANGE ORDERS:		ORIGINAL CONTRACT DURATION (DAYS):	
PREVIOUS REVISED CONTRACT SUM:	$ 0.00	NET TOTAL OF DAYS FROM PREVIOUS CHANGE ORDERS:	0
THIS CHANGE ORDER WILL: ◯ INCREASE ◯ DECREASE ◯ USE ALLOWANCES		THIS CHANGE ORDER WILL: ◯ INCREASE ◯ DECREASE	
THE CONTRACT SUM BY:		THE CONTRACT DURATION BY (DAYS)	0
REVISED CONTRACT SUM, INCLUDING THIS CHANGE ORDER:	$ 0.00	REVISED CONTRACT DURATION, INCLUDING THIS CHANGE ORDER:	
The amount of this Change Order will be the responsibility of: <Select Client>		REVISED SUBSTANTIAL COMPLETION DATE, INCLUDING THIS CHANGE ORDER:	

The **OWNER** does hereby certify that this **CHANGE ORDER** was executed per the provisions of Title 39, Code of Alabama, 1975, as amended.

RECOMMENDED BY

_____
ARCHITECTURAL/ENGINEERING FIRM

BY: _____

NAME: _____

TITLE: _____

APPROVALS

_____
COMMUNITY COLLEGE PRESIDENT

BY: _____
SIGNATURE OF OFFICER

NAME: _____

TITLE: _____

ALABAMA COMMUNITY COLLEGE SYSTEM (ACCS)

BY: _____ DATE: _____
CHIEF FACILITIES OFFICER

CONTRACTING PARTIES

_____
CONTRACTOR COMPANY

BY: _____

NAME: _____

TITLE: _____

ALABAMA COMMUNITY COLLEGE SYSTEM
(AS OWNER)

BY: _____
CHANCELLOR

CONSENT OF SURETY

_____
SURETY COMPANY

BY: _____
(ATTACH CURRENT POWER OF ATTORNEY)

Review/Initial of Regional Facilities Director _____

FACILITIES DIVISION

ACCS FORM 2-G

***NOTE: Any Change Order without documented ACCS Facilities Division approval is the expense of the Architect and/or the Contractor.**

CHANGE ORDER JUSTIFICATION

•Purpose and instructions on next page. Do not staple this form and/or attachments; use clips

CHANGE ORDER JUSTIFICATION #		ACCS PROJECT #		DATE:	

A **PROJECT NAME & LOCATION:**

OWNER ENTITY NAME & ADDRESS:

CONTRACTOR COMPANY NAME & ADDRESS:

ARCHITECTURAL/ENGINEERING FIRM NAME & ADDRESS:

B **DESCRIPTION OF PROPOSED CHANGE(S):** **Attach contractor's detailed cost proposal(s)*

C THIS CHANGE ORDER WILL: ◯ INCREASE ◯ DECREASE		THE CONTRACT SUM BY:	
THIS CHANGE ORDER WILL USE ALLOWANCES: ◯ YES ◯ NO		THE AMOUNT OF ALLOWANCES USED:	
THIS CHANGE ORDER WILL: ◯ INCREASE ◯ DECREASE		THE CONTRACT DURATION BY (DAYS):	

D **THE CHANGE ORDER IS:**

- ◯ **Owner (ACCS) directed changes in the Work**
- ◯ **College requested changes in Work**
- ◯ **Differing (hidden) site conditions**
- ◯ **Other (please explain in Section D)**

JUSTIFICATION FOR NEED OF CHANGE(S):

Attach documented written approval from ACCS to proceed with change order.

E **JUSTIFICATION OF CHANGE ORDER** vs. **COMPETITIVE BID:**

F **ARCHITECT/ENGINEER'S EVALUATION OF PROPOSED COST:**

Review/Initial of Regional Facilities Director _____

G CHANGER ORDER RECOMMENDED	CHANGE ORDER JUSTIFIED AND APPROVED
_____ ARCHITECTURAL/ENGINEERING FIRM NAME BY: _____ ARCHITECT/ENGINEER'S SIGNATURE BY: _____ OWNER'S DESIGNATED REPRESENTATIVE SIGNATURE	BY: _____ ACCS CHIEF FACILITIES OFFICER BY: _____ OWNER'S LEGAL COUNSEL'S SIGNATURE (FOR CHANGE ORDERS 10% OR GREATER)

CHANGE ORDER JUSTIFICATION: PURPOSE and INSTRUCTIONS

The **CHANGE ORDER JUSTIFICATION** is to be prepared by the design professional, who has evaluated the fairness and reasonableness of the proposed cost of the change(s) and recommends that the proposed Change Order be executed. The fully executed Form **CHANGE ORDER JUSTIFICATION** must accompany the proposed Change Order. Instructions for completing the Change Order Justification form are:

1. Insert the proposed Change Order Number, date of the Justification, and ACCS Project Number in the spaces provided in the upper right-hand corner.

2. Section (A): Insert the complete name and address of the PROJECT, OWNER(S), CONTRACTOR, AND ARCHITECT/ENGINEER.

3. Section (B): Provide a complete description of the proposed changes in work, referring to and attaching r evised specifications and/or drawings as appropriate. An attachment may be used if additional space is needed. **Attached a copy of the contractor's detailed cost proposal.**

4. Section (C): Insert the Contract Sum increase or decrease and the Contract Duration increase or decrease of Days of this Change Order request.

5. Section (D): Explain why it is necessary, or in the public's interest, to make the proposed change(s) to the Work. Select the type of Change Order. Attach documented written approval.

6. Section (E): Explain why award of the changed work to the existing contractor instead of awarding the work under the competitive bid process is justified.

7. Section (F): The design professional must state his or her evaluation of the reasonableness and fairness of the proposed costs based upon his or her review of the contractor's proposal.

8. Section (G): The design professional must recommend the Change Order to the Owner by signing the document; the Owner may require such recommendation from other individuals.

FACILITIES DIVISION

ACCS FORM 2-H

SUPPLY BOND

BOND NUMBER:

KNOW ALL BY THESE PRESENTS:

That _____, called the Principal, and _____, a _____, called the Surety, and _____ , called the Obligee, in the amount of _____U.S. Dollars($_____), for payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein.

WHEREAS, Principal entered into that certain material and/or equipment contract ("Contract") with the Obligee dated _____ for _____, a copy of which is by reference made a part hereof ("Contract").

NOW, THEREFORE, if Principal shall faithfully comply with all terms and conditions of said Contract, or if the Principal or Surety shall pay, indemnify, and hold harmless the Obligee from all direct damages sustained by the Obligee as a result of any default by the Principal under the Contract, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, however, that it is a condition precedent to recovery under this bond that written notice of any default claimed under the Contract be provided to Surety at the following address:

_____

_____.

However, the failure to comply with this notice requirement shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or to release the Surety from its obligations, except to the extent that the Surety demonstrates actual prejudice;

PROVIDED, further, that any suit by the Obligee under this bond must be instituted before the later of (**a**) the expiration of one year from the date the Principal was obligated under the Contract, which may be extended by the agreement of Principal and Obligee, to deliver the materials and/or equipment to the Obligee, or (**b**) the expiration of one year from the date any other default by the Principal under the Contract;

PROVIDED, further, that notwithstanding anything herein to the contrary, the terms of this bond shall be read to be consistent with the requirements of **Title 39** of the **Code of Alabama** relating to performance bonds required of persons contracting for public works, and

PROVIDED, further that no right of action shall accrue on this bond to or for the use of any person or corporation other than the Obligee named herein or its successor.

Sealed with our seals and dated this ___ day of _____, _____.

Witness _____

Witness _____

Agreed and acknowledged this _____ day of _____ , _____.

By: _____

Obligee

PRINCIPAL:

_____

_____

Title: _____

SURETY:

_____

_____

Title: _____

State of Alabama

Disclosure Statement

Required by Article 3B of Title 41, Code of Alabama 1975

ENTITY COMPLETING FORM

ADDRESS

CITY, STATE, ZIP TELEPHONE NUMBER

STATE AGENCY/DEPARTMENT THAT WILL RECEIVE GOODS, SERVICES, OR IS RESPONSIBLE FOR GRANT AWARD

ADDRESS

CITY, STATE, ZIP TELEPHONE NUMBER

This form is provided with:

☐ Contract ☐ Proposal ☐ Request for Proposal ☐ Invitation to Bid ☐ Grant Proposal

Have you or any of your partners, divisions, or any related business units previously performed work or provided goods to any State Agency/Department in the current or last fiscal year?

☐ Yes ☐ No

If yes, identify below the State Agency/Department that received the goods or services, the type(s) of goods or services previously provided, and the amount received for the provision of such goods or services.

STATE AGENCY/DEPARTMENT	TYPE OF GOODS/SERVICES	AMOUNT RECEIVED

Have you or any of your partners, divisions, or any related business units previously applied and received any grants from any State Agency/Department in the current or last fiscal year?

☐ Yes ☐ No

If yes, identify the State Agency/Department that awarded the grant, the date such grant was awarded, and the amount of the grant.

STATE AGENCY/DEPARTMENT	DATE GRANT AWARDED	AMOUNT OF GRANT

1. List below the name(s) and address(es) of all public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

NAME OF PUBLIC OFFICIAL/EMPLOYEE	ADDRESS	STATE DEPARTMENT/AGENCY

2. List below the name(s) and address(es) of all family members of public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the public officials/public employees and State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

NAME OF FAMILY MEMBER	ADDRESS	NAME OF PUBLIC OFFICIAL/ PUBLIC EMPLOYEE	STATE DEPARTMENT/ AGENCY WHERE EMPLOYED

If you identified individuals in items one and/or two above, describe in detail below the direct financial benefit to be gained by the public officials, public employees, and/or their family members as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

Describe in detail below any indirect financial benefits to be gained by any public official, public employee, and/or family members of the public official or public employee as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

List below the name(s) and address(es) of all paid consultants and/or lobbyists utilized to obtain the contract, proposal, request for proposal, invitation to bid, or grant proposal:

NAME OF PAID CONSULTANT/LOBBYIST	ADDRESS

By signing below, I certify under oath and penalty of perjury that all statements on or attached to this form are true and correct to the best of my knowledge. I further understand that a civil penalty of ten percent (10%) of the amount of the transaction, not to exceed $10,000.00, is applied for knowingly providing incorrect or misleading information.

Signature Date

Notary's Signature Date Date Notary Expires

Article 3B of Title 41, Code of Alabama 1975 requires the disclosure statement to be completed and filed with all proposals, bids, contracts, or grant proposals to the State of Alabama in excess of $5,000.

Revised: 09/2013

FACILITIES DIVISION

ACCS FORM 6-A

PRE-CONSTRUCTION CONFERENCE CHECKLIST

PROJECT NAME:			
ACCS PROJECT #		**DATE:**	
ANTICIPATED NTP DATE:		**MEETING PLACE:**	
ANTICIPATED COMPLETION DATE:		**MEETING TIME:**	

NA			
	1.		**INTRODUCTIONS**
○ ○	**A.**		**Attendees have all completed Pre-Construction Sign-In Sheet (Name/Company/Telephone/Email)**
○ ○	**B.**		**Define the Project Team - Introduction of all participants and their roles**
○ ○		**1.**	College Personnel - Owner; ACCS Facilities; College
○ ○		**2.**	Design Professional(s) - Architect's Representative(s); Engineer's Representative(s)
○ ○		**3.**	Contractor(s) - Project Manager; Superintendent; Major Sub-Contractor(s)
	2.		**PROJECT CONTRACT**
○ ○	**A.**		**ACCS Facilities Division authority**
○ ○		**1.**	After bid there are no scope changes, change orders, etc without ACCS approval
○ ○		**2.**	Acknowledgment of Understanding for Use of Allowances and Change Orders
○ ○	**B.**		**Identify Contract Amount - Base Bid plus Alternates**
○ ○		**1.**	Verify Alternates accepted
○ ○		**2.**	Review of Allowance and Unit Prices
○ ○		**3.**	Value Engineering
○ ○	**C.**		**Verify end of Contract has everything checked**
○ ○	**D.**		**Notice to Proceed Date**
○ ○	**E.**		**Contract Completion Date**
○ ○	**F.**		**Liquidated Damages will be processed as Change Orders**
○ ○	**G.**		**Conformance Documents set of Drawings and Project Manual made available to contractor**
○ ○	**H.**		**Approved Schedule of Values**
○ ○		**1.**	How to correctly calculate the percentage of the schedule
○ ○	**I.**		**Letter from manufacturer on long lead times**
○ ○	**J.**		**Approved list of sub-contractors**
○ ○	**K.**		**Approved Weather Days – How to correctly calculate weather days**
○ ○	**L.**		**Contractor to provide building permit status**
○ ○	**M.**		**Pay Applications**
○ ○		**1.**	Pay Applications will be presented and reviewed in OAC meetings
○ ○		**2.**	Pay Applications require the following attachments: **Schedule of Values**, **Construction Schedule**, **Progress Schedule**, and copies of any **Change Orders** requested for payment
○ ○		**3.**	Any Pay Application with a Change Order shall have back up documentation before it can be reviewed
○ ○		**4.**	All Final Pay Applications for Contractor and Design Professional will require ACCS Facilities Division review and approval
○ ○	**N.**		**Change Order process**
	3.		**PROCEDURAL AND COORDINATION ITEMS**
○ ○	**A.**		**Point of contact for project. Job Superintendent and phone number.**
○ ○	**B.**		**Contractor's duty to coordinate work of separate contractors**
○ ○		**1.**	CMa responsible for multi-prime contracts
○ ○	**C.**		**Conduct of contractor's personnel**
○ ○		**1.**	Construction crew members shall conduct themselves professionally at all times
○ ○		**2.**	No interaction with faculty, staff and/ or students
○ ○		**3.**	No foul language

NA			3. PROCEDURAL AND COORDINATION ITEMS (CONTINUED)
○		○	4. No smoking or use of tobacco products
○		○	5. No drugs or alcohol
○		○	6. No firearms on school property
○	○		**D. Project sign and other job signs**
○	○		**E. Overall phasing of the work**
○	○		**F. Communication from College regarding dates and times of unavailability**
○		○	1. Coordinate outages and work in existing building(s) with Owner
○	○		**G. Use of site and existing building(s), access drive, keep existing exit paths open**
○		○	1. Project limits as shown on drawings
○		○	2. Building location(s) relative to critical property line, easement, setback, etc.
○		○	3. Verify sanitary outfall before committing floor level
○		○	4. Protecting trees
○		○	5. Contractor must provide own dumpster(s) and cannot use facility dumpsters
○		○	6. Parking for workers
○	○		**H. Use of existing toilets or need for temporary toilet facilities**
○	○		**I. Coordinate and utilities supplied by Owner**
○		○	1. Where utility cut off valves are onsite in case of emergency
○	○		**J. Material storage, lay down areas and staging areas**
○	○		**K. Routine job cleanup**
○		○	1. Secure job site (tools, materials, work)
○	○		**L. OSHA - report all accidents - safety General Contractor's responsibility**
○	○		**M. Contractors reminded of obligation to comply with the Alabama Child Labor Law and E-Verify**
○	○		**N. Bring to our attention any issues revealed during work**
NA			**4. OAC MEETINGS FORMAT**
○	○		**A. Frequency of OAC meeting**
○	○		**B. Architect shall coordinate, schedule, and conduct the OAC Meetings**
○	○		**C. Agenda items to be included:**
○		○	1. Review previous OAC meeting minutes
○		○	2. Project Schedule (Critical Path, Delays/Justifications, Recovery Schedule, 2-3 Week Look ahead, Upcoming Inspections/Testing)
○		○	3. RFIs and Submittals Log (Procurement and Materials)
○		○	4. ASIs and Open Change Order Requests
○		○	5. Allowances Log
○		○	6. Change Orders (Additional Days, Calculation of Weather Days)
○		○	7. Pay Applications (Schedule of Values review, Percentage Completion, Progress Schedule)
○		○	8. Job Site Logistics (Access, Site Use, Temporary Facilities, Deliveries, Cleaning, Safety Plans)
○		○	9. Field Observations and Deficiencies Log
○		○	10. Review Date and Time of next OAC meeting
○		○	11. Site Visit after meeting
○	○		**D. Architect shall complete the meeting minutes for circulation and for the Project Record**
NA			**5. INSPECTIONS AND TESTING**
○	○		**A. Advance notice for required inspections, must be requested 14 days in advance**
○		○	1. Contractor to notify architect by email of date project will be ready for inspection by AHJ
○		○	2. Contractor to verify that their own inspection has been completed before AHJ inspection
○	○		**B. Cancellations of inspections may subject contractor to payment of any AHJ cancellation fees**
○	○		**C. Other inspections required before work is covered**
○	○		**D. Third-party inspections/special inspections**

NA	5. INSPECTIONS AND TESTING (CONTINUED)	
○ ○	E.	**Soil Testing**
○ ○	1.	Soil compaction, soil type, lab tests, etc.
○ ○	2.	Soil treatment, mix on site in presence of Superintendent
○ ○	3.	Stock piling top soil (location and protection)
○ ○	4.	Procedure if bad soil or rock is encountered, Geotech and special inspections
○ ○	5.	ADEM land disturbance permits shall be required if site is over 1 acre
○ ○	F.	**Below Slab/Underground Utility Inspection**
○ ○	G.	**Footings and Foundations Inspection**
○ ○	H.	**Concrete Slab Inspection**
○ ○	I.	**Weatherproofing/Building Envelope Inspection**
○ ○	J.	**In-Wall/Framing Inspection**
○ ○	K.	**Gypsum Board Inspection**
○ ○	L.	**Roofing Inspection**
○ ○	M.	**Storm Shelter Inspection (if applicable)**
○ ○	N.	**Above Ceiling Inspections**
○ ○	1.	Required attendees: Contractor, Owner, Architect, MEP Engineers, Major Subs
○ ○	2.	All work must be completed except for installation of ceiling tiles and/or hard ceilings
○ ○	3.	Space must be conditioned
○ ○	4.	Permanent power must be connected unless otherwise arranged
○ ○	5.	Grease duct must be inspected and approved prior to fire wrapping
○ ○	O.	**Life Safety Inspections (Elevator, Fire Suppression, Fire Alarm, Emergency Lights, ADA)**
○ ○	1.	Required attendees: Contractor, Owner, Architect, Engineers, Major Subs, Local Fire Marshall
○ ○	2.	Fire alarm certification
○ ○	3.	Fire alarm monitoring requirements (who is listed as first responder)
○ ○	4.	All sprinkler system valves must be electrically supervised
○ ○	5.	Project Schedule (Critical Path, Delays/Justifications, Recovery Schedule, 2-3 Week Look ahead, Upcoming Inspections/Testing)
○ ○	6.	Above ground and below ground sprinkler certifications
○ ○	7.	Emergency and exit lighting tests
○ ○	8.	Kitchen hood fire suppression systems must be complete and certified
○ ○	9.	Fire alarm and fire sprinkler contractors must be permitted through the State of Alabama Fire Marshall's office. Provide permits
○ ○	10.	Flush/pressure test for new and/or existing fire hydrants
○ ○	11.	Must have clear egress/access and emergency (for first responders) access to building
○ ○	12.	Must have ADA access completed
○ ○	P.	**Substantial Completion**
○ ○	1.	General Contractor's Roofing Guarantee and Manufacturer' s Roofing Warranties must be presented to Owner at Final Inspection and submitted with Certificate of Substantial Completion
○ ○	2.	Certification of Structural Observations from the Structural Engineer of Record must be attached to the Certificate of Substantial Completion form
○ ○	3.	Certificate of Substantial Completion/Final Inspection
○ ○	4.	Advertisement for Completion for projects more than $100,000
○ ○	Q.	**Final Inspection**
○ ○	1.	Completed certificate of structural engineer's observations (for storm shelter)
○ ○	2.	Elevator inspection completed and certificate of operation provided by the State of AL Dept of Labor
○ ○	3.	Boiler/vessels inspection completed and certificate of operation provided by the State of Alabama Department of Labor

NA		
	5.	**INSPECTIONS AND TESTING** (CONTINUED)
○ ○	**4.**	Elevators/Pressure Vessels must be inspected and approved by the State of Alabama Department of Labor prior to final inspection
○ ○	**5.**	Release of retainage - 30 days after completion of advertisement
○ ○	**R.**	**Year-End Inspection**
NA	**6.**	**CONFERENCES**
○ ○	**A.**	**Storm Shelter**
○ ○	**1.**	Required attendees: Contractor, Owner, Architect, Structural Engineer, Major Subs, Special Inspections Representative
○ ○	**2.**	Completed and signed Contractor's Statement of Responsibility for Construction of Tornado Storm Shelter (Hurricane Shelter Where Applicable) along with the required Quality Assurance Plan (QAP) must be submitted to the Owner at or before the pre-construction conference
○ ○	**B.**	**Pre-Roofing Conference**
○ ○	**1.**	Required attendees: Contractor, Owner, Architect, Roofing Sub, Roofing Manufacturer's Rep
○ ○	**2.**	No roofing materials installed prior to conference
○ ○	**3.**	Light gauge metal roof framing and/or wood truss framing to be inspected by structural engineer
○ ○	**4.**	Roofing submittals and warranties must be approved by Architect prior to pre-roofing conference
○ ○	**5.**	Roofing manufacturer must provide documentation that roof design and roofing materials meet code requirements for wind uplift and impact resistance
○ ○	**6.**	Copy of sample roof warranty
○ ○	**C.**	**Pre-Asphalt Paving Installation and Expectations Meeting**
○ ○	**1.**	Required attendees: Contractor, Owner, Architect, Asphalt Sub
○ ○	**2.**	Review sequencing and schedule of paving and striping
○ ○	**3.**	Schedule to make sure surrounding irrigation is 2 days before and 2 days after paving
○ ○	**4.**	Subgrade, milled surface, underlying pavement surface has been approved for paving
○ ○	**5.**	Review examples of expectations for finished project
○ ○	**D.**	**Pre-Landscape Sod Installation and Expectations Meeting**
○ ○	**1.**	Required attendees: Contractor, Owner, Architect, Landscape Sub
○ ○	**2.**	Review sequencing and schedule of landscaping materials
○ ○	**3.**	Review expectations of cleared site, rough grade, top soil depth, finish grade and settled surface
○ ○	**4.**	Review examples of expectations for finished project
○ ○	**E.**	**Pre-Flooring Installation and Expectations Meeting**
○ ○	**1.**	Required attendees: Contractor, Owner, Architect, Flooring Sub
○ ○	**2.**	Review sequencing of the surrounding work (ceilings, walls, painting)
○ ○	**3.**	Surrounding work completed before final flooring is installed
○ ○	**F.**	**Pre-Closeout Review**
○ ○	**1.**	Required attendees: Contractor, Owner, Architect
○ ○	**2.**	Review timeline and checklist
NA	**7.**	**QUALITY CONTROL**
○ ○	**A.**	**Concrete**
○ ○	**1.**	Ready mix plant, file delivery tickets, slump tests, cylinders
○ ○	**2.**	Surveyor to check foundation wall if location critical
○ ○	**3.**	Quality of concrete work; concrete testing
○ ○	**4.**	Inspections before pouring concrete
○ ○	**B.**	**What is expected of masonry work, mortar additive**
○ ○	**C.**	**Problems with hollow metal (install proper fire labels)**
○ ○	**D.**	**Fire damper installation issues**
○ ○	**E.**	**Potential conflict of mechanical and electrical equipment (shop drawings)**
○ ○	**F.**	**Return air plenums (no combustibles)**

NA	8. PROJECT CLOSEOUT	
○	G.	Protect mechanical and electrical items during interior work
○	H.	Coordinate with local fire authority to assure access to the building for firefighting equipment during construction and before final acceptance. Provide fire extinguishers as required.
○	A.	All items received by Owner before Final Acceptance will be issued
○	1.	Closeout Documentation
○	2.	Final Pay Application, fully executed
○	3.	Conformance documents (digital copy)
○	4.	Owner acceptance of nonconforming work by Change Order
○	5.	Schedule of Attic Stock
○	6.	Letter from Design Professional certifying that the work is complete
○	B.	All closeout documentation must be submitted per specifications
○	C.	Project Closeout Documentation
○	1.	Warranties
○	2.	Lien Waivers
○	3.	Operation and Maintenance Manuals and Owner Training videos
○	4.	As-Built Drawings
○	5.	Submittals
○	6.	Tests and Reports
○	D.	After Project Closeout, Contractor to submit Advertisement for Completion
○	E.	Sales tax savings (Alabama Department of Revenue)
○	F.	Warranty Document Information
○	1.	Alabama Community College System
○	2.	Name of College
○	3.	Address/Name of College Building
○	4.	Contact Person: Office of the President

NA	9. OTHER (ADDITIONAL ITEMS SPECIFIC TO THE PROJECT)	
○	1.	
○	2.	
○	3.	
○	4.	
○	5.	
○	6.	
○	7.	

ATTENDEES	
NAME:	**COMPANY:**

APPROVALS

BY: _____ **DATE:** _____
SIGNATURE OF ARCHITECTURAL/ENGINEERING FIRM

BY: _____ **DATE:** _____
OWNER'S DESIGNATED REPRESENTATIVE

BY: _____ **DATE:** _____
SIGNATURE OF CONTRACTOR

BY: _____ **DATE:** _____
SIGNATURE OF REGIONAL FACILITIES DIRECTOR

FACILITIES DIVISION

ACCS FORM 6-C

STATEMENT OF FIELD OBSERVATIONS

ACCS PROJECT#:		**DATE:**		**TIME:**	
PROJECT NAME:					
Address:					
OWNER ENTITY:					
Address:		Phone:			
		Email:			
CONTRACTOR COMPANY:					
Address:		Phone:			
		Email:			
ARCHITECTURAL/ENGINEERING FIRM:					
Address:		Phone:			
		Email:			

PROJECT DATA ON THE DATE OF OBSERVATION

#OF WORKERS:		**START DATE:**	
WEATHER:			
SITE CONDITIONS:			
CONTRACT COMPLETION DATE:		**CONTRACTOR COMPLETION DATE:**	
SCHEDULED STATE OF COMPLETION:	%	**ESTIMATED ACTUAL COMPLETION:**	%
CONTRACTOR'S SUPERINTENDENT:		**JOB PHONE:**	

COMMENTS/DEFICIENCIES:

SIGNATURE:		**REPORT#:**	

CC: Owner, Architect/Engineer, Contractor

FACILITIES DIVISION ACCS FORM 6-D

APPLICATION AND CERTIFICATE FOR PAYMENT

ACCS PROJECT#:		APPLICATION#:		DATE:	
PROJECT:					

TO COLLEGE:			
Address:		Phone:	
		Email:	
FROM CONTRACTOR:			
Address:		Phone:	
		Email:	
ARCHITECT/ENGINEER:			
Address:		Phone:	
		Email:	

TOTAL ORIGINAL CONTRACT:	
FULLY EXECUTED CHANGE ORDER(S) NUMBERS THROUGH	
TOTAL CONTRACT TO DATE:	$ 0.00
Work Completed to Date per attached Schedule of Values:	
Stored Materials:	
Total Completed Work and Stored Materials: (% of Contract To Date)	$ 0.00
5% of Total Completed Work and Stored Materials (TCWSM) is retained when TCWSM is less than or equal to 50% of Total Contract to Date. 0% retained when TCWSM is more than 50% of Total Contract to Date. 0 is retained on final pay app.	☐ **Final Payment Application**
Less Retainage: $ 0.00 **Total Due:**	$ 0.00
Less Total Previous Payments:	$ 0.00
Balance Due This Estimate:	$ 0.00

1 CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that to the best of his knowledge, information, and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by him for Work for which previous Certificates for Payments were issued and payments received from the Owner and that current payment shown herein has not yet been received.

By: _____ **Date:** _____
CONTRACTOR'S SIGNATURE

Name: _____

Title: _____

Sworn and subscribed before me this _____ day of <month>

(SEAL) _____
NOTARY PUBLIC'S SIGNATURE

2 ARCHITECT'S/ENGINEER'S CERTIFICATION

In accordance with the Contract Documents, the Architect or Engineer of Record certifies to the Owner and College that to the best of the Architect's/ Engineer's knowledge and belief:

1. the work has progressed to the point indicated herein **and according to the updated attached project master schedule,**
2. the quality of the Work is in accordance with the Contract documents, and
3. the Contractor is entitled to payment of the amount approved.

By: _____ **Date:** _____
ARCHITECT'S/ENGINEER'S SIGNATURE

Name: _____

Title: _____

INSTRUCTIONS

- Contractor's signature date cannot precede this Pay App date.
- One payment application per month may be submitted.
- Retainage is released as final payment when all close-out requirements per General Conditions Article 34 are completed with ACCS Form 7-F Project Close Out Checklist attached.

3 COLLEGE APPROVAL

By: _____ **Date:** _____
COLLEGE

Name: _____

Title: _____

REQUIRED ATTACHMENTS: 1 ACCS Form 6-E Schedule of Values; 2 practicable construction schedule approved when the Notice to Proceed was issued; 3 updated construction schedule using ACCS Form 6-H Progress Schedule & Report or approved "more comprehensive schedule format;" 4 copies of all approved ACCS Form 2-F Contract Change Orders requesting payment this Pay Application (see General Conditions of the Contract, Article 12 – Progress Schedule).

IF APPLICABLE: ANY PAY APPLICATION THAT REDUCES RETAINAGE REQUIRES ACCS APPROVAL PRIOR TO PROCESSING FOR PAYMENT

_____ **Name:** _____ **Date:** _____
ACCS FACILITIES REPRESENTATIVE

SCHEDULE OF VALUES

ACCS Form 6-E

Project:

ACCS Project No.:

Contractor Company:

Application No.:

Retainage: *5% of Completed Work and Stored Materials to Date (G) is retained when G Total is less than 50% of Scheduled Value (C) Total. 0 is retained on final payment application.*

Application Date:

Period From: Period To:

A	B	C	D	E	F	G		H	I
Item No.	Description of Work	Scheduled Value (including fully executed change orders)	Work Completed: From Previous Application (D+E)	Work Completed: This Period	Materials Presently Stored (Not in D or E)	Completed Work & Stored Materials to Date (D+E+F)	% of Contract to Date (G/C)	Balance to Finish (C-G)	Retainage (Variable Rate)
1.						$ -			$ -
2.						$ -			$ -
3.						$ -			$ -
4.						$ -			$ -
5.						$ -			$ -
6.						$ -			$ -
7.						$ -			$ -
8.						$ -			$ -
9.						$ -			$ -
10.						$ -			$ -
11.						$ -			$ -
12.						$ -			$ -
13.						$ -			$ -
14.						$ -			$ -
15.						$ -			$ -
16.						$ -			$ -
17.						$ -			$ -
18.						$ -			$ -
19.						$ -			$ -
20.						$ -			$ -
21.						$ -			$ -
22.						$ -			$ -
23.						$ -			$ -
24.						$ -			$ -
25.						$ -			$ -
26.						$ -			$ -
27.						$ -			$ -
28.						$ -			$ -
29.						$ -			$ -
30.						$ -			$ -
	TOTALS:	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**$ -**	**$ -**

INVENTORY OF STORED MATERIALS

Project:	ACCS Project No.:
Contractor:	For Estimate No.:
	For Period Ending:

A	B	C	D	E	F
DESCRIPTION	MATERIALS STORED LAST PERIOD	PURCHASED THIS PERIOD	TOTAL COLUMNS B + C	MATERIALS USED THIS PERIOD	MATERIALS PRESENTLY STORED

To be used as documentation to support value of Stored Materials reported on APPLICATION AND CERTIFICATE FOR PAYMENT.

PROJECT DEFICIENCY LOG

ACCS Form 6-G

ACCS Project #:		ACCS Project Name:	
Design Professional:		Contractor:	

Item No.	Description	Location *(Bldg, Room, Level, Etc.)*	Identified By	Date Identified	Priority *(Critical, Major, Minor)*	Report Identifying Deficiency	Target Date for Completion	Assigned To	Date Completed	Signed Off By	Date Signed Off	Status *(Complete, In Progress, Not Started)*	Comments (Reviewer or Contractor)

REV. 102825

ACCS FORM 6-H

SAMPLE PROGRESS SCHEDULE & REPORT

ACCS Project No.:

PROJECT:

CONTRACTOR (Contractor may use own form):

ARCHITECT/ENGINEER:

DATE OF REPORT:

PROCEED DATE:

PROJECTED COMPLETION DATE:

	WORK DIVISION	%	AMOUNT	
1.	GENERAL REQUIREMENTS			
2.	SITEWORK			
3.	CONCRETE			
4.	MASONRY			
5.	METALS			
6.	WOOD AND PLASTIC			100%
7.	THERMAL AND MOISTURE PROTECTION			90%
8.	DOORS AND WINDOWS			80%
9.	FINISHES			70%
10.	SPECIALTIES			60%
11.	EQUIPMENT			50%
12.	FURNISHINGS			40%
13.	SPECIAL CONSTRUCTION			30%
14.	CONVEYING SYSTEMS			20%
15.	MECHANICAL			10%
16.	ELECTRICAL			0%
TOTAL ORIG. CONTRACT		100%		
ANTICIPATED DRAW IN $1,000				
ACTUAL DRAW IN $1,000				

LEGEND: ANTICIPATED ACTIVITY ACTUAL ACTIVITY ANTICIPATED CASH FLOW ACTUAL CASH FLOW

USE ADDITIONAL SHEETS IF JOB IS SCHEDULED OVER 12 MONTHS.

FACILITIES DIVISION

ACCS FORM 6-J

CERTIFICATION OF STRUCTURAL OBSERVATIONS

ACCS PROJECT#:	
PROJECT NAME:	
OWNER:	
CONTRACTING COMPANY:	

I _____, do hereby verify that I have personally conducted the visual Design Professional observations of the construction of the structural system for conformance to the approved construction documents for the referenced project. The visual observations of the structural systems were personally conducted by me at all significant construction stages and at the completion of the construction of the structural system. To the best of my knowledge, all structural deficiencies have been resolved except as noted below:

Signed on this date, _____ **Design Professional's Seal**

_____

ARCHITECTURAL / ENGINEERING FIRM

_____

SIGNATURE OF ARCHITECT OR
STRUCTURAL ENGINEER OF RECORD

PRINTED NAME: _____

FACILITIES DIVISION

ACCS FORM 6-K

CERTIFICATE OF SUBSTANTIAL COMPLETION

TO: **ACCS FACILITIES DIVISION,** 135 S. Union Street Montgomery, AL 36130 | 334.293.4500

• *Do not staple this form and/or attachments; use clips. Print single-sided; do not submit double-side printed documents*

	ACCS PROJECT#:	
OWNER ENTITY NAME AND ADDRESS: Email to receive executed copy:		**ARCHITECTURAL/ENGINEERING FIRM NAME & ADDRESS:** Email to receive executed copy:
CONTRACTOR COMPANY NAME AND ADDRESS: Email to receive executed copy:		**BONDING COMPANY NAME AND ADDRESS:** Email to receive executed copy:

PROJECT:

Substantial Completion has been achieved for: ◯ **the entire Work** ◯ **the following portion of the Work:**

The **Date of Substantial Completion** of the Work covered by this certificate is established to be: _____

"Substantial Completion" means the stage in the progress of the Work, or designated portion of the Work, that all punch list items are completed, all change orders are executed, the Owner can occupy or utilize the Work for its intended use, warranties commence, Contractor is no longer liable for Liquidated Damages, and the Owner becomes responsible for security, utilities, insurance and maintenance.

"The Date of Substantial Completion of the Work establishes the extent to which the Contractor is liable for Liquidated Damages, if any. If the Contractor fails to complete all closeout items within forty-five (45) days, the Contractor shall bear any expenses, including additional Architectural services and expenses, incurred by the Owner as a result of failure to complete closeout items in a timely manner and may be issued a Notice to Cure.

The Year End Inspection Date to help identify and address any construction defects or warranty issues shall be established as _____ , which is 11 months after the Date of Substantial Completion.

Nothing herein shall limit or waive the Owner's rights under Article 27 of the General Conditions (ACCS Form 2-B), including but not limited to issuance of Notices to Cure or Notice of Termination issued to Contractors and Sureties, to obtain completion, correction, or repair of any remaining unfinished Work.

Only one (1) originally executed substantial completion form shall be routed for signature. ACCS Facilities Division office will mail the fully-executed original to the Owner and email copies to all parties.

ATTACHMENTS:

- ☐ Completed Punch List
- ☐ Change Order Log: All change orders and their execution date, no outstanding change orders
- ☐ Pre-Closeout Meeting Review Checklist executed with signatures
- ☐ Documentation from the AHJ of their review and approval
- ☐ General Contractor's Roofing Guarantee (ACCS Form 6-L) and any other warranties specified in the Contract Documents - (if project includes roofing)
- ☐ Certification of Structural Observations (ACCS Form 6-J) - (if project includes classrooms or dorm rooms)

RECOMMENDED BY:		CONTRACTING PARTIES:	
ARCHITECT/ENGINEER	DATE	CONTRACTOR	DATE
APPROVALS:			
AHJ INSPECTOR (IF APPLICABLE)	DATE	ACCS CHIEF FACILITIES OFFICER	DATE
***A/E PEER REVIEWER**(IF APPLICABLE)	DATE		
COLLEGE DESIGNATED REPRESENTATIVE	DATE		
ACCS REGIONAL FACILITIES DIRECTOR	DATE		

*ACCS Colleges are required to provide an A/E Peer Reviewer to review the A/E of Record's project design and to perform construction inspections when AHJ is not present in city/town where project's work is taking place.

FACILITIES DIVISION

ACCS FORM 6-L

GENERAL CONTRACTOR'S ROOFING GUARANTEE

• Do not staple this form and/or attachments; use clips. Print single-sided; do not submit double-side printed documents

ACCS PROJECT#:			
PROJECT NAME:			
Address:			
PROJECT OWNER:			
Address:			
CONTRACTOR COMPANY:			
Address:		Phone:	
		Email:	

EFFECTIVE DATES OF GUARANTEE

DATE OF ACCEPTANCE:		**DATE OF EXPIRATION:**	

1. The General Contractor does hereby certify that the roofing work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved roofing manufacturers recommendations.

2. The General Contractor does hereby guarantee the roofing and associated work including but not limited to all flashing and counter flashing both composition and metal, roof decking and/or sheathing; all materials used as a roof substrate or insulation over which roof is applied; promenade decks or any other work on the surface of the roof; metal work; gravel stops and roof expansion joints to be absolutely watertight and free from all leaks, due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of substantial completion of the project. This guarantee does not include liability for damage to interior contents of building due to roof leaks, nor does it extend to any deficiency which was caused by the failure of work which the general contractor did not damage or did not accomplish or was not charged to accomplish.

3. Subject to the terms and conditions listed below, the General Contractor also guarantees that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the roofing manufacturers standards as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashings, etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with construction documents as are necessary to maintain said work in satisfactory condition, and further, to respond on or within three (3) calendar days upon proper notification or leaks or defects by the Owner or Architect.

(a) Specifically excluded from this Guarantee are damages to the work, other parts of the building and building contents caused by: (1) lightning, windstorm, hailstorm and other unusual phenomena of the elements; and (2) fire. When the work has been damaged by any of the foregoing causes, the Guarantee shall be null and void until such damage has been repaired by the General Contractor, and until the cost and expense thereof has been paid by the Owner or by the responsible party so designated.

(b) During the Guarantee Period, if the Owner allows alteration of the work by anyone other than the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the owner engages the General Contractor to perform said alterations, the Guarantee shall not become null and void, unless the General Contractor, prior to proceeding with the said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Guarantee.

(c) Future building additions will not void this guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the roof areas, and any damage caused by such addition. If this contract is for roofing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing roof.

(d) During the Guarantee period, if the original use of the 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 of service more severe than originally specified, this Guarantee shall become null and void upon the date
of said change.

(e) The Owner shall promptly notify the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____ _____

_____

GENERAL CONTRACTOR'S AUTHORIZED SIGNATURE

BY: _____

SIGNEE'S PRINTED NAME

TITLE: _____

SIGNEE'S TITLE

FACILITIES DIVISION

ACCS FORM 6-M

SAMPLE FORM OF ADVERTISEMENT FOR COMPLETION

LEGAL NOTICE

In accordance with Chapter 1, Title 39, Code of Alabama, 1975, as amended, notice is hereby given that:

_____

(Contractor Company Name)

Contractor, has completed the Contract for:

◯ CONSTRUCTION ◯ RENOVATION ◯ ALTERATION ◯ EQUIPMENT ◯ IMPROVEMENT

of:

at:

for the State of Alabama and the (County) (City) of: _____ ,
Owner(s), and have made request for final settlement of said Contract. All persons having any claim for labor, materials, or otherwise in connection with this project should immediately notify:

_____

(Architect/Engineer)

BUSINESS ADDRESS:

_____

(Contractor)

NOTE: This notice must be run once a week for three successive weeks for projects exceeding $100,000. For projects of $100,000 or less, there is no requirement for Advertisement for Completion. A copy of the publisher's affidavit of publication (including a copy of the advertisement) shall be submitted by the Contractor to the Design Professional.

FACILITIES DIVISION

ACCS FORM 6-N

CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS

ACCS PROJECT#:			
DATE OF THE CONSTRUCTION CONTRACT:			
PROJECT (SAME AS APPEARS IN THE CONSTRUCTION CONTRACT)**:**			
STATE OF:		**COUNTY OF:**	

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Construction Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO

1. Consent of Surety to Final Payment. Whenever Surety is involved, a Consent of Surety form is required.

INDICATE ATTACHMENT: ◯ YES ◯ NO

THE FOLLOWING SUPPORTING DOCUMENT SHOULD BE ATTACHED HERETO IF REQUIRED BY THE OWNER:

1. Contractor's Release of Waiver of Liens

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment supplies, to the extent required by the Owner, accompanied by the list thereof

3. Contractor's Affidavit of Release of Liens

_____

CONTRACTOR

NAME :

ADDRESS :

_____

SIGNATURE OF AUTHORIZED REPRESENTATIVE

BY: _____

SIGNEE'S PRINTED NAME

TITLE: _____

SIGNEE'S TITLE

Sworn to and subscribed before me this

_____ day of _____ ,

_____ .

_____

NOTARY PUBLIC'S SIGNATURE

My commission expires: _____

SEAL

FACILITIES DIVISION

ACCS FORM 6-P

CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS

ACCS PROJECT#:	
DATE OF THE CONSTRUCTION CONTRACT:	
PROJECT (SAME AS APPEARS IN THE CONSTRUCTION CONTRACT)**:**	
STATE OF:	**COUNTY OF:**

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Construction Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO

1. Contractor's Release of Waiver of Liens

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment supplies, to the extent required by the Owner, accompanied by the list thereof

CONTRACTOR

NAME :

ADDRESS :

SIGNATURE OF AUTHORIZED REPRESENTATIVE

BY: _____

SIGNEE'S PRINTED NAME

TITLE: _____

SIGNEE'S TITLE

Sworn to and subscribed before me this

_____ day of _____ ,

_____ .

NOTARY PUBLIC'S SIGNATURE

My commission expires: _____

SEAL

VER: 03282024

FACILITIES MANAGEMENT

ACCS FORM 6-Q

CONSENT OF SURETY TO FINAL PAYMENT

ACCS PROJECT#:	
DATE OF THE CONSTRUCTION CONTRACT:	
SURETY'S BOND NUMBER:	

TO: OWNER (THE ALABAMA COMMUNITY COLLEGE SYSTEM)

PROJECT: (SAME AS APPEARS IN THE CONSTRUCTION CONTRACT)

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
SURETY:

on bond of
CONTRACTOR:

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to the Owner.

as set forth in said Surety's bond.

SIGNED AND SEALED this _____ day of _____.

SURETY: _____ **SEAL:**

COMPANY NAME

BY: _____

SIGNATURE OF AUTRHORIZED REPRESENTATIVE

_____

PRINTED NAME AND TITLE

Note: Original Power of Attorney for the Surety's signatory shall be furnished with each original form.

FACILITIES DIVISION

ACCS FORM 7-E

PRE-CLOSEOUT REVIEW CHECKLIST

PROJECT NAME:					
ACCS PROJECT #		**DATE:**		**MEETING TIME:**	
MEETING LOCATION:					

NA		
	1. TIMELINE	
○ ○	**A.**	**Pre-Closeout Review - Minimum of 4 weeks prior to Substantial Completion**
○ ○	**B.**	**Establish a Substantial Completion/Final Inspection date**
○ ○	**C.**	**Final Punch List Items - completed and reinspected within 30 days of Pre-Closeout Review**
○ ○	**D.**	**Closeout Meeting and Final Acceptance - within 45 days of Substantial Completion or possible Notice to Cure**
○ ○	**E.**	**Advertisement of Completion - advertised immediately following Final Acceptance**
○ ○	**F.**	**Final Payment for Contractor - 30 days after Advertisment of Completion has been posted for 3 weeks**
○ ○	**G.**	**Final Payment for Design Professional - immediately following Final Payment for Contractor**
○ ○	**H.**	**One-Year Inspection - scheduled 11 months after Date of Substantial Completion**

NA		
	2. REQUIREMENTS	
○ ○	**A.**	**Pre-Closeout Review**
○ ○	**1.**	Work is very close to being substantially complete
○ ○	**2.**	Final Punch List contains only items that can be completed and reinspected within 30 days so that the Owner can occupy without disruption or interference by the Contractor. Contractor has established a schedule of when punch list items will be completed.
○ ○	**B.**	**Substantial Completion (ACCS Form 6-K)**
○ ○	**1.**	Final building cleaning is completed and accepted according to General Conditions Article 48 B
○ ○	**2.**	Pre-Closeout Review Checklist completed and executed with signatures
○ ○	**3.**	All Change Orders are completed and executed. A Change Order Log is provided showing the execution dates.
○ ○	**4.**	Life safety systems have been tested and certified
○ ○	**5.**	Certificate of Occupancy
○ ○	**6.**	Systems start up and Owner Training have been completed
○ ○	**7.**	General Contractors 5-Year Warranty (ACCS Form 6-L) and other Roofing Warranties
○ ○	**8.**	Certification of Structural Observations (ACCS Form 6-J) if project includes classrooms and dorms
○ ○	**9.**	Lock cores have been changed from the contractor to the College cores and keys have been transferred
○ ○	**10.**	Scheduled One-Year inspection
○ ○	**C.**	**Closeout Meeting and Final Acceptance**
○ ○	**1.**	Contractor's Affidavit of Payment of Debts and Claims (ACCS Form 6-N)
○ ○	**2.**	Contractor's Affidavit of Release of Liens (ACCS Form 6-P)
○ ○	**3.**	Release of Claims (if claim has been given by one or more Subcontractors)
○ ○	**4.**	Contractor's One-Year Warranty (General Conditions Article 35)
○ ○	**5.**	Other Warranties as required in the Project Manual
○ ○	**6.**	As-Built Drawings
○	**a.**	Contractor to send to Architect within 10 days of Date of Substantial Completion
○	**b.**	Design Professional deliver to Owner one hard copy and one digital copy
○ ○	**7.**	Owner Training Videos on building systems and maintenance items
○ ○	**8.**	O&M Manuals (one hard copy and one digital copy)
○ ○	**9.**	Reports and Tests delivered to Owner (Material, Product, Compatibility, Field)

ACCS FORM 7-E

NA	2. REQUIREMENTS (CONTINUED)	
○	10.	Approved Submittals and Shop Drawings
○	a.	Submittals due to Owner within 30 days of Date of Substantial Completion
○	11.	Schedule of Attic Stock, spare parts and materials that include quantity, label and storage location
○	12.	Notice of Intent to Close Permit (if ADEM project)
○	13.	Owner acceptance of nonconforming work by Change Order
○	14.	Letter from Architect/Engineer of Record certifying the work is complete.
○	15.	Conformance documents delivered to Owner (digital copy)
○ ○	D.	**Advertisement for Completion submitted by Contractor**
○	1.	Closeout Meeting and Final Acceptance has occurred
○ ○	E	**Final Payment for Contractor**
○	1.	30 Days after the Advertisement for Completion has completed its public posting
○	2.	Consent of Surety to Final Payment (ACCS Form 6-Q)
○ ○	F.	**Final Payment for Design Professional**
○	1.	Final Payment for Contractor has been executed
○	2.	Amendment between Owner and Architect is executed for final costs of project.
○ ○	G.	**Final Project Request Form submitted by the College after all payments have been finalized.**

ATTENDEE LIST	
NAME:	**COMPANY:**

APPROVALS

BY: _____ **DATE:** _____
SIGNATURE OF ARCHITECHTURAL/ENGINEER OF RECORD

BY: _____ **DATE:** _____
SIGNATURE OF COLLEGE DESIGNATED REPRESENTATIVE

BY: _____ **DATE:** _____
SIGNATURE OF CONTRACTOR

BY: _____ **DATE:** _____
SIGNATURE OF REGIONAL FACILITIES DIRECTOR

SECTION 01 0150
SPECIAL CONDITIONS

1.1 TIME FOR COMPLETION OF WORK

A. The Contractor's official time for construction to start work shall be the date of the Owner's written "Notice to Proceed" with the Work; and Substantial Completion of the Work shall be achieved within **FOUR HUNDRED TWENTY (420) CONSECUTIVE CALENDAR DAYS**.

B. The Contractor may proceed to award sub-contracts, assemble materials, etc., after written "Notice To Proceed" with the Work is given by the Owner.

C. Properly supervised work, per requirements, will be permitted on Saturdays and Sundays.

D. Acceptance of the completed Work of this Contract will be at a single date, and not in phases, unless otherwise indicated.

E. Nothing in the Contract Documents shall permit or be construed to permit payment to the Contractor for any extended overhead or profit due to completion of the project extending beyond the Contractual completion date. In no event shall the Owner or Architect be liable to the Contractor for damage due to any delay to any portion of the Work of this Contract.

F. See Article 23 of the General Conditions of the Construction Contract (ACCS Form 2-B) for conditions and procedures related to delays for inclement weather and other schedule impacts beyond the Contractor's control.

1.2 LIQUIDATED DAMAGES

A. Actual damages for delay in completion may be impossible to determine, and the Contractor shall be liable for and the Owner shall deduct as liquidated damages from the final payment due the Contractor, the following:
   1. See Section 00 5000.02 - General Conditions of the Contract for Construction, Article 49 - Liquidated Damages for liquidated damages to be assessed for each calendar day of delay in completion of any part of the work beyond the number of days specified.

B. By submitting a Bid Proposal, the General Contractor and their Subcontractors acknowledge and acceptance these Liquidated Damages provisions.

1.3 SITE RESTRICTIONS

A. The limits of work and known restrictions are indicated on the Site Plan and various portions of the Drawings and the Project Manual.
   1. Refer also to Section 01 1000 - Summary of The Work, for additional information and requirements.

1.4 PRE-BID CONFERENCE

A. Refer to Advertisement for Bids and Instructions to Bidders, for additional information and requirements of the Pre-Bid Conference, including whether attendance is recommended or mandatory.

1.5 PRE-SHORING CONFERENCE

A. Mandatory Pre-Shoring Installation Conference: Conduct conference at project site to comply with requirements in Division 1 Sections "Special Conditions" and "Administrative Requirements".

1. The mandatory preinstallation conference shall occur prior to any demolition/construction but after the on-site field visit.
2. The purpose of the mandatory preinstallation conference is to review the criteria with the General Contractor, Architerct, Owner, ACCS Facilities Owner/Director, demolition subcontractor, structural engineer, and shoring engineer.
3. The meeting shall establish the following:
   a. Roles and expectations of each subcontractor.
   b. Days and times of demolition schedules.
   c. Sequencing of operations for demolition, shoring, .
   d. Verficiation of responsibilities to protect the work at all times.

1.6 PRE-CONSTRUCTION CONFERENCES

A. Refer to Section 01 3000 - Administrative Requirements.

1.7 CONTRACTOR ACCESS TO SITE

A. The Contractor will have access to the site immediately upon receipt of the Owner's written Notice to Proceed with work. All routes of access to the site and gate locations by the Contractor or their subcontractors, are subject to approval by Owner, Architect, and other authorities having jurisdiction. Check site plan for location of work limits. Refer to Section 01 1000 - Summary of The Work and Section 01 5000 - Temporary Facilities and Controls, for additional information and requirements.

B. The Contractor shall be required to coordinate the Work of the project with the Owner’s activities, to the extent that the Work of this Contract has little or no effect on normal operations.

1.8 CONTRACTOR’S PLAN FOR CONSTRUCTION OF PROJECT

A. Contractor shall prepare and submit within 7 days from award of contract to the Architect for review and approval a Bar Graph, indicating his proposed plan and sequence of operations to complete each phase of this project, on schedule as required by contract. This Bar Graph is expected to be a Critical Path graph.
   1. Schedule should identify project milestones and expected durations.

1.9 CONTRACTOR JOB MEETINGS

A. On-Site Meetings with Architect, designated Owner's Representative, and various trades and subcontractors, shall be conducted by the Contractor as directed by the Architect for purpose of furthering the progress of the work, solving construction problems, and issuing instructions.

B. Refer to “Pre-construction Conferences” paragraph above, “General Conditions of the Contract”, and Section 01 3000 - Administrative Requirements for additional information and requirements.

1.10 STORED MATERIALS

A. It is recognized that the size of the site is restrictive and that it may be necessary for the Contractor to store some materials on site prior to removal or disposal. When such on site storage is necessary, comply with requirements of authorities having jurisdiction, including in part, on site retention of earth, storm water run-off, slopes of debris, earth, etc.

B. Store items to be incorporated in the Work in stable and secure manner, off of ground, separated by hardwood or treated wood blocking, and under cover or in storage building.
   1. Any materials found stored directly on ground or paving, in standing water, etc., will be rejected. Rejected materials shall immediately be removed from the site, and replaced with new materials at the Contractor’s expense.

2. Distribute materials around concrete slabs, framed floors and roofs in such manner as to prevent any damage to structure, construction, improvements, etc.

C. Refer to Section 01 6000 - Product Requirements, for additional information and requirements for any off-site stored materials.

1.11 PROTECTION

A. The Contractor shall provide and maintain adequate fencing and barricades, where indicated, and wherever required. Building entrances and exits shall remain unobstructed at all times when buildings are occupied.

B. The Contractor shall provide suitable protection for all employees, the public, users of other adjacent facilities, and building occupants at all times during the execution of the Work until the completion of the Work.
   1. Construction equipment shall not come in contact with or swing over existing facilities to remain, public areas, occupied buildings, right-of-ways, etc.

C. The Contractor shall avoid damage as a result of their operations, to the existing buildings, walks, pavement, curbs, grass, shrubbery, trees, utilities, adjoining property, etc., and shall at its own expense, completely repair any damage thereto caused by Contractor operations. All repair work is subject to Architect's approval and that of its Owner.

D. Refer to Section 01 5000 - Temporary Facilities and Controls for additional information and requirements.

1.12 WORK LIMITS PROTECTION

A. The Contractor shall locate all temporary buildings, equipment storage, material storage, and related staging areas within a secure area to protect the public, and others from construction activities. The type and location of such protection shall be determined by the Contractor based on an assessment of the site conditions and restraints, but shall be subject to acceptance of the Architect, Owner, and authorities having jurisdiction.

B. Refer to Section 01 5000 - Temporary Facilities and Controls for additional information and requirements.

1.13 EMPLOYMENT OF AND PAYMENT FOR TESTING SERVICES

A. The following information regarding Employment of and Payment for Testing Services under the work of Specifications shall take precedence over any conflicting statements otherwise, which may have remained in the Project Manual after editing:
   1. Initial testing required by the Contract Documents for Divisions 2 through 5, and Divisions 31-33 (except not utility systems testing) shall be provided by an independent testing agency selected, employed and paid by the Owner.
   2. Initial testing required by the Contract Documents for all other testing and Divisions 6 through 26 shall be provided by a testing agency acceptable to the Owner, and selected, employed, and paid by the Contractor from his/her Contract amount.
   3. Any retesting required (due to failure of initial testing to meet the requirements of the Contract Documents) shall be at the Contractor's expense.
   4. Any retesting required (due to questionable materials or construction methods, for verification purposes, and etc.) shall be at the Contractor's expense when the results of such retesting indicate any work or materials do not comply with requirements of the Contract Documents. Otherwise, such retesting will be at Owner's expense.
   5. Any retesting under the above provisions shall be performed by the same Owner accepted testing agency.

6. Nothing in the Contract Documents shall prevent the Contractor from performing any other or additional Quality Control testing at his/her own expense, to verify compliance with the Bid and Contract Documents.

B. The Contractor shall be responsible for contacting and directions to the accepted testing agency and for any follow-up communications required, for all testing required by the Contract Documents.

C. Refer to Section 01 4000 - Quality Requirements for additional information and requirements.

1.14 PROHIBITED MATERIALS

A. ASBESTOS: All materials, equipment, components, accessories, and etc., installed in the work of this contract, both field installed and bought-out manufactured items from any source shall be 100-percent free of asbestos.

B. LEAD CONTENT: All water-bearing lines, water dispensing equipment, finish materials, and paint other than exposed exterior roof flashings, shall be 100-percent free of lead.

C. CALCIUM CHLORIDE: Calcium chloride and/or derivatives or additives thereof shall not be permitted in any concrete, concrete product, grout, masonry and/or mortar.

D. ENVIRONMENTAL REGULATIONS: All materials, their application, installation, and completion, shall comply with applicable environmental regulations, including in part, erosion, air-borne contaminants, and volatile organic compounds (VOC's).

E. FORMALDEHYDE: All insulation and other products shall be 100-percent free of formaldehyde.

1.15 PROHIBITED EQUIPMENT

A. The elevated and framed floor slabs are not designed to accommodate heavy rolling point loads. Scissor lifts are not permitted on any elevated or framed slab during the construction of the project.

1.16 PROJECT SIGNS

A. This project DOES NOT require an Owner defined project sign or project plaque. The General Contractor shall furnish and install safety and directional signage as indicated herein.

B. Provide, securely install and maintain prefinished metal signs on each side of each gate leaf and at 50'-0" o.c. maximum on street/public side of all construction fencing provided (if any).
   1. Copy: "NO TRESPASSING
   2. DANGER
   3. CONSTRUCTION AREA"
   4. Size:Approximately 1'-6" wide x 1'-0" high.

C. Provide other pedestrian and vehicular signs as necessary and required, in compliance with requirements of authorities having jurisdiction. Signs shall remain on site for duration of this Contract.

D. General Contractor may have a sign on his/her Construction Office and as needed for delivery directions only.

E. Subcontractors will not be allowed to post signs.

1.17 PERSONNEL EXPERIENCE AND SUPERINTENDENTS

A. Unless more stringent requirements are listed in individual specification Sections, Subcontractors shall have no less than FIVE (5) years verifiable experience in their trade and no less than FIVE (5) years verifiable experience in their business enterprise contracting for work

under this project; The type of work subcontracted for this project shall be the principal business of the Subcontractor.

B. Superintendents and foremen, or other individual in the lead or supervisory position for any portion of the Work under this Contract shall have no less than TEN (10) years verifiable experience in performing the type of work they are responsible for in the administration of projects of similar scale and complexity AND yielding successful results regarding delivery of the project on time, on budget, and of high quality. Specifically, the Superintendent shall have significant experience in the management of projects of similar scope and complexity. He/ she shall be organized, possess strong communication and leadership skills, and must be capable of constructive problem solving collaboratively with the Owner, Design Professional and other project partners.
   1. The Contractor shall submit resumes of work and project experience for their Superintendent and foremen with a minimum of THREE (3) references, as soon as possible and at least within FIVE (5) calendar days of receipt of the Contract to be executed for the work, for review and acceptance by the Owner and Architect.
   2. If the Superintendent is replaced on the job after work begins, the same qualifications as above shall apply. Submit for review and acceptance by the Owner and Architect.

1.18 SUBMITTALS

A. Submittal requirements are indicated throughout the Contract Documents, and the following supplements those requirements.
   1. Electronic Document Submittal Service will be used for administration of the Contract. See Section 01 3000 - Administrative Requirements.
   2. Contractor will be required to make submittals for every item and product so indicated; Also upon request, for any additional or other item or products intended for use or incorporation in the Work.
      a. The Contractor shall submit to the Architect within 30 days of “Notice to Proceed”, a complete listing of all required submittals, warranties, guarantees, close-out documents, and materials requiring extra, "maintenance" or “attic” stock delivered to the Owner, for review and acceptance. Include for each item, the anticipated date of Submittal to the Architect. Re-submit until accepted or approved.
   3. The Contractor shall review, mark all necessary changes, revisions, and questions; and then stamp, sign, approve, and submit to the Architect, all Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, and shall do so 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.
      a. The Contractor shall not make submittals to the Architect which they have not reviewed, stamped, signed and approved by the Contractor; or in such case, no action will be taken by the Architect or their Consultants regarding that or those submittals.
   4. Review time will be limited to two (2) weeks, except for more complex submittals, such as Structural elements and Divisions 21-26, which may require additional time to properly review.
   5. Colors will not be selected until most or all submittals required have been received and reviewed. Actual color chip samples shall be required along with standard color selection paperwork. No exceptions.
   6. Samples: Submit the number specified in Section 01 3000 - Administrative Requirements.
   7. Submit test reports as required or otherwise requested, in the same manner as other submittal data.

8. Contractor shall provide a letter from the Concrete Finisher stating that its superintendent has reviewed the scope of work with the Concrete Polishing contractor, snd that he/ she has a complete understanding for the requirements of concrete placement for a successful polishing and dyeing process. Concrete submittals associated with slab on grade to be polished will not be reviewed prior to receipt of the coordination letter.
9. Contractor shall provide a letter from the Mechanical Contractor stating the Mechanical Contractor has coordinated all powered requirement with the Electrical Contractor. Mechanical submittals will not be reviewed without receipt of the coordination letter.
10. Contractor shall distribute reviewed submittals to all concerned and appropriate Subcontractors and Suppliers.
11. Contractor shall provide access on-site to all reviewed and approved submittals.

B. Review and/or approval of submittals by the Architect, Owner and/or their Consultants shall not relieve the Contractor of his responsibility to comply with the requirements of the Contract Documents.
1. Any proposed change in the Work shall be submitted separate from any other item during construction, with same documentation as pre-bid requests, or they will not be considered.
2. No actual or proposed change shall be included in Shop Drawings or other Construction submittals, and none so included will be considered approved under any circumstances.
3. Shop Drawings are communications between the Contractor and various suppliers, fabricators, and subcontractors. The design professional's role is to review the drawings to answer questions that arise about design intent.
4. A reviewed Shop Drawing or Submittal with deviations from the original design intent illustrated in the Contract Documents, is NOT a Change Order, and does not constitute the Architect's or Owner's approval of the cost or time associated with the deviation. Changes to contract sum and/ or contract time may ONLY be achieved by fully executed Change Order.
5. Dimensions, quantities, and coordination remain solely the Contractor's responsibility.

C. Refer to Section 01 3000 - Administrative Requirements for additional information and requirements.

1.19 SITE MAINTENANCE

A. The Owner will require all mud or debris resulting from this construction to be removed from streets, sidewalks, etc., by the Contractor as it appears, one or more times daily.

B. Trash, debris, etc., must be removed from the site as Contractor's trash cans, waste receptacles, etc., are filled. Trash and Debris shall not be permitted to accumulate or blow around the site, within the buildings, etc.

C. The Contractor shall be responsible for maintaining existing landscaping and lawns within and below any construction fencing, for the duration of the Work of the Contract, or until any such fencing is removed.

D. Refer to Sections 01 1000 - Summary of the Work, 01 5000 - Temporary Facilities and Controls, 01 7000 - Execution and Closeout Requirements and other locations in the Bid and Contract Documents for additional information and requirements.

1.20 INSURANCE AND SPECIAL PROVISIONS

A. The Contractor and their insurer, by execution of the Contract, shall waive all rights of subrogation against "the Owner, the Architect, and their Consultants", and same shall be indicated on all insurance provided by the General Contractor and each Subcontractor.

B. The Contractor and their insurer, and each Subcontractor, shall name “the Owner, Architect, and their Consultants”, as additional named primary insureds on all insurance provided by the Contractor and each Subcontractor, except not for “Workers Compensation and Employers Liability”.

C. Refer to the “General Conditions of the Construction Contract” and other portions of the Bid and Contract Documents, for additional information and insurance requirements. Note that Builder’s Risk insurance is a requirement of the Contract.
   1. Extent of coverage required and/or any approval or acceptance of the insurance carried shall not act to modify the liability of the Contractor, nor to imply that the limits, features and/or coverages described are adequate to protect the interests or exposures of the Contractor.

D. The Contractor shall “hold harmless” and indemnify the Owner, Architect, and their Consultants from any claim or legal action resulting from any circumstances related to the Work of this project, including in part, payment of any legal or other expenses, fines, judgments, etc.

E. Insurance policies required by the Contract Documents shall not be canceled, altered, or changed, without first having given thirty (30) days written notice to the Owner, with a copy sent to the Architect, except ten (10) days written notice for non-payment of premium.
   1. Copies of all policies, endorsements, and insurance certificates, including new, renewed, altered, and/or changed during this Contract shall be delivered to the Owner within ten (10) days of effective date(s), with a copy sent to the Architect, by the Contractor.

F. Refer to "General Conditions of the Contract for Construction" for additional information and requirements regarding minimum insurance and indemnity requirements.

G. Special Provision: Nothing in this or other paragraphs of the Contract Documents shall create or give to third parties any claim or right of action beyond such as may legally exist irrespective of the Contract.

1.21 ACCESSIBILITY OF ALL COMPLETED WORK

A. All products and installations of the Work of this Contract, shall be as designed by the fabricator, manufacturer, etc., and installed by the Contractor, Subcontractors, etc., so as to provide full accessibility to people with disabilities, unless specifically indicated otherwise. This shall include in part, the following:
   1. Mounting heights of all electrical devices, switches, etc., all designated plumbing fixtures, and their operation, in all areas except mechanical and electrical rooms, and service areas which are not accessible at any time to the public or Owner’s administrative (not service or maintenance) personnel.
   2. Signage.
   3. Door operation and hardware.
   4. Elevator (if any).
   5. Slip resistance of all completed flooring and walkway surfaces both interior and exterior.

B. Comply with the more stringent requirements of at least the following, either the latest edition or latest adopted edition of the locality, and all revisions and amendments thereto:
   1. American National Standards Institute (ANSI), ANSI A 117.1.
   2. D.O.J. ADA Standards for Accessible Design.
   3. International Building Code, as applicable at the project locale.

1.22 CONTRACTOR PROGRAMS AND CONDUCT OF PERSONNEL

A. The Contractor shall implement programs and make literature available to all construction and administration personnel to ensure this project is a safe place to work. The project site shall, at all times, be free from illegal drugs, alcohol, and other substances that may contribute to injury or damage. Further, employees shall not be permitted on site if under the influence of illegal drugs, alcohol, or similar substances.
   1. The Contractor and every Subcontractor shall have as part of their personnel, safety, substance abuse prevention, and/or quality programs, mandatory drug testing at pre-employment, post-accident, and at random during employees' tenure with their firms. Each such entity shall be prepared to provide non-confidential verification to the Owner that such testing is consistently on-going, upon Owner's request.

B. Programs shall be acceptable to, or recommended by, one or more of the following:
   1. Contractor's Underwriter for Worker's Compensation or liability insurance.
   2. OSHA.
   3. Associated General Contractors.
   4. U.S. Department of Defense, Corps of Engineers, or Veterans Administration.

C. Conduct of all personnel employed for the Work of this project shall be held to a high standard and shall not be offensive to others on or around the site, including in part, pedestrians including students, the public, the Owner, Owner's Consultants, etc.
   1. Construction personnel shall be directed not to communicate with students or faculty in the vicinity of the project site. Any offensive dialogue or actions reported to the Owner may result in removal of the personnel from the project.
   2. The Contractor and their employees shall limit any discussion of the Work of this project to the Owner's representative named in the front of this Project Manual, inspecting authorities with jurisdiction, and the Architect. In no instance shall this project be discussed with others, except as may required for the successful performance of the work.

D. The Contractor shall immediately dismiss and escort off of the project site, any worker who is obviously under the influence of alcohol or other debilitating substance, and any personnel exhibiting offensive behavior as described above, by law, or by local statute or regulations of local authorities.

1.23 WORK BY OTHERS

A. The following items of work are to be provided by others, and are Not in Contract (N.I.C.). The Contractor will be required to coordinate with the Owner as necessary to accommodate provisions for these items.
   1. Movable furniture, furnishings, office equipment, IT equipment, AV equipment, voice/ data equipment, security equipment, access control equipment, and similar work excluded from the Contract Documents.
   2. Listed Equipment, residential appliances, items of Alternate work that are not accepted by Owner, work indicated "Not In Contract" (N.I.C.), work indicated as "Future", and/or similar items excluded from the Contractor's scope of work.
      a. Unless otherwise indicated, coordination, locating, and providing rough-ins for all power, water supply, gas, drains, drain lines, condensate drain outlet, and other utilities required for such equipment, casework, etc., including the preparation required for the installation of finishes indicated as "future", shall be included in Base Bid.

B. Refer to Section 01 1000 - "Summary of The Work" for additional information and requirements.

1.24 DEMOLITION

A. Section 02 4100 - “Demolition,” is applicable to the entire Work of this project and not just to Division 2 where it occurs.

B. The demolition work may includes existing materials known to contain hazardous materials. See Section 02 4100 - Demoltion for requirements associated with the testing, identification, and remediation of hazardous materials, if present.

1.25 INSPECTIONS

A. See Section 01 3000 - Administrative Requirements for information on scheduling of Inspections, and minimum requirements for required inspections.

1.26 PERMIT AND INSPECTION FEES

A. This project will be administered by the Alabama Community College Facilities Division, with permitting and inspection services to be provided by the City of Enterprise, AL.

1. The General Contractor shall review the "ACCS Manual of Procedures", available at https://www.accs.edu/facilities/, and become familiar with the requirements and procedures of the ACCS Facilities Division. The ACCS Facilities Division does not charge fees for administering ACCS projects.
2. This project will not be administered by the Alabama Department of Construction Management (DCM). The DCM will not collect fees associated with this project, nor will it have a role in plan review, inspection, or contract administration.

1.27 PROJECT FUNDING

A. The funding for this project is to be administered through the Alabama Community College System. Pay Applications will be routed to the College that will operate the facility, and accounting thereafter will be coordinated between the College and the System office internally. The ACCS endeavours to process payment for properly submitted Pay Applications within thirty (30) days of receipt.

B. See the "General Conditions of the Contract for Construction" for additional requirements.

END OF SECTION

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SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

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

1.2 PROJECT IDENTIFICATION

A. General: The project name is "ESCC Lolley Gym Renovation" The project is located on a site owned by the Alabama Community College System (ACCS) at 600 Plaza Drive, Enterprise, AL 36330. The facility will be operated and maintained by Enterprise State Community College.

B. Owner: Alabama Community College System (ACCS).

C. Architect: Goodwyn Mills Cawood, LLC.

1.3 PROJECT SUMMARY

A. Abbreviated Written Summary: Briefly and without force and effect upon the contract documents, the Work of the Contract is summarized below.
   1.

1.4 PRIORITY AND UNIQUE PROJECT ELEMENTS AND CONDITIONS

A. The following items are some of the priority and unique aspects of this project. While the listing below is not all inclusive, it is intended to provide clear understanding to the General Contractor of the procedures and expectations with regard to constructing this project successfully.
   1. ACCS Responsibility for Code Compliance Procedures: Pursuant to ACT 2021-476 effective August 1, 2021, the ACCS Board of Trustees has adopted procedures to be followed on all construction projects. This project will not be administered, reviewed, or inspected by the Alabama Department of Construction Management (DCM). The project is required to comply with adopted State Building Codes and the rules and regulations administered by the State Fire Marshal. The General Contractor shall review the ACCS Manual of Procedures available under the Facilities tab of the ACCS website.
   2. Standard ACCS Forms: The General Contractor shall utilize standard ACCS forms as included herein and available at www.accs.edu/facilities. Do not use DCM Forms for this project.
   3. Existing Site Coordination: The existing site is on the Enterprise State Community College campus. The documents include instructions for demolition and/ or relocation of existing utilities, and other improvements. The General Contractor shall coordinate the work with the Owner to minimize disruptions to ongoing campus activities. See Section 02 4100 - Demolition, and the drawings for detailed requirements.
   4. Sub-Contractor Qualifications: Within the Specification Sections certain requirements for the qualifications of Sub-Contractors for priority work are specified. Particular emphasis will be placed on the compliance with these requirements for the following trades:
      a. Section 03 3660 - Sealed Concrete Floor.
      b. Section 03 3680 - Concrete Polishing.
      c. Division 22 - Plumbing.
      d. Division 23 - HVAC.
      e. Division 26 - Electrical.
      f. Division 27 - Communications.

g. Division 28 - Electronic Safety and Security.

5. Conduct of Personnel: The project site is located at an operating college. The Contractor shall ensure the behavior of personnel on the project is appropriate and respectful of the ongoing adjacent operations.
6. Sealed and Polished Concrete Floors: The project includes significant quantities of sealed, polished and dyed concrete floor slabs. The General Contractor and ALL Subcontractors shall work diligently to deliver the quality end product defined in the Contract Documents. See Section 03 3000 - Cast-in-Place Concrete, Section 03 3010 - Cast-in-Place Concrete for Exposed Concrete Floors, Section 03 3660 - Sealed concrete Floor, and Section 03 3680 - Concrete Polishing for detailed requirements including mandatore Pre-Pour (Concrete) Conferences and requirements for protection of concrete slabs throughout the construction duration.
7. Finishing Overhead Structure: Where documents call for painting of the overhead structure, or portions thereof, coordinate the sequence of the work to facilitate efficient application of finishes without overspray on pre-finished components. Painting Subcontractor shall coordinate with the steel framing and metal deck erector to ensure materials are protected from damage prior to and during installation, and that prefinished surfaces are protected while painting adjacent surfaces. Where paint is to be applied prior to other work that will be fastened to painted surfaces, encure installers perform work in a clean, orderly, and neat manner to prevent damage to finished surfaces. Prefinished products shall likewise be protected from damage during installation to minimuze required touch-up of surfaces.
8. Layout and Finish of Exposed Interior Work: This project will educate future tradespeople, and as such is a laboratory for education in building systems. The contractor and sub-contractors shall be diligent is executing the work in a manner that will yield an organized, clean, neat, professional finished product. Protect materials from damage prior to and during installation, lay out the work so that systems are coordinated, installed straight and true to building lines, utilize fasteners and hangers that are new, match in finish, and are spaced regularly. Do not install damaged, mismatched, or second hand components.

1.5 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5000.01 - ACCS Form 2.A - Construction Contract.

1.6 OWNER OCCUPANCY

A. Owner intends to occupy the Project upon Substantial Completion.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

1.7 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: The Contractor shall have exclusive use of the site during the construction period as follows.
   1. The contractor shall confine operations at the site to the areas permitted under the Contract. Portions of the site outside of construction limits shall not be disturbed.
   2. Existing public roads and adjacent private roads that are off-site shall be kept clear and available at all times. These areas may not be utilized for construction parking, storage, without the express written consent of the municipality or private owner as applicable.
   3. Remove dirt, mud, debris, and other construction related debris from public and adjacent roadways and sidewalks as it occurs.

4. Do not unreasonably encumber the site with materials or equipment. If off site storage is required, obtain and pay for such storage in a fully conded and insured facility acceptable to the Owner, with all stored items clearly identified as being assigned to this Project.
5. Lock automotive and motorized construction vehicles when unattended. Do not leave vehicles unattended with motor running or ignition key in place.
6. Construction equipment shall not come in contact with or swing over existing facilities to remain, public areas, occupied buildings, rights-of-way, etc. at any time.
7. The Contractor, sub-contractors, and employees of both shall limit discussion of the Project to the Owner's Representatives, Consultants employed, inspecting authorities with jurisdiction, and the Architect. This project otherwise shall not be discussed with other parties.
8. Smoking or use of any tobacco products is strictly prohibited on site, in or on the building during construction, and in the vicinity of any schools in the immediate area.
9. Consumption or presence of alcohol tobacco, and/ or other debilitating substances is strictly prohibited on site, in or on the building during construction.
10. Firearms are not permitted on site, in or on the building during construction, or in the vicinity of any schools in the immediate area.

B. Provide access to and from site as required by law and by Owner:
1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
2. Do not obstruct roadways, sidewalks, or other public ways without permit.

C. Existing building spaces may not be used for storage.

D. Utility Outages and Shutdown:
1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
2. Prevent accidental disruption of utility services to other facilities.

E. Adjacent Construction Parking and Lay-Down Area
1. The General Contractor shall return the site of any temporary parking or storage areas to the Owner in equal or better condition to that prior to commencement of construction.

1.8 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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Goodwyn Mills Cawood

2400 5th Avenue South
Suite 200
Birmingham, AL 35233

T (205) 879-4462

www.gmcnetwork.com

Electronic File Conversion and Transfer Agreement

Goodwyn Mills Cawood, LLC. (GMC) in cooperation with its Consultants may, at its sole discretion, provide electronic document and file conversion services to the prime entity holding, or intending to enter into, an Agreement with an Owner for construction of a Project. GMC will typically accept only one request per project from one entity, typically the General Contractor.

Consultants referred to herein are all consultants to GMC for or in connection with the Project, including but not limited to those listed below.

It is acknowledged that neither GMC nor its Consultants are under any obligation to furnish electronic files to any party. The General Contractor and/or Sub-contractors should not, under any circumstances, assume they will receive any or all requested electronic files. Whether files are provided or not, the General Contractor remains completely responsible for performing all work required of the Contract Documents in full, including the preparation of accurate and detailed required shop-drawings.

When furnished, files will be transmitted electronically via FTP Site, or similar file transfer mechanism. It is the intent of GMC to furnish files in a timely manner, typically within two (2) weeks of receipt of payment of fees. However, the complexity and scale of the conversion is directly related to the requested file format and quantity of files requested. Where GMC believes a request will require additional time, we will notify the User and make reasonable effort to deliver files in phases if beneficial.

Please contact Alyssa Martin at (205) 879-4462 with any questions.

GOODWYN MILLS CAWOOD, LLC.

PROJECT

Project Name:

Project No.:

Document Issue Date:

Prime/Architect/Engineer: GOODWYN MILLS CAWOOD, LLC.

Consultants:

Goodwyn Mills Cawood, LLC. (hereafter "GMC"), for itself and its identified Consultants, hereby grants non-exclusive use of the requested electronic files to the party (User) listed below. User accepts that GMC and its Consultants reserve the right to convey or not convey electronic files at their sole discretion. User further agrees, as a precedent to transmittal of digital files to any other party, to require written agreement of equivalent confidentiality and indemnification provisions from any party that receives the digital files. The digital information furnished under this agreement is proprietary, is the property of GMC and/or its Consultants, and is protected by applicable copyright laws.

The information provided by GMC and/or its Consultants is solely for the convenience of the recipient. Neither GMC nor its Consultants make any warranty or guarantee, express or implied, as to the suitability of the files for any specific purpose. It is understood the files are (1) digital, (2) typically have been converted electronically into a format suitable to the User, (3) are inherently capable of being manipulated and altered through intentional and unintentional means, (4) are partial and therefore inherently incomplete representations of the Contract Documents, and (5) may include inaccuracies clarified elsewhere in the Contract documents. Consequently, ONLY the COMPLETE Printed Contract Documents, as amended, shall serve as the basis for the scope, quantity, and quality of the work required for the Project. Under no circumstances whatsoever shall GMC and/or its Consultants be or become liable to anyone for the accuracy or completeness of information included in requested electronic files. The burden of, and responsibility for, determining the fitness of data included in electronic files falls solely and completely on the User.

LIMITED USE: The use of any digital file(s) is solely limited to the listed Project below. In no event shall files be utilized for any other Project, or any use beyond the use specifically listed herein. Further, under no circumstances may the General Contractor or and Sub-Contractor submit files furnished under this Agreement as required shop drawing submittals. By execution of this Agreement, the User acknowledges these limitations, and shall comply fully therewith.

CONFIDENTIALITY: User agrees to hold Project information strictly confidential, and User agrees it shall limit the use of transmitted electronic files solely to those applications necessary to perform work required for the Project.

INDEMNIFICATION: User hereby agrees to indemnify, defend, and hold harmless GMC, its directors, officers, and employees, and its Consultants, Consultant's directors, Consultants officers and employees, and the insurers, agents, and affiliates of both GMC and its Consultants, from any and all liability including claims for consequential damages or attorney's fees that may arise out of or relate in any matter to the authorized or unauthorized use, reuse, or alteration of this information by User, its employees or agents, vendors, contractors, sub-contractors, or any other party.

REVISIONS: The Contract Documents are subject to change, and revisions are not always incorporated throughout the documents. It is the User's sole responsibility to review the complete current Contract Documents, and identify inconsistencies between the electronic files and the current Contract Documents.

DIGITAL PROTOCOL: The USER is solely responsible for examination of digital files for virus contamination. Neither GMC nor its Consultants, or the directors, officers, employees, insurers, agents, or affiliates of either are responsible for damages incurred due to virus contamination, or for software version and/or file compatibility, or any similar hardware or software compliance issues.

FEE STRUCTURE: Prior to conversion of files, GMC must receive this complete Electronic File Conversion and Transfer Agreement, completed in full, and executed by a representative of the User with authorization to enter into contracts on behalf of the User.

			PER SHEET FEE
Civil	C		$125
Architecture	A		$150
Structural	S		$125
Mechanical	M, P, FP		$125
Electrical	E		$125
Acoustical & AV	AV		$125
Other	G, FS, etc.		$100

USER ACCEPTANCE OF AGREEMENT

Company Name: _____

By: _____ Date: _____

Its: _____

REQUESTED FILE FORMAT

User (Select ONE)	File Format
☐	Bound Auto CAD Release
☐	Bound Auto CAD Release
☐	Bound Auto CAD Release 3
☐	Bound Auto CAD Release

SCHEDULE OF REQUESTED FILES (To be filled by User)

SHEET		INTENDED USE		FEE	
No.	Name				

(PRINT ADDITIONAL FORMS AS REQUIRED)

SECTION 01 2100
ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contingency allowance.

B. Payment and modification procedures relating to allowances.

1.2 RELATED REQUIREMENTS

A. Section 01 2000 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 CONTINGENCY ALLOWANCE

A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

B. Funds will be drawn from the Contingency Allowance only by Change Order.

C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.4 ALLOWANCES SCHEDULE

A. Allowance No. 1 - BRICK MASONRY
   1. Field Brick: Allow a unit cost of $850.00 per thousand for brick units, including purchase, delivery to the job site, and all related costs. Colors to be selected by Architect.
   2. Include overhead and profit in Base Bid, and not as part of Allowance.
   3. Installation of brick masonry and mortar installation and installation materials (grout, ties, reinforcing, etc.) shall be included in Base Bid, and not as part of Allowance.
   4. Concrete masonry units (CMU), mortar, installation, and installation materials (grout, ties, reinforcing, etc.) shall be in Base Bid, and not as part of Allowance.
   5. The brick will be modular (7-5/8" x 2-1/4" x 3-5/8" depth), unless otherwise indicated, selected by Architect after bidding, with special shapes as indicated and specified.

B. Allowance No. 2 - HAZARDOUS MATERIALS ABATEMENT (Cash Allowance)
   1. Allow a lump sum price of FORTY THOUSAND DOLLARS ($40,000) for the abatement of hazardous materials (mechanical equipment, pipe, mastic, and pipe insulation).
   2. See Section 02 4100 - Demolition for requirements. Costs associated with testing to identify hazardous
   3. DO NOT INCLUDE OVERHEAD AND PROFIT IN BASE BID. If the Hazardous Materials Abatement Allowance is utilized, the General Contractor's overhead and profit shall be paid from the Allowance funds.

C. Allowanec No. 3 - UNDERCUT AND BACKFILL WITH OFFSITE MATERIAL
   1. In accordance with Section 01 2200 - Unit Prices and Section 31 2000 Earth Moving, include an Allowance for the quantity identified. The Allowance value will be adjusted up or down based on the actual quantity of the Work
   2. See Section 01 2200 - Unit Prices for costs to be included and procedures for payment of Unit Price Work.
   3. Calculated Allowance No. 3:
      a. Unit Price Item 2b: Undercut and Backfill with Offsite Material
      b. Quantity of TWO HUNDRED FIFTY (250) Cubic Yards (CY)

c. Unit Price for each CY $_____.
d. Total Allowance No. 5 Value (b x c): $_____.

D. Allowance No. 4 - EQUIPMENT FOR LAUNDRY, CONCESSIONS, AND HOSPITALITY
1. Allow a lump sum price of SIXTY THOUSAND DOLLARS ($60,000) for equipment to be used in laundry, concessions, and hospitality spaces, per Owner instructions.
2. Overhead and Profit shall be in Base Bid, and not part of Allowance.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2200
UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for unit prices.
   1. A unit price is an amount proposed by Bidders and stated on "Attachment A to Proposal Form", as a price per unit of measurement for materials and/or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased, in accordance the General Conditions and/or other provisions of the Bid and Contract Documents.
   2. Unit prices shall include all necessary material, labor, fees, layout, supervision (field and home office), general expenses, insurance, bonds, overhead, profit and applicable taxes, for unit item of work in place.
   3. Refer to other Division 1 Sections and individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of approval, verification, measurement and payment for unit prices are specified in those sections.

B. Related work specified elsewhere includes:
   1. Section 01 0150 - Special Conditions.
   2. Division 2 - Existing Conditions Sections.
   3. Division 3 - Concrete Sections.
   4. Division 7 - Thermal and Moisture Protection Sections.
   5. Division 8 - Openings Sections.
   6. Division 9 - Finishes Sections.
   7. Division 10 - Specialties Sections.
   8. Division 11 - Equipment Section.
   9. Divisions 31-35 - Site Work Divisions.

C. Schedule:
   1. A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.
   2. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 ITEMIZED UNIT PRICE SCHEDULE

A. Item No. 1 - Additional Soil:
   1. Item No. 1a - Select/Structural Fill:
      a. Description: Provide acceptable fill obtained from either onsite or offsite locations, compacted to meet the requirements specified for the affected area, in accordance with Section 31 2000 "Earth Moving".
      b. Unit of Measure: Cubic Yard (CY) of fill, in place.

B. Item No. 2 - Sod:

1. Description: Provide additional sod as directed, including fine grading, soil amendments, fertilizers, sod, maintenance, etc., as specified in Division 32 Sections relating to "Landscape Work".
2. Unit of Measure: Square yard (SY) of sod, in place.

C. Item No. 3 - Undercut & Backfill with Offsite Material.
1. Description: Undercutting below planned subgrade as required due to careful inspection by probing, proofrollling, and testing shall be paid on a unit price basis per cubic yard of undercut. Unit price shall include excavation and legal off-site disposal of unsuitable material and replacement with compacted controlled fill back to subgrade elevation in cuts and back to original grade in fills in accordance with Section 31 2000 - "Earth Moving". This shall not apply to previously prepared areas of the site that may become unstable due to construction traffic, rain, etc.
2. Unit of Measure: Cubic Yard (CY) of unsuitable material (bank measure).

D. Item No. 4 - Concrete Sidewalk.
1. Description: Install concrete sidewalk not otherwise shown on drawings, in location directed by Architect.
2. Unit of Measure: Square Foot (SF) of sidewalk installed.

E. Item No. 5 - Cast-in-Place Concrete.
1. Description: Install cast-in-place concrete not otherwise shown on drawings, in location directed by Architect.
2. Unit of Measure: Square Foot (SF) of concrete installed.

F. Item No.6 - Gravel:
1. Description: Provide additional gravel as directed and specified in Division 32 Sections relating to "Landscape Work".
2. Unit of Measure: Ton (TN) of sod, in place.

G. Item No. 7 - Floor Tile and Mastic:
1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
2. Unit of Measure: Square Feet (SF).

H. Item No. 8 - Transite Pipe (Asbetos-Cement):
1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
2. Unit of Measure: Linear Feet (LF).

I. Item No. 9 - Transite Siding and Panels:
1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
2. Unit of Measure: Square Feet (SF).

J. Item No. 10 - Transite Ductwork:
1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
2. Unit of Measure: Linear Feet (LF).

K. Item No. 11 - Window Glazing:
1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
2. Unit of Measure: Linear Feet (LF).

L. Item No. 12 - Spray-Applied Ceiling Texture:
   1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
   2. Unit of Measure: Square Feet (SF).

M. Item No. 13 - Thermal System Insulation:
   1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
   2. Unit of Measure: Linear Feet (LF).

N. Item No. 14 - Pipe Insulation - Runs, Elbows, Joints:
   1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
   2. Unit of Measure: Linear Feet (LF).

O. Item No. 15 - Roofing Materials - Felts, Flashings, Mastics:
   1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
   2. Unit of Measure: Square Feet (SF).

P. Item No. 16 - Plaster Systems:
   1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
   2. Unit of Measure: Square Feet (SF).

Q. Item No. 17 - Ceiling Tiles:
   1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
   2. Unit of Measure: Square Feet (SF).

R. Item No. 18 - Fire Doors:
   1.
   2. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
   3. Unit of Measure: Each (EA).

S. Item No. 19 - Gaskets and Packings:
   1. Description: Provide unit rates for removal, handling, and disposal of asbestos-containing materials as identified in Section 02 8200 - Asbestos Abatement.
   2. Unit of Measure: Linear Feet (LF).

END OF SECTION

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SECTION 01 2500
SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

1.2 RELATED REQUIREMENTS

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

B. Section 01 2100 - Allowances, for cash allowances affecting this section.

C. Section 01 2200 - Unit Prices, for additional unit price requirements.

D. Section 01 2500.01 - Substitution Request Form: Required form to be used for substitution requests.

E. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.

F. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.3 DEFINITIONS

A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
   1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
      a. Unavailability.
      b. Regulatory changes.
   2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
      a. Substitution requests offering advantages solely to the Contractor will not be considered.

B. Substitutions: See General Conditions of the Construction Contract for definition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
   4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
   5. Waives claims for additional costs or time extension that may subsequently become apparent.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.

1. Note explicitly any non-compliant characteristics.

C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
   1. Forms included in the Project Manual are adequate for this purpose, and must be used.

D. Limit each request to a single proposed substitution item.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

A. Submittal Time Restrictions:
   1. Instructions to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.

B. Submittal Form (before award of contract):
   1. Submit substitution requests by completing the form in Section 01 2500.01 - Substitution Request Form; see this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.3 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

A. Architect will consider requests for substitutions only within 30 days after date of Agreement.

B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.

C. Submit request for Substitution for Convenience within 14 days of discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
   1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
   2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
   3. Bear the costs engendered by proposed substitution of:
      a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.

D. Substitutions will not be considered under one or more of the following circumstances:
   1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
   2. Without a separate written request.
   3. When acceptance will require revisions to Contract Documents.

3.4 RESOLUTION

A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.

B. Architect will notify Contractor in writing of decision to accept or reject request.
   1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.5 ACCEPTANCE

A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive,

Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.6 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION

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SUBSTITUTION REQUEST

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

Attn: _____ A/E Project No.: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page and Paragraph: _____

Proposed Substitution: _____

Trade Name: _____

Manufacturer: _____ Model No.: _____

Mfg. Address _____ City, State, zip: _____ Phone: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the date are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____ E-mail: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specifications, Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specifications Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

INCOMPLETE INFORMATION WILL BE GROUNDS FOR REJECTION

SECTION 01 2900
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

A. Schedule of Values: A statement acceptable to the Owner and Architect 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.
   1. Correlate 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. Submittals Schedule.
      c. 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.

B. Format and Content: Use the 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. Contractor's name and address.
      c. Date of submittal.
   2. Submit draft of Schedule of Values that will accompany Application for Payment.
   3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
      a. Related Specification Section or Division.
      b. Description of the Work.
      c. Name of subcontractor.
      d. Name of manufacturer or fabricator.
      e. Name of supplier.
      f. Change Orders (numbers) that affect value.
      g. Dollar value.
         1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
   4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual Table of Contents. Provide several line items for principal subcontract amounts, where appropriate. Include separate line items under required principal subcontracts for

Operation and Maintenance Manuals, Punch List activities, Project Record Documents, and Demonstration and Training in the amount of 5 percent of the Contract Sum.

5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. 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. Include evidence of insurance or bonded warehousing if required.
7. 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.
8. 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.
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 or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by approving authority 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: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Forms: Use Application and Certificate for Payment form stipulated in front-end documents 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. Approving authority 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

E. Transmittal: Submit ONE (1) signed and notarized original copy of each Application for Payment to Architect by a method ensuring receipt within 24 hours. Required attachments shall be transmitted simultaneously.
   1. Transmit Application for Payment with a transmittal form listing attachments and recording appropriate information about the application.

F. 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, before deduction for retainage, on each item.
2. When an application shows completion of an item, submit 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 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 waivers of lien on forms, executed in a manner acceptable to Owner.

G. 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. Contractor's Construction Schedule (preliminary if not final).
4. Products list.
5. Schedule of unit prices.
6. Submittals Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
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.
16. Initial settlement survey and damage report if required.

H. Application for Payment at Substantial Completion: After issuing 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 Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

I. Final Payment Application: 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. Contractor's Affidavits of Payment of Debts and Claims, Release of Liens, and Consent of Surety to Final Payment.
5. Evidence that claims have been settled.

6. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project Coordination

B. Requests For Information.

C. Preconstruction meeting.

D. Progress meetings.

E. Submittals for review, information, and project closeout.

F. Number of copies of submittals.

G. Submittal procedures (Including Submittal Numbering/Tracking Guide and form for Transmittal).

H. Inspections.

1.2 RELATED REQUIREMENTS

A. Section 01 0150 - Special Conditions: Additional Administrative and Submittal Requirements.

B. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.

C. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 PROJECT COORDINATION

A. Project Coordinator: Contractor's Project Manager.

B. Cooperate with the Owner and Architect in allocation of mobilization areas of site; for field offices and sheds, for traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Owner and Architect.

D. Comply with Owner and Architect's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Owner and Architect for use of temporary utilities and construction facilities.

F. Coordinate field engineering and layout work under instructions of the Owner and Architect.

G. Make the following types of submittals to Architect:
   1. Schedule of Submittals.
   2. Requests for interpretation.
   3. Requests for substitution.
   4. Shop drawings, product data, and samples.
   5. Test and inspection reports.
   6. Design data.
   7. Manufacturer's instructions and field reports.
   8. Applications for payment and change order requests.
   9. Progress schedules.
   10. Coordination drawings.

11. Correction Punch List and Final Correction Punch List for Substantial Completion.
12. Closeout submittals.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
   1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
   2. Contractor and Architect are required to use this service.
   3. It is Contractor's responsibility to submit documents in allowable format.
   4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
   5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
   6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
   7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.

C. Submittal Service: The selected service is:
   1. Procore | Construction Management (tel: 1-866-477-6267): www.procore.com

D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.

E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.2 REQUEST FOR INFORMATION

A. All Pre-Bid Questions, or Requests for Information must be submitted through a prequalified General Contractor via email to the Architect's Project Manager, with a copy to Alyssa Martin (alyssa.martin@gmcnetwork.com). Pre-Bid Questions will be accepted up to 48 hours prior to Bid Opening.

B. Send requests for information (RFI's) to Architect's Project Manager and administrative assistant, following the example form included at the end of this section.

C. Sequentially number the Requests for Information (RFI), and date accordingly.

D. Explanations and interpretations will be issued via Addendum.

E. After award of the Bid, a Request for Information (RFI), when submitted to the Architect, may result in an Architect's Supplemental Instruction (ASI), Request for Proposal (RFP), or Construction Change Directive (CCD) prior to the issuance of a Change Order.

3.3 PRECONSTRUCTION CONFERENCES

A. Prior to commencing any work on the project, a pre-construction conference shall be held. Mandatory attendance will be required of the General Contractor and representative of all specialty and principal subcontractors involved in the project. Time and date of said conference shall be established by the Architect after award of construction contract.

B. A Pre-Construction meeting shall not be conducted until both (1) the permit fee and (2) the signed Construction Contract have been received by the Owner.

C. Architect will schedule a meeting after Notice of Award.

D. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.

E. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.
   8. Other items: To be announced.

F. Similarly, prior to commencing any major portion of the Work of the project, preconstruction conferences shall be held. Mandatory attendance will be required of the General Contractor and representative of all specialty and principal subcontractors involved in the individual major portions of project. Time and date of said conferences shall be established by the General Contractor, and the Architect, Owner, and appropriate Consultants shall be advised in writing of times and dates, by the General Contractor.
   1. “Major portion” may be defined as work items for each Subcontractor working on site, and shall include in part, but not be limited to, earthwork, sitework, site utilities, concrete work, masonry, Division 5, roof framing and Division 6, insulation, roofing systems, finishes, specialties, casework, mechanical, plumbing, and electrical.

G. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 PROGRESS MEETINGS

A. Construction Manager shall schedule and administer meetings throughout progress of the Work at maximum monthly bi-weekly intervals.

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

C. The Contractor shall record minutes and distribute copies within two days after meeting to participants through the electronic document submittal service.,

D. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor's superintendent.
   5. Major subcontractors.

E. Agenda:
   1. Review minutes of previous meetings.
   2. Review of work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to work.

3.5 COORDINATION DRAWINGS

A. Submit Coordination Drawings of the primary above ceiling systems including primary structural elements, plumbing systems, mechancal systems, and fire protection systems.

B. Review drawings prior to submission to Architect.

3.6 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect, using the submittal numbering tracking system, for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.7 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.

6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.8 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
1. Project record documents.
2. Operation and maintenance data.
3. Warranties.
4. Bonds.
5. Other types as indicated.

B. Submit for Owner's benefit during and after project completion.

3.9 NUMBER OF COPIES OF SUBMITTALS (WHEN ELECTRONIC DOCUMENT SUBMITTAL SERVICE IS USED)

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

C. Samples: Submit no less than 3-each of any sample or color chart which is required or otherwise requested, unless more are required in individual specification sections; one of which will be retained by Architect.
1. After review, produce duplicates.
2. Retained samples will not be returned to Contractor unless specifically so stated.

D. Refer to Section 01 0150 - "Special Conditions" for additional information and requirements.

3.10 SUBMITTAL PROCEDURES

A. General Requirements:
1. Use a separate transmittal for each item.
2. Use a single transmittal for related items.
3. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
   a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
   a. Deliver submittals to Architect at business address.

b. Upload submittals in electronic form to Electronic Document Submittal Service website.

8. Schedule submittals to expedite the Project, and coordinate submission of related items.
   a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
   b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
   c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
10. Provide space for Contractor and Architect review stamps.
11. When revised for resubmission, identify all changes made since previous submission.
12. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
13. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
14. Submittals not requested will not be recognized or processed.

B. Product Data Procedures:
   1. Submit only information required by individual specification sections.
   2. Submit concurrently with related shop drawing submittal.
   3. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
   2. Do not reproduce Contract Documents to create shop drawings.
   3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:
   1. Transmit related items together as single package.
   2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

E. Transmit each submittal with approved form.

F. Transmit each submittal. Sequentially number each transmittal form according to the example shown on the sample Transmittal form provided at the end of this Section. Include the date, project number and name along with number of copies submitted.

G. Deliver submittals to Architect at business address to the attention of the Contract Administration Coordinator.

H. A Submittal Schedule must be submitted and approved by Architect prior to review of any and all submittals.

3.11 SCHEDULING OF INSPECTIONS

A. The General Contractor shall contact the Local Authority Having Jurisdiction to schedule required inspections, and shall notify the Owner and Architect simultaneously of said request.

B. Inspections should typically be requested fourteen (14) days in advance.

C. After Building Inspector notifies the General Contractor of date and time of inspection, the General contractor shall notify Architect and Owner.

D. Cancellations of any scheduled inspection must be received in writing by email no less than 48 hours prior to the scheduled inspection. The email shall be sent to the Contractor, Building Inspector, and Owner. If an inspection is cancelled, it will be rescheduled subject to Building Inspector's availability and may result in additional fees.

3.12 MINIMUM REQUIREMENTS FOR REQUIRED INSPECTIONS

A. Use the following minimum requirements to help determine if a project is ready for required inspection:

B. PRE-CONSTRUCTION CONFERENCE.
   1. Required Attendees: Contractor, Owner, Architect, Major Subcontractors.
   2. Inspection Requirements:
      a. Signed construction contract.
      b. Verification of payment of permit fee.
      c. Contractor's Statement of Responsibility and Quality Assurance Plan (for storm shelter).
      d. Fire Alarm Contractor's Certification (from State Fire Marshall).
      e. ADEM permit, if more than 1 acre of land is disturbed.

C. PRE-CONSTRUCTION CONFERENCE FOR STORM SHELTER.
   1. Required Attendees: Contractor, Owner, Architect, Structural Engineer, Major Subcontractors, Special Inspections Representative.
   2. Inspection Requirements:
      a. DCM. Inspector must have already received Contractor's Statement of Responsibility and Quality Assurance Plan.

D. PRE-ROOFING CONFERENCE.
   1. Required Attendees: Contractor, Owner, Architect, Roofing Subcontractor, Roofing Manufacturer's Representative.
   2. Inspection Requirements:
      a. Roofing submittals must be approved by Architect prior to pre-roofing conference.
      b. Roofing manufacturer must provide documentation that roof design and roofing materials meet code requirements for wind uplift and impact resistance.
      c. Copy of sample roofing warranty.

E. ABOVE-CEILING INSPECTION.
   1. Required Attendees: Contractor, Owner, Architect, MEP Engineers, Major Subcontractors.
   2. Inspection Requirements:
      a. All work must be completed except for installation of ceiling tiles and/or hard ceilings.
      b. Space must be conditioned.
      c. Permanent power must be connected unless otherwise arranged with the DCM. Inspector.
      d. Grease duct must be inspected and approved by the Inspector prior to fire wrapping and Above-Ceiling Inspection.

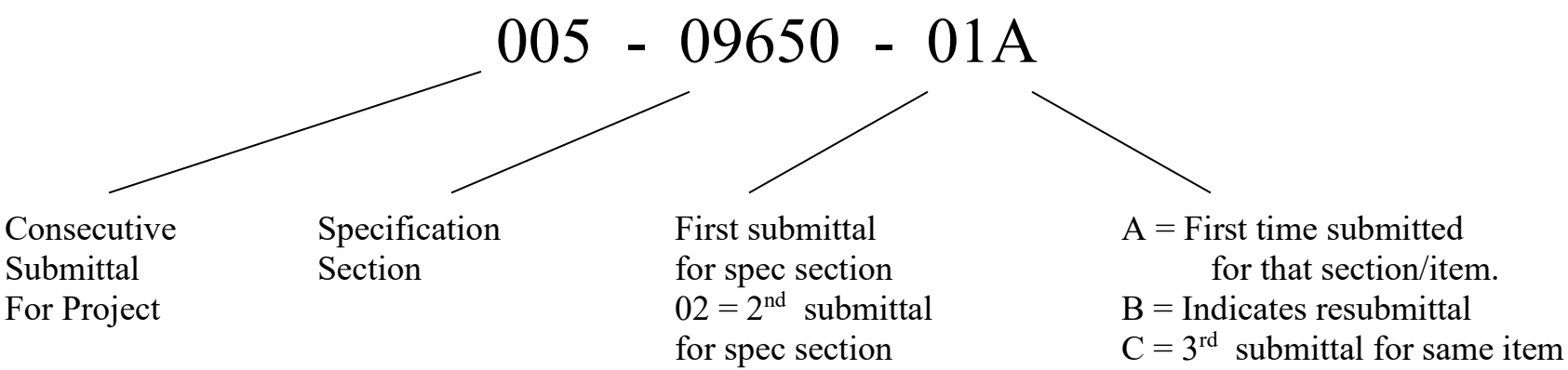
F. LIFE SAFETY INSPECTIONS AND FINAL INSPECTIONS.
   1. Required Attendees: Contractor, Owner, Architect, Engineers, Major Subcontractors, Local Fire Marshall.

2. Inspection Requirements:
    a. Fire alarm certification.
    b. Kitchen hood fire suppression system certification.
    c. General Contractor's 5-Year Roofing Warranty (ACCS Form 6-L).
    d. Roofing manufacturer's guaranty.
    e. Above ground and below ground sprinkler certifications.
    f. Completed Certificate of Structural Engineers Observations for storm shelters.
    g. Emergency and exit lighting tests.
    h. Fire alarm must be monitored.
    i. Elevator Inspection completed and Certificate of Operation provided by the State of Alabama Department of Labor.
    j. Boiler/Vessels Inspection completed and Certificate of Operation provided by the State of Alabama Department of Labor.
    k. Flush test for underground sprinkler lines (witnessed by local fire marshall, fire chief and/or Inspector).
    l. Flush/pressure test for new and/or existing fire hydrants.
    m. Must have clear egress/access and emergency (for first responders) access to building.
    n. Must have ADA access completed.

G. YEAR-END INSPECTIONS.
1. Required Attendees: Contractor, Owner, Architect, Engineers and/or Major subcontractors may also be required to attend.
2. Inspection Requirements:
    a. Owner's list of documented warranty items.

END OF SECTION

SUBMITTAL NUMBERING / TRACKING



***

INCLUDE ARCHITECT'S PROJECT NUMBER ON ALL SUBMITTAL TRANSMITTALS

**** Architect's Project No. & Name: ABHM260005 – LOLLEY GYMNASIUM RENOVATION**
for Enterprise State Community College
Enterprise, Alabama

REQUEST FOR INFORMATION

RFI No. _____

DATE: _____ PROJECT NAME: _____

GM&C PROJECT No._____

FROM: _____ PROJECT MANAGER: _____

_____ GOODWYN MILLS CAWOOD, LLC.

_____ 2400 Fifth Avenue South, Suite 200

_____ Birmingham, AL 35233

REQUEST:

SIGNATURE: _____

SUGGESTION:

RESPONSE: ROUTING:_____ DATE REC'D: _____

SIGNATURE: _____ DATE RET'D: _____

DISTRIBUTION: O Contract Administrator O Consultant O _____ O _____ O _____

*** SEND THIS FORM TO THE CONTRACT ADMINISTRATION COORDINATOR ***

TRANSMITTAL

No. _____

DATE: _____ PROJECT: _____

GM&C PROJECT No. _____

FROM: _____ PROJECT MANAGER: _____

_____ GOODWYN MILLS CAWOOD, LLC.

_____ 2400 Fifth Avenue South, Suite 200

_____ Birmingham, AL 35233

Shop Drawing / Submittal No. (see example below) Description

Copies	Submittal Number	Description

RESPONSE: ROUTING: _____ DATE REC'D: _____

SIGNATURE: _____ DATE RET'D: _____

Shop Drawing / Submittal Number Example 005 - 09650 - 01A

- 005 — Consecutive submittal for Project
- 09650 — Specification Section
- 01 — First submittal for spec section; 02 = 2nd submittal for spec section
- A — A = First time submitted for that section/item.; B = Indicates resubmittal; C = Third submittal for same item

*** SEND THIS FORM TO THE CONTRACT ADMINISTRATION COORDINATOR ***

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, with network analysis diagrams and reports.

1.2 RELATED REQUIREMENTS

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

B. 00 5000.11 - Sample Progress Schedule and Report.

C. Section 01 1000 - Summary: Work sequence.

1.3 REFERENCE STANDARDS

A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.

B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; 2016, with Addendum (2021).

1.4 SUBMITTALS

A. Within 10 days after date of Agreement, submit preliminary schedule.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Submit updated schedule with each Application for Payment.

D. Submit in PDF format.

1.5 QUALITY ASSURANCE

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

1.6 SCHEDULE FORMAT

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

B. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

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

3.2 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification section number.

C. Identify work of separate stages and other logically grouped activities.

D. Provide sub-schedules to define critical portions of the entire schedule.

E. Include conferences and meetings in schedule.

F. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

G. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

H. Indicate delivery dates for owner-furnished products.

I. Provide legend for symbols and abbreviations used.

J. Show total float for each construction activity.

3.3 BAR CHARTS

A. Include a separate bar for each major portion of Work or operation.

B. Identify the first work day of each week.

3.4 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Annotate diagrams to graphically depict current status of Work.

D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Submit reports required to support recommended changes.

G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

3.6 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 3553
SECURITY PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Security measures including formal security program, entry control, and personnel identification.

1.2 RELATED REQUIREMENTS

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

B. Section 01 1000 - Summary: use of premises and occupancy.

1.3 SECURITY PROGRAM

A. Protect Work , existing premises and Owner's operations from theft, vandalism, and unauthorized entry.

B. Initiate program at project mobilization.

C. Maintain program throughout construction period until Owner occupancy.

D. Maintain program throughout construction period until Owner acceptance precludes the need for Contractor security.

1.4 ENTRY CONTROL

A. Restrict entrance of persons and vehicles into Project site.

B. Allow entrance only to authorized persons with proper identification.

1.5 PERSONNEL IDENTIFICATION

A. Provide identification badge to each person authorized to enter premises.

B. Badge To Include: Personal photograph, name, assigned number , expiration date and employer.

C. Maintain a list of accredited persons, submit copy to Owner on request.

D. Require return of badges at expiration of their employment on the Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. Testing and inspection agencies and services.

D. Control of installation.

E. Mock-ups.

F. Tolerances.

G. Manufacturers' field services.

H. Defect Assessment.

1.2 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.

B. Section 01 4223 - Reference Standards and Definitions.

C. Section 01 4533 - Code Required Special Inspections.

D. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.3 DEFINITIONS

A. 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.

1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

1.4 REFERENCE STANDARDS

A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2023).

B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2026.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2025.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing of Soil and Rock as Used in Engineering Design and Construction; 2026.

E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2026.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2026.

G. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2025.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: For integrated exterior and interior 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.
   3. Fire Protection: Sprinkler shop drawings shall include PE stamp of Professional Engineer licensed in the state in which the project is located.

C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

D. Schedule of Submittals.

E. 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.

F. 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.

G. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Compliance with Contract Documents.
      k. When requested by Architect, provide interpretation of results.
   2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

H. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
   1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

I. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

J. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

K. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
   1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
   2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications:
   1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
   2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
   3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

1.7 TESTING AND INSPECTION AGENCIES AND SERVICES

A. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

C. Contractor Employed Agency:
   1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
   2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
   3. Laboratory: Authorized to operate in the State in which the Project is located.
   4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
   5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

D. Refer to Section 01 0150 - "Special Conditions" for additional information and requirements.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 REQUIRED MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.

C. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary. Construct mock-up in at least three (3) distinct phases, with review period to allow the Architect to review the components in place before they are concealed by additional construction.

D. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.

E. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

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

G. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
   1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
   2. Make corrections as necessary until Architect's approval is issued.

H. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

I. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.4 TESTING AND INSPECTION

A. See individual specification sections for testing required.

B. Testing Agency Duties:
   1. Test samples of mixes submitted by Contractor.
   2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
   6. Perform additional tests and inspections required by Architect.
   7. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Price.

F. Refer to Section 01 0150 - "Special Conditions" for additional information and requirements.

3.5 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.6 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

SECTION 01 4001
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 AUTHORITY HAVING JURISDICTION

A. State of Alabama: The project shall comply with the Codes adopted by the Alabama Community College Systems (ACCS). The ACCS will not otherwise provide plan review or inspection services, nor will it administer the contract for construction or issue certificates. The State of Alabama Fire Marshal and other State agencies providing services associated with elevators, boilers, and similar regulated products and systems maintain jurisdiction over the project.

B. City of Enterprise: The City had jurisdiction with regard to zoning, permitting, and inspections.

1.2 SUMMARY OF REFERENCE STANDARDS

A. This project is located within the City Limits of Enterprise, AL and is in Coffee County, AL. Regulatory requirements applicable to this project are the following:
   1. Zoning Code: City of Enterprise, AL.

B. 29 CFR 1910 - Occupational Safety and Health Standards; Current Edition.

C. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

D. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. ICC (IECC) - International Energy Conservation Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. ICC (IFC) - International Fire Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. ICC (IFGC) - International Fuel Gas Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. ICC (IMC) - International Mechanical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 RELATED REQUIREMENTS

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

B. Section 01 4000 - QUALITY REQUIREMENTS.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 4100
STRUCTURAL TESTS AND SPECIAL INSPECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements required for compliance with the International Building Code, Chapter 17, Structural Tests and Special Inspections.

B. Structural testing and special inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve contractor of responsibility for compliance with other construction 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 construction 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. The owner will engage one or more qualified special inspectors and / or testing agencies to conduct structural tests and special inspections specified in this section and related sections and as maybe specified in other divisions of these specifications.

D. Related Sections include but are not limited to the following:
1. Section 02 2000 - “Earthwork”
2. Section 03 3000 - “Cast-In-Place Concrete”
3. Section 05 1200 - “Structural Steel”
4. Section 05 2100 - “Steel Joist and Joist Girders”
5. Section 05 3100 - “Steel Deck”
6. Section 05 4500 - “Light Gauge Steel Trusses”

E. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved by the building official.

F. Construction Documents: Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit. Construction Documents include all supplemental instructions, sketches, addenda, and revisions to the drawings and specifications issued by the registered design professional beyond those issued for a building permit.

G. Shop Drawings / Submittal Data: Written, graphic and pictorial documents prepared and / or assembled by the contractor based on the Construction Documents.

H. Structural Observation: Visual observation of the structural system by a representative of the registered design professional’s office for general conformance to the approved construction documents. Structural observations are not considered part of the structural tests and special inspections and do not replace inspections and testing by the testing agency or special inspector.

I. Special Inspector: A qualified person who demonstrating competence, to the satisfaction of the code enforcement official and registered design professional in responsible charge, for inspection of the particular type of construction or operation requiring special inspection. The special inspector shall be a licensed professional engineer or engineering intern or a qualified representative from the testing agency.

J. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.

K. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.

L. Testing Agency: A qualified materials testing laboratory under the responsible charge of a licensed professional engineer, approved by the code enforcement official and the registered design professional in responsible charge, to measure, examine, test, calibrate, or otherwise determine the characteristics or performance of construction materials and verify confirmation with construction documents.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Minimum qualifications of inspection and testing agencies and their personnel shall comply with ASTM E329-03 Standard Specification for Agencies in the Testing and / or Inspection of Materials Used in Construction.
   a. Inspectors and individuals performing tests shall be certified for the work being performed as outlined in the appendix of the ASTM E329. Certification by organizations other than those listed must be submitted to the building official for consideration before proceeding with work.
2. In addition to these requirements, local jurisdiction may have additional requirements. It is the responsibility of the testing and inspection agencies to meet local requirements and comply with local procedures.

B. Qualifications of Special Inspector: The Special Inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the Building Official, for inspection of the particular type of construction or operation being inspected. The Special Inspector shall meet the legal qualifications of the building code having jurisdiction.

1. Duties and Responsibilities of the Special Inspector:
   a. The Special Inspector shall observe the work assigned to ascertain, to the best of his/her knowledge that it is in conformance with the approved design drawings and specifications.
   b. The Special Inspector shall furnish inspection reports to the Building Official, the Architect/Engineer, and the Owner. All discrepancies shall be brought to the immediate attention of the Architect/Engineer, Contractor, and Owner. A report that the corrected work has been inspected shall be sent to the Building Official, the Architect/Engineer, and the Owner.
   c. The Special Inspector shall create and maintain a log of all discrepancies throughout the duration of the project. This log shall include, but is not limited to, discrepancy date, description, drawing and/or detail reference, description of as-built condition, description of any remedial work performed, and status of discrepancy. This log shall be submitted to the Architect/Engineer on a periodic basis for the review and comment. Upon completion of the project, this log shall be submitted in its entirety as an attachment to the final signed report described below.
   d. The Special Inspector shall submit a final signed report stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance to the approved plans and specifications and the applicable workmanship provisions of the building code.

1.4 CONFLICTING REQUIREMENTS, REPORTS, AND TEST RESULTS

A. General: 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 uncertainties and requirements that are different, but apparently equal, to the registered design professional in responsible charge 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 the registered design profession in responsible charge for a decision before proceeding.

C. The special inspector's reports and testing agencies results shall have precedence over reports and test results provided by the contractor.

D. Where a conflict exists between the construction documents and approved shop drawings / submittal data, the construction documents shall govern unless the shop drawings / submittal data are more restrictive. All conflicts shall be brought to the attention of the registered design professional in responsible charge.

1.5 SUBMITTALS BY SPECIAL INSPECTOR AND / OR TESTING AGENCY

A. Special inspectors shall keep and distribute records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge, contractor, architect, and owner. Reports shall indicate that work inspected was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon by the permit applicant and the building official prior to the start of work.

1. Special inspection reports and test results shall include, but not be limited to, the following:
   a. Date of inspection.
   b. Description of inspections or tests performed including location (reference grid lines, floors, elevations, etc.).
   c. Statement noting that the work, material, and / or product conforms or does not conform to the construction document requirements.
      1) Name and signature of contractor's representative who was notified of work, material, and / or products that do not meet the construction document requirements.
   d. Name and signature of special inspector and / or testing agency representative performing the work.

B. Schedule of Non-Compliant Work: Each agent shall maintain a log of work that does not meet the requirements of the construction documents. Include reference to original inspection / test report and subsequent dates of re-inspection / retesting.

C. Reports and tests shall be submitted within 1 week of inspection or test. Schedule of Non-Compliant Work shall be updated daily and submitted at monthly intervals.

D. Final Report of Special Inspections. Submitted by each agent listed in the schedule of Structural Testing and Special Inspections.

1.6 PAYMENT OF TESTING LABORATORY

A. The Owner will pay for the initial laboratory services for the testing of materials for compliance with the requirements of the contract documents. The Contractor will be liable to the Owner for the cost for testing and retesting of materials that do not comply with the requirements of the contract documents and shall furnish and pay for the testing and inspection of other items as specified in these Specifications.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITY

A. The contractor shall coordinate the inspection and testing services with the progress of the work. The contractor shall provide sufficient notice to allow proper scheduling of all personnel. The contractor shall provide safe access for performing inspection and on site testing.

B. The contractor shall submit schedules to the owner, registered design professionals and testing and inspecting agencies. Schedules will note milestones and durations of time for materials requiring structural tests and special inspections.

C. The contractor shall repair and / or replace work that does not meet the requirements of the construction documents.

1. Contractor shall engage an engineer / architect to prepare repair and / or replacement procedures.
2. Engineer / architect shall be registered in the state in which the project is located. Engineer shall be acceptable to the registered design professional in responsible charge, code enforcement official, and owner.
3. Procedures shall be submitted for review and acceptance by the registered design professional in responsible charge, code enforcement official, and owner before proceeding with corrective action.

D. The contractor shall be responsible for costs of:

1. Re-testing and re-inspection of materials, work, and / or products that do not meet the requirements of the construction documents and shop drawings / submittal data.
2. Review of proposed repair and / or replacement procedures by the registered design professional in responsible charge and the inspectors and testing agencies.
3. Repair or replacement of work that does not meet the requirements of the construction documents.

3.2 STRUCTURAL OBSERVATIONS

A. Structural observations may be made periodically as determined by the registered design professional in responsible charge.

3.3 TESTING AND INSPECTION

A. Testing and inspection shall be in accordance with the attached Schedule of Special Inspections.

B. Reference related specifications for the minimum level of inspections and testing. Provide additional inspections and testing as necessary to determine compliance with the construction drawings.

3.4 SCHEDULES AND FORMS – ATTACHED OR IN CONSTRUCTION DOCUMENTS

A. STATEMENT OF SPECIAL INSPECTIONS

B. SCHEDULE OF SPECIAL INSPECTIONS (ON STRUCTURAL DRAWINGS)

C. FINAL REPORT OF SPECIAL INSPECTIONS

END OF STRUCTURAL TESTS AND SPECIAL INSPECTIONS

STATEMENT OF SPECIAL INSPECTIONS

Project:
Project Address:
Permit Applicant:
Applicant Address:
Owner:
Owner Address:

Registered Design Professionals (RDP):

Architect:
Geotechnical Engineer:
Structural Engineer:
Mechanical Engineer:
Electrical Engineer:

This statement of special inspections is submitted as a condition for permit issuance in accordance with Chapter 17 of the International Building Code. It includes a *Schedule of Special Inspections* applicable to the above referenced project as well as the identity of the individuals, agencies, or firms intended to be retained for conducting these inspections.

The Special Inspector(s) shall keep records of all inspections and shall furnish interim inspection reports to the building official and to the registered design professional in responsible charge at a frequency agreed upon by the permit applicant and building official prior to the start of work. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and the registered design professional in responsible charge prior to completion of that phase of work. A *Final Report of Special Inspections* documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted by each agent at the completion of that phase of work.

Maximum frequency of interim report submittals shall not be less than_____.

The Special Inspection program does not relieve the contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Owner's Acknowledgement:

_____

Signature Date

Building Official's Acceptance:

_____

Signature Date

_____

Permit No.

FINAL REPORT OF SPECIAL INSPECTIONS

Project:
Project Address:
Testing / Inspection Agent:
Testing / Inspection Agent Address:
Scope of Testing / Inspections:

(To be completed by Testing / Inspection Agent)

To the best of my information, knowledge, and belief, the special inspections or testing required for this project, and designated for this Agent in the *Schedule of Special Inspections* submitted for permit, have been completed in accordance with the contract documents.

Interim reports submitted prior to this final report and numbered _____ to _____ form a basis for, and are to be considered an integral part of this final report. The following discrepancies that were outstanding since the last interim report dated have been corrected:

_____

_____

(Attach 8 1/2" x 11" continuation sheet(s) if required to complete the description of corrections)

Prepared By:

Type or print name

Signature Date

Special Inspector's Seal

(Licensed Professional Engineer)

SECTION 01 4223
REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DEFINITIONS:

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.

C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Architect," "requested by the Architect," and similar phrases.

D. Approve: The term "approved," where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

G. Install: The term "install" is used to describe operations at project site including the actual "unloading, temporary storage, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."

H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

I. Installer:
   1. An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
   2. The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

J. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

K. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project.

The extent of the Project Site is shown on the Drawings, and may or may not be identical with the description of the land on which the Project is to be built.

1. If areas available are not indicated, they will be as mutually agreed by Owner and Contractor at Preconstruction Conference and as modified during construction.

L. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

M. OFCI - Owner Furnished, Contractor Installed.

N. OFOI: Owner Furnished, Owner Installed.

1. Equipment indicated on the drawings with the (OFOI) symbol designates the Owner will supply and deliver to the project site any equipment and finish items specified in these specifications and the Owner install the equipment and finish items in place ready for intended use.
2. The Owner shall furnish all standard integral parts of the equipment and finishes, and tailgate-deliver items to project site.
3. Owner shall receive items at site and give written receipt for items at time of delivery, noting visible defects or omissions. If such declaration is not given, the Owner shall assume responsibility for such defects and omissions. Contractor shall be responsible for cooperating with the Owner who shall provide unloading, handling and proper storage of equipment prior to installation at the site. The Owner and the Contractor will coordinate deliveries of equipment and finish items to coincide with construction schedule to minimize storage of equipment before installation.
4. Owner shall uncrate, assemble, set items in place, and install items in accordance with manufacturer's instructions.
5. Contractor shall provide utility rough-in for equipment items where required regardless of equipment responsibility designation unless specifically noted otherwise.
6. Contractor shall be responsible for verification of utility requirements for approved equipment items. Upon request, the Owner shall make available dimensions and power characteristics of the Owner-furnished items.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION:

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 50-Division format and MASTERFORMAT numbering system.

B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language:
   a. Language used in Specifications and other Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

1.4 INDUSTRY STANDARDS:

A. Applicability of Standards: Except where 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 the standard in effect as of the date of the Contract Documents.

C. Conflicting Requirements:
   1. Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer requirements that are different, but apparently equal, and uncertainties to the Architect for a decision before proceeding.
   2. 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. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards:
   1. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
   2. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

1.5 DRAWING SYMBOLS:

A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., seventh edition.

B. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect/Engineer for clarification before proceeding.

1.6 SUBMITTALS:

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

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SECTION 01 4533
CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Code-required special inspections.

B. Testing services incidental to special inspections.

C. Submittals.

D. Manufacturers' field services.

E. Fabricators' field services.

1.2 DEFINITIONS

A. Code or Building Code: ICC (IBC), International Building Code, Most Recent Edition Adopted by Authority Having Jurisdiction (State of Alabama AND Local Municapility AHJ), Including All Applicable Amendments and Supplements and specifically, Chapter 17 - Special Inspections and Tests.

B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.

C. NIST: National Institute of Standards and Technology.

D. Special Inspections and Tests: Inspections and testing of materials, installation, fabrication, erection, or placement of components and connections mandated by Building Code to safeguard public welfare.

1. Special inspections and tests are separate from and independent of tests and inspections conducted by Owner or Contractor for purposes of quality assurance and contract administration.

1.3 REFERENCE STANDARDS

A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2026.

B. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2025.

C. IAS AC291 - Accreditation Criteria for Special Inspection Agencies AC291; 2025, with Editorial Revision.

D. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Special Inspection Agency Qualifications: Prior to start of work, Special Inspection Agency is required to:

1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

3. Submit certification that Special Inspection Agency is acceptable to AHJ.
4. Submit documentation that Special Inspection Agency is accredited by IAS according to IAS AC291.

C. Testing Agency Qualifications: Prior to start of work, Testing Agency is required to:
1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
3. Submit certification that Testing Agency is acceptable to AHJ.
4. Submit documentation that Testing Agency is accredited by IAS according to IAS AC89.

D. Manufacturer's Qualification Statement: When required by AHJ, submit documentation of manufacturing capability and quality control procedures. Include documentation of AHJ approval.

E. Fabricator's Qualification Statement: When required by AHJ, submit documentation of fabrication facilities and methods and quality control procedures. Include documentation of AHJ approval.

F. Special Inspection Reports: After each special inspection, Special Inspector is required to submit at least two copies of report; one to Architect and one to AHJ.
1. Include:
a. Date issued.
b. Project title and number.
c. Name of Special Inspector.
d. Date and time of special inspection.
e. Identification of product and specifications section.
f. Location in the Project.
g. Type of special inspection.
h. Date of special inspection.
i. Results of special inspection.
j. Compliance with contract documents.
2. Final Special Inspection Report: Document special inspections and correction of discrepancies prior to the start of the work.

G. Test Reports: After each test or inspection, Testing Agency is required to submit report to Architect and to AHJ.
1. Include:
a. Date issued.
b. Project title and number.
c. Name of inspector.
d. Date and time of sampling or inspection.
e. Identification of product and specifications section.
f. Location in the Project.
g. Type of test or inspection.
h. Date of test or inspection.
i. Results of test or inspection.
j. Compliance with contract documents.

H. Certificates: When required by AHJ, Special Inspector will submit certification by manufacturer, fabricator, and installation subcontractor to Architect and AHJ.
   1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

I. Fabricator's Inspection Reports: When required by AHJ, submit reports to Architect and AHJ.

1.5 SPECIAL INSPECTION AND TESTING AGENCY

A. Owner or Architect to employ services of Special Inspection Agency to perform inspections and associated testing and sampling in accordance with ASTM E329 and required by building code.

B. Special Inspection Agency may delegate to independent testing agency to perform testing and sampling associated with special inspections and required by building code.

C. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of contract documents.

1.6 TESTING AND INSPECTION AGENCIES

A. Owner or Architect may employ services of independent testing agency to perform additional testing and sampling required by contract documents or associated with special inspections but not required by building code.

B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of contract documents.

1.7 QUALITY ASSURANCE

A. Special Inspection Agency Qualifications:
   1. Independent firm specializing in performing testing and inspections of the type specified in this section.
   2. Accredited by IAS according to IAS AC291.

B. Testing Agency Qualifications:
   1. Independent firm specializing in performing testing and inspections of the type specified in this section.
   2. Accredited by IAS according to IAS AC89.

C. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 SPECIAL INSPECTIONS AND TESTING

A. The Code requires special inspections and testing of certain materials, components, assemblies, and connections used in constructing the project. Special inspections and testing will be performed in accordance with the Code.

3.2 SPECIAL INSPECTION AGENCY DUTIES AND RESPONSIBILITIES

A. Special Inspection Agency shall:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified reference standards.

3. Ascertain compliance of materials and products with requirements of Contract Documents.
4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
5. Perform additional tests and inspections required by Architect.
6. Submit reports of all tests or inspections specified.

B. Limits on Special Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the work.

C. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

D. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.3 TESTING AGENCY DUTIES AND RESPONSIBILITIES

A. Testing Agency Duties:
1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
2. Perform specified sampling and testing of products in accordance with specified standards.
3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of work or products.
5. Perform additional tests and inspections required by Architect.
6. Submit reports of all tests or inspections specified.

B. Limits on Testing or Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the work.

C. On instructions by Architect, perform re-testing required because of non-compliance with specified requirements, using the same agency.

D. Contractor will pay for re-testing required because of non-compliance with specified requirements.

3.4 CONTRACTOR DUTIES AND RESPONSIBILITIES

A. Contractor Responsibilities, General:
1. Deliver to agency at designated location, adequate samples of materials for special inspections that require material verification.
2. Cooperate with agency and laboratory personnel; provide access to approved documents at project site, to the work, to manufacturers' facilities, and to fabricators' facilities.
3. Provide incidental labor and facilities:
a. To provide access to work to be tested or inspected.

b. To obtain and handle samples at the site or at source of Products to be tested or inspected.
c. To facilitate tests or inspections.
d. To provide storage and curing of test samples.

4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing or inspection services.
5. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

3.5 FABRICATORS' FIELD SERVICES

A. When specified in individual specification sections, require material suppliers, assembly fabricators, or product manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, to test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

END OF SECTION

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SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telecommunications services.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

H. Field offices.

1.2 RELATED REQUIREMENTS

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

1.3 TEMPORARY UTILITIES

A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

B. Existing facilities may not be used.

C. New permanent facilities may be used.

D. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.4 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:
   1. Telephone Lines: One line, minimum; one handset per line.
   2. Internet Connections: Minimum of one; DSL modem or faster.
   3. Cellular phones are an acceptable substitute for items 1 & 2, provided they fulfill requirements of same.

1.5 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.6 BARRIERS

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

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 FENCING

A. Provide minimum 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks. Provide gates as required by Contractor and/or authorities having jurisdiction, with all related safety and warning signs.
   1. Fencing shall be at least 11-1/2 gauge galvanized chain-link fencing, securely held in place by posts, braces, rails, etc.

B. Fence shall be approximately 30-feet from perimeter of buildings, unless Drawings indicate otherwise. Extent of fencing shall be as required to maintain a secure worksite.

C. All such fencing shall be removed upon completion of the work of this project, removed from the site, and any post holes filled and compacted same as adjacent grade or paving, by the Contractor.

D. Responsibility and maintenance of such fencing and areas within such fencing shall be held by this Contractor beginning at the date of its erection and until its removal, close to the date of project completion.

1.8 EXTERIOR ENCLOSURES

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

1.9 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

B. Coordinate with Owner's security program.

1.10 VEHICULAR ACCESS AND PARKING

A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Designated existing on-site roads may be used for construction traffic.

F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

G. See Section 01 1000 - Summery for additional information regarding parking areas.

1.11 WASTE REMOVAL

A. See Section 01 7419 - CONSTRUCTION WASTE MANAGEMENT and DISPOSAL, for additional requirements.

B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

C. Provide containers with lids. Remove trash from site periodically.

D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

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

1.12 PROJECT SIGNS

A. See Section 01 0150 - "SPECIAL CONDITIONS" for requirements.

1.13 FIELD OFFICES

A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.

B. Provide space for Project meetings, with table and chairs to accommodate 10 persons.

C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition.

E. Restore new permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

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SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations.

E. Procedures for Owner-supplied products.

F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

A. Instructions To Bidders, and Supplementary Instructions To Bidders: Additional information and requirements concerning Substitutions.

B. Section 01 4000 - QUALITY REQUIREMENTS: Product quality monitoring.

1.3 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 - PRODUCTS

2.1 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Use of products having any of the following characteristics is not permitted:
   1. Made of wood from newly cut old growth timber.

C. Where other criteria are met, Contractor shall give preference to products that:
   1. Are extracted, harvested, and/or manufactured closer to the location of the project.
   2. Have longer documented life span under normal use.
   3. Result in less construction waste. See Section 01 7419 - Construction Waste Management and Disposal.
   4. Are made of vegetable materials that are rapidly renewable.

2.2 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.3 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 - EXECUTION

3.1 SUBSTITUTION LIMITATIONS

A. Acceptance of suppliers, manufacturers, and/or products shall be limited to those named, unless others are properly submitted during bidding in accordance with substitution procedures, and subsequently accepted.

B. Instructions to Bidders specifies time restrictions and procedures for submitting requests for substitutions during the bidding period. These time restrictions and procedures are superceded by any modifications found in Supplementary Instructions to Bidders (or Additions to Instructions to Bidders).

C. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
   1. Submittals during construction other than those pre-qualified or pre-accepted will not be reviewed, but instead returned for re-submittal, without exception.

D. Substitution Submittal Procedure. A proper pre-bid submittal for "pre-qualified" or "pre-accepted" consideration and review, shall be one which includes at least the following:
   1. Submit any request for substitution for consideration. Limit each request to one proposed substitution.
      a. Use Substitution Request form attached at end of this Section.
   2. Submit with cover letter which outlines the purpose of the submittal, Architect's specifications which apply, and each variation from the original specification.
   3. Submit product data (all current and relevant manufacturer's published data), certified test results attesting to the proposed product equivalence, and additional information as required so that a review can be quickly made by comparing the submittal item for item to the original specification. Include samples and other data as requested for the original item. Burden of proof is on proposer.
   4. Substitution requests shall be submitted through a qualified General Contractor bidding the project.

E. After receipt of bids and execution of the Construction Contract, the Owner and the Architect will consider substitutions only under the following conditions:
   1. Unavailability of materials if beyond the control of the Contractor and submitted proof that firm orders for the material were placed within ten (10) days after approval of the Subcontractors and Material Suppliers Lists.

2. Other unavailability will be considered only as being due to strikes, lockouts, bankruptcy, or discontinuance of manufacture.
3. Any approved substitutions shall be incorporated into the Contract by Change Order.

3.2 OWNER-SUPPLIED PRODUCTS

A. Owner's Responsibilities:
1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
2. Arrange and pay for product delivery to site.
3. On delivery, inspect products jointly with Contractor.
4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
1. Review Owner reviewed shop drawings, product data, and samples.
2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
3. Handle, store, install and finish products.
4. Repair or replace items damaged after receipt.

3.3 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

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

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419 - Construction Waste Management and Disposal.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide off-site storage and protection when site does not permit on-site storage or protection.

G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

H. Comply with manufacturer's warranty conditions, if any.

I. Do not store products directly on the ground.

J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

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

L. Prevent contact with material that may cause corrosion, discoloration, or staining.

M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Pre-installation meetings.

C. Cutting and patching.

D. Surveying for laying out the work.

E. Cleaning and protection.

F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

G. General requirements for maintenance service.

1.2 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.

B. Section 01 4000 - QUALITY REQUIREMENTS: Testing and inspection procedures.

C. Section 01 5000 - TEMPORARY FACILITIES and CONTROLS: Temporary exterior enclosures.

D. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

E. Section 02 4100 - Selective Demolition: Selective demolition of building elements for alterations purposes.

F. Individual Product Specification Sections:
   1. Advance notification to other sections of openings required in work of those sections.
   2. Limitations on cutting structural members.

1.3 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2027.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.

6. Include in request:
   a. Identification of Project.
   b. Location and description of affected work.
   c. Necessity for cutting or alteration.
   d. Description of proposed work and products to be used.
   e. Alternatives to cutting and patching.
   f. Effect on work of Owner or separate Contractor.
   g. Written permission of affected separate Contractor.
   h. Date and time work will be executed.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.5 QUALIFICATIONS

A. For survey work, employ a Professional Land Surveyor licensed in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.6 PROJECT CONDITIONS

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.

H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.7 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
   1. Contractor shall schedule ordering of products, taking lead-times into account, and shall be responsible for any cost associated with expediting delivery of specified items in order to keep project on schedule.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

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

F. Coordinate completion and clean-up of work of separate sections.

G. After Owner-occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.8 PREREQUISITES TO SUBSTANTIAL COMPLETION

A. Required commissioning of Division 23 - HVAC must be complete, except for functional testing and controls training, prior to Substantial Completion, unless approved in writing by the Owner.

1.9 PREREQUISITED TO FINAL COMPLETION

A. All Test and Balance work must be complete.

PART 2 - PRODUCTS

2.1 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

1. Every trade shall examine substrate to determine if it is adequate to receive the work of that section prior to initiating work.
2. Notify Contractor of any deficiencies needing correction.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

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

3.3 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of examination, preparation and installation procedures.
2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

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

D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

G. Utilize Standards of Practice for Professional Land Surveyors.

H. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

I. Periodically verify layouts by same means.

J. Maintain a complete and accurate log of control and survey work as it progresses.

3.5 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-complying work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

I. Patching:
   1. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

2. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
3. Match color, texture, and appearance.
4. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.7 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.8 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Prohibit traffic from landscaped areas.

H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.9 ADJUSTING

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

B. Testing, adjusting, and balancing HVAC systems: See appropriate Division 23 Section.

3.10 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

B. Use cleaning materials that are nonhazardous.

C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

F. Replace filters of operating equipment.

G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

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

I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.11 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect.

B. The Contractor shall generate and provide a punch-list to the Architect prior to requesting inspection for substantial completion.

C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

F. Accompany Architect on Contractor's preliminary final inspection.

G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.

H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.12 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

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SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

E. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.2 RELATED REQUIREMENTS

A. Section 01 2500 - Substitution Procedures.

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

C. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

D. Section 01 5000 - TEMPORARY FACILITIES and CONTROLS: Additional requirements related to trash/waste collection and removal facilities and services.

E. Section 01 6000 - Product Requirements: Waste prevention requirements related to product substitutions.

F. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

G. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

1.3 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.4 SUBMITTALS

A. Waste Management Plan: Include the following information:
   1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
   2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
   4. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.

PART 2 PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

A. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 6000 - Product Requirements.
   1. Relative amount of waste produced, compared to specified product.
   2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
   3. Proposed disposal method for waste product.
   4. Markets for recycled waste product.

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

A. See Section 01 3000 - Administrative Requirements for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01 5000 - Temporary Facilities and Controls for additional requirements related to trash/waste collection and removal facilities and services.

C. See Section 01 6000 - Product Requirements for waste prevention requirements related to delivery, storage, and handling.

D. See Section 01 7000 - Execution and Closeout Requirements for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Prebid meeting.
   2. Preconstruction meeting.
   3. Regular job-site meetings.
   4. Job safety meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. As a minimum, provide:
      a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
      b. Separate dumpsters for each category of recyclable.
      c. Recycling bins at worker lunch area.
   2. Provide containers as required.
   3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
   4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
   5. Locate enclosures out of the way of construction traffic.
   6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
   8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Warranties and bonds.

1.2 RELATED REQUIREMENTS

A. General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment. All record documents, warranties and O&M manuals are to be submitted in paper format (1 copy) along with 1 copy of PDFs of the documents.

B. At completion of Project, the Contractor shall submit to Architect a complete set of clearly marked-up Project Documents, as follows:
   1. One (1) Original Set clearly marked as-built, record drawings and specifications.
   2. One(1) copy of PDFs: Each with as-built record drawings and as-built record specifications along with O&M Manuals and Warranties.

C. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit one paper set and one PDF set of revised final documents in final form within 10 days after final inspection, each with as-built record drawings and as-built record specifications along with O&M Manuals and Warranties as referenced above.

D. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
   4. Submit PDFs of as-built record drawings and as-built record specifications along with O&M Manuals and Warranties as referenced above.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawingsand Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

G. Scan marked-up Record Drawings and Specifications onto one(1) CD, DVD, or other portable digital media storage device (each with as-built record drawings and as-built record specifications).

3.2 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

1. Product data, with catalog number, size, composition, and color and texture designations.
2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

D. Include color coded wiring diagrams as installed.

E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

G. Provide servicing and lubrication schedule, and list of lubricants required.

H. Include manufacturer's printed operation and maintenance instructions.

I. Include sequence of operation by controls manufacturer.

J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

K. Provide control diagrams by controls manufacturer as installed.

L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

O. Include test and balancing reports.

P. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

D. Prepare data in the form of an instructional manual.

E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

M. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.

b. Air and water balance reports.
c. Certificates.

N. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

O. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.6 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

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SECTION 02 4100
DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Selective demolition of building elements for alteration purposes.

C. Abandonment and removal of existing utilities and utility structures.

1.2 RELATED REQUIREMENTS

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

B. Section 01 1000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

C. Section 00 2100 - Allowances: Hazardous Materials remediation if required.

D. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

E. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

F. Section 01 7000 – Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

G. Section 31 1000 - Site Clearing: Vegetation and existing debris removal.

H. Section 31 2000 – Earth Moving: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.3 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2004.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Areas for temporary construction and field offices.
   2. Areas for temporary and permanent placement of removed materials.

C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications:

1. Company specializing in the type of work required.

B. Regulatory Requirements: Comply with governing EPA notification regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
   1. Where required by local Health Department or other authorities having jurisdiction, provide certificate of pest and rodent eradication and subsequent inspection completed prior to and after building demolition.

C. Pre-demolition Conference: Demolition will be reviewed at required Preconstruction Conference for the Project.
   1. In addition, conduct pre-demolition conferences at Project site with Owner's representatives, to provide final notice to and coordination with Owner's representatives and on-site personnel.

D. Notices: Contractor shall provide all notices required by Code, applicable regulations, ordinances and/or local and other authorities having jurisdiction.
   1. All notices shall be in writing, with copies provided to the Owner and Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fill Material: As specified in Section 31 2000 – Earth Moving.

PART 3 - EXECUTION

3.1 SCOPE

A. Remove paving and curbs as required to accomplish new work.

B. Remove all other paving and curbs within site boundaries, unless otherwise noted.

C. Remove masonry screen walls. Salvage some bricks for utility patching on building.

D. Remove manholes and manhole covers, curb inlets and catch basins, unless otherwise noted.

E. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 31 2000.

F. Remove items indicated.

G. Salvage, relocate, or recycle as directed and as applicable.
   1. The Owner reserves the right of first refusal for any structures, materials, and/or accessory items on site or within the buildings including, but not limited to, fire alarm panels and accessories, door hardware, electrical transformers, copper tubing, onsite trees and shrubs, and other items of value that may or may not be shown on the plans or called out in the project manual. Any items removed from the site without prior approval from the Owner will be paid to the Owner by the contractor at two times (2x) the market value.

H. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

I. Fill excavations, open pits, and holes in ground areas generated as result of removals, using flowable fill, within the building control area.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.

3. Use of explosives is not permitted.
4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
5. Provide, erect, and maintain temporary barriers and security devices.
6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
8. Do not close or obstruct roadways or sidewalks without permit.
9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of Notification To Proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed and delivered to a location as directed by the Owner.

D. Do not begin removal until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.

E. Protect existing structures and other elements that are not to be removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

G. If hazardous materials are discovered during removal operations, stop work and notify Engineer and Owner; hazardous materials include regulated asbestos containing materials, lead, and mercury.
1. Removal of asbestos shall be subject to state and local regulatory requirements.

H. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Dismantle existing construction and separate materials.
2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

I. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.3 EXISTING UTILITIES

A. Coordinate work with utility companies.
1. The locations of existing underground utilities are shown in an approximate manner only. The Contractor shall determine exact location of all existing utilities before commencing work. The contractor shall be fully responsible for any and all damages which might be occasioned by his failure to exactly locate and preserve any and all underground utilities. The Contractor shall contact Alabama One Call (811), as well as engaging a private utility locator, a minimum of 48 hours prior to excavation and Enterprise State Community College School Facilities a minimum of 5 days prior to excavation in order to give all three entities enough time to mark utilities. If no paint is visible, Contractor shall not

perform excavation until verifying with Enterprise State Community College School Facilities that the work site is cleared for excavation.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 5 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Engineer or Engineers before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities, but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.5 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash and legally dispose of off-site.

B. Remove from site all materials not to be reused on site; do not burn or bury.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

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SECTION 02 8200
ASBESTOS ABATEMENT

PART 1 - GENERAL

1.01 REFERENCE STANDARDS

THE WORK OF THIS SECTION SHALL BE PERFORMED IN ACCORDANCE WITH THE MOST CURRENT EDITIONS OF THE FOLLOWING REGULATIONS, STANDARDS, AND GUIDANCE DOCUMENTS. WHERE CONFLICTS OCCUR, THE MORE STRINGENT REQUIREMENT SHALL APPLY.

A. 29 CFR 1910 - Occupational Safety and Health Standards; Current Edition.

B. 29 CFR 1926.1101 - Asbestos; Current Edition.

C. 40 CFR Part 61 Subpart M - National Emissions Standard for Hazardous Air Pollutants.

D. 40 CFR 763.90(i)(5) - Asbestos Hazard Emergency Response Act (AHERA)

E. U.S. Department of Transportation (DOT) 49 CFR 171-180, Hazardous Materials Regulations governing packaging, labeling, and transport of asbestos waste.

1.02 PROJECT INFORMATION

A. Project Location
   1. This project involves abatement activities at the following location:

      Enterprise State Community College - Lolley Gymnasium

      600 Plaza Drive

      Enterprise, Coffee County, Alabama 36330

B. Owner
   1. The Owner is the entity with legal authority over the property and ultimate responsibility for project execution. The Owner’s representative shall serve as the primary point of contact for contractual matters, site access, scheduling, and project approvals.

      Owner: Enterprise State Community College

      Owner's Representative: Goodwyn Mills Cawood, LLC

C. Hazardous Materials Consultant/Asbestos Inspector
   1. The hazardous materials consultant is responsible for conducting the asbestos inspection, preparing the hazardous materials survey, and providing technical support related to Asbestos Containing Materials (ACM) identification. The consultant’s findings form the basis of the Scope of Work contained in this specification.

      Asbestos Inspector: Mr. Pierce Lagle

      Inspector's Firm: Goodwyn Mills Cawood, LLC

D. Abatement Designer/Specification Preparer
   1. The abatement designer is responsible for preparing this Section 02 8200 Asbestos Abatement specification, establishing required work practices, and ensuring that the specification aligns with applicable federal, state, and local regulations, including Alabama Department of Environmental Management (ADEM) requirements.

      Abatement Designer: Mr. Pierce Lagle

      Designer''s Firm: Goodwyn Mills Cawood, LLC

E. General Contractor
   1. Where applicable, the General Contractor is responsible for overall project coordination, including scheduling, site access, utility shutdowns, and integration of abatement activities

with demolition or renovation work. The General Contractor shall coordinate with the Abatement Contractor to ensure safe and efficient sequencing of work.

F. Abatement Contractor
   1. The Abatement Contractor shall be a licensed asbestos abatement firm authorized to perform asbestos work in the State of Alabama. The Abatement Contractor is responsible for executing the work described in this specification, including containment, removal, cleanup, waste handling, and compliance with Occupational Safety and Health Administration (OSHA), National Emissions Standard for Hazardous Air Pollutants (NESHAP), DOT, and ADEM requirements.

G. Project Monitor
   1. The Owner shall notify the contractor if a project monitor has been selected and shall identify the Project Monitor to the contractor prior to commencement of abatement activities.
   2. Should the Owner retains a Project Monitor, the Project Monitor shall provide oversight of asbestos abatement activities and verify that the Work is performed in accordance with this Specification, applicable regulations, and accepted industry practices. Responsibilities shall include observing work practices; documenting compliance; conducting visual inspections; reviewing Contractor submittals; and advising the Owner on technical matters related to asbestos abatement.
   3. The Project Monitor will not perform personal air monitoring, area air monitoring, clearance sampling, or any other air sampling required under OSHA 29 CFR 1926.1101 or project-specific requirements. All air monitoring required by OSHA, NESHAP, or this specification shall be performed by an independent third-party air monitoring firm retained by the Abatement Contractor. The air monitoring firm shall be accredited and qualified to perform asbestos air sampling and analysis in accordance with applicable regulations.
   4. The Abatement Contractor remains solely responsible for conducting exposure assessments, implementing appropriate respiratory protection, and ensuring compliance with all OSHA air monitoring requirements. The Project Monitor's presence does not relieve the Contractor of any regulatory or contractual obligations.

1.03 DEFINITIONS

A. Adequately Wet

"Adequately wet" means that ACM has been sufficiently saturated with amended water so that fibers are not released during removal, handling, or disturbance. If visible emissions occur at any time, the material is not considered adequately wet and additional wetting is required.

B. Critical Barrier

A critical barrier is a physical separation constructed of two layers of 6-mil polyethylene sheeting, sealed airtight over all openings, penetrations, and surfaces as required to isolate the work area during Class I abatement. Critical barriers prevent the migration of asbestos fibers to adjacent spaces.

C. Competent Person

The competent person is an individual who meets the training and experience requirements of OSHA 29 CFR 1926.1101 and is capable of identifying asbestos hazards, selecting appropriate control strategies, and implementing corrective measures. The competent person shall have the authority to stop work and modify procedures as necessary to maintain compliance.

D. Regulated Area

A regulated area is a space where asbestos work is performed and where airborne asbestos concentrations may reasonably be expected to exceed permissible limits. Access to the

regulated area is restricted to authorized personnel, and warning signs shall be posted at all entrances in accordance with OSHA requirements.

E. Work Area

The work area is the portion of the building or structure where ACM removal is conducted and where engineering controls, work practices, and protective measures are implemented. The work area includes all surfaces, equipment, and materials that may become contaminated during abatement.

F. Negative Pressure Enclosure (NPE)

A negative pressure enclosure is a fully contained work zone maintained under continuous negative pressure using HEPA-filtered air filtration devices. The NPE is required for Class I friable abatement and shall maintain a minimum pressure differential of −0.02 inches water column relative to adjacent spaces.

G. Decontamination Unit

A decontamination unit is a three-stage system consisting of a clean room, shower room, and equipment room, used for entry to and exit from Class I containment. The unit provides a controlled pathway for workers and equipment to prevent the spread of asbestos fibers outside the work area.

H. Asbestos-Containing Material (ACM)

Any material containing more than 1% asbestos by weight, as determined by polarized light microscopy (PLM) or other approved analytical methods.

I. Category I Non-Friable ACM

Non-friable ACM that is not likely to become friable during removal, including floor tile, mastic, roofing materials, gaskets, and resilient flooring. Category I materials may be removed using Class II work practices when they remain intact.

J. Category II Non-Friable ACM

Non-friable ACM that has a higher potential to become friable during removal, including window glazing, caulking, and certain siding materials. Category II materials require Class II work practices and must be handled in a manner that prevents breakage or pulverization.

1.04 OTHER REGULATED MATERIALS (ORM)

The hazardous materials survey identified additional regulated materials that are not asbestos-containing materials but require proper handling, removal, or disposal in accordance with applicable federal, state, and local regulations. These materials shall be managed by the Abatement Contractor unless otherwise noted, and shall be removed prior to demolition activities. The materials listed in this section represent the most common regulated items identified during the survey; however, this list is not exhaustive. The Contractor is responsible for properly managing any additional regulated materials encountered during the work and shall coordinate with the General Contractor or demolition contractor to ensure that all ORM are removed prior to demolition.

The contractor shall provide unit rates for disposal of each of the following ORM's listed below. Unit rates shall be provided on a per-unit basis appropriate to the material type.

A. Polychlorinated Biphenyl (PCB) Light Ballasts

Light ballasts manufactured prior to 1979 may contain PCBs. Ballasts labeled “No PCB” may be disposed of as non-hazardous waste. Ballasts without such labeling shall be assumed to contain PCBs and shall be removed intact, containerized, and disposed of as PCB bulk product waste in accordance with 40 CFR 761.

B. Mercury-Containing Devices

Thermostats, switches, relays, fluorescent lamps, and other mercury-containing devices (if applicable) shall be removed intact and managed as universal waste in accordance with 40 CFR 273. Broken devices shall be handled as hazardous waste.

C. Refrigerants and HVAC Gases

Refrigerants (including R-22, R-410A, and other CFC/HCFC/HFC compounds) shall be recovered by a certified technician in accordance with EPA Section 608 requirements. Recovery documentation shall be provided as part of closeout submittals.

D. Electronic Equipment and E-Waste

Computers, monitors, televisions, and other electronic devices shall be removed and managed in accordance with applicable e-waste recycling requirements. Cathode ray tubes (CRT) devices shall be handled as universal waste unless otherwise directed.

E. Other Universal Waste

Batteries, lamps, and other universal waste items identified in the survey shall be removed, containerized, labeled, and stored in accordance with 40 CFR 273.

1.05 REGULATORY APPLICABILITY

THIS PROJECT INVOLVES THE REMOVAL OF BOTH FRIABLE AND NON-FRIABLE ASBESTOS-CONTAINING MATERIALS (ACM). THE REGULATORY FRAMEWORK GOVERNING THIS WORK VARIES DEPENDING ON MATERIAL TYPE, FRIABILITY, AND THE NATURE OF THE DEMOLITION ACTIVITIES.

A. OSHA 29 CFR 1926.1101 applies to all asbestos work performed on this project, including Class I and Class II operations.

B. NESHAP requirements apply to all demolition and renovation activities and require that ACM be adequately wetted, properly handled, and disposed of in a manner that prevents visible emissions.

C. Asbestos Hazard Emergency Response Act (AHERA), 40 CFR Part 763, does not apply to this project because the structures are not K-12 schools. However, where final clearance air sampling is required by this specification for Class I work, the clearance criterion shall be based on the commonly used AHERA PCM clearance threshold of 0.01 fibers per cubic centimeter (f/cc). AHERA aggressive sampling and school management plan requirements are not applicable.

D. All asbestos notifications, demolition notifications, and related regulatory submissions must be made to the ADEM.

E. Where discrepancies exist between OSHA, NESHAP, ADEM, or this specification, the most protective requirement shall govern.

1.06 SUMMARY OF WORK

A. This specification describes the procedures, materials, equipment, and work practices required for the safe removal and disposal of asbestos-containing materials identified in the hazardous materials survey. The work includes both friable and non-friable ACM and requires the Contractor to apply different control strategies depending on the classification of each material.

B. The intent of this specification is to ensure that asbestos abatement activities are conducted in a manner that protects workers, building occupants, adjacent properties, and the environment, and that all work is completed in compliance with OSHA, NESHAP, DOT, and ADEM requirements.

C. Since preparation of the referenced hazardous materials survey, the project scope has changed to include full demolition of the natatorium structure. The original survey did not sample suspect building envelope components associated with the natatorium. Accordingly, additional assessment and, if necessary, abatement of building envelope materials may be required as part of the work.

1.07 PERFORMANCE REQUIREMENTS

A. The Contractor shall perform all work in a manner that prevents the release of asbestos fibers to the surrounding environment. Materials shall be maintained adequately wet during removal, and visible emissions shall not occur at any time.

B. The Contractor shall implement the appropriate level of engineering controls, work practices, and personal protective equipment (PPE) based on the classification of each ACM.

C. The Contractor shall immediately stop work and notify the Owner if suspect ACM not identified in the survey is encountered. No disturbance of suspect materials shall occur until laboratory analysis confirms whether the material contains asbestos.

D. The Contractor shall coordinate with the General Contractor to ensure that utilities, mechanical systems, and building components affected by abatement have been properly decommissioned prior to the start of work.

E. The Contractor shall provide unit rates for removal, handling, and disposal of asbestos-containing materials identified in Section 1.09. Unit rates shall include all labor, equipment, materials, and disposal costs and shall be used for evaluation of change orders, quantity adjustments, and removal of additional materials discovered during demolition. Unit rates shall be provided on a per-unit basis [square foot (SF), linear foot (LF), each (EA)] appropriate to the material type. Unit rates shall be provided for the following material types:
   1. Floor tile and mastic (SF)
   2. Transite (Asbestos-cement) Pipe (LF)
   3. Transite Siding and Panels (SF)
   4. Transite Ductwork (LF)
   5. Window glazing (LF or EA)
   6. Spray-applied ceiling texture (SF)
   7. Thermal system insulation (TSI)
   8. Pipe insulation - Runs, elbows, joints (LF)
   9. Roofing materials (felts, flashings, mastics) (SF)
   10. Plaster systems (SF)
   11. Ceiling tiles (SF)
   12. Fire doors (EA)
   13. Gaskets and packings (LF)

1.08 SUBMITTALS

A. Bid Submittals

The following documents shall be submitted with the Contractor’s bid. Failure to provide these items may result in rejection of the bid.
   1. Company Qualifications demonstrating current Alabama asbestos abatement licensing and experience with similar projects.
   2. Supervisor and Worker Licenses showing current Alabama accreditation.
   3. Project Approach or Work Plan Summary describing the Contractor’s general approach to Class I and Class II work.
   4. Proof of Insurance including general liability, pollution liability, and workers’ compensation coverage.
   5. List of Proposed Third-Party Air Monitoring Firms the Contractor intends to use for OSHA-required personal and clearance sampling.
   6. References for at least three similar abatement projects completed within the past five years.

B. Pre-Abatement Submittals

The following documents shall be submitted and approved prior to mobilization and commencement of abatement activities.

1. Detailed Project-Specific Work Plan describing containment design (for Class I work), Class II work practices, sequencing, and methods of removal.
2. Exposure Assessment or Objective Data supporting the Contractor's respiratory protection strategy for Class II work.
3. Respiratory Protection Program including medical evaluations and fit test documentation for all workers.
4. Name and Accreditation of Third-Party Air Monitoring Firm retained by the Contractor to perform OSHA-required personal monitoring and final clearance sampling.
5. ADEM Asbestos Notification and proof of submission.
6. Landfill Approval Documentation confirming acceptance of asbestos waste.
7. Emergency Response Plan including procedures for accidental disturbance, power loss, or containment breach.
8. Decontamination Unit Layout (Class I work only).
9. Equipment List including Air Filtration Devices (AFD), HEPA vacuums, and other critical equipment.

C. Closeout Submittals

All closeout submittals required under this section shall be submitted directly to the Project Monitor, where one has been designated by the Owner. The Project Monitor shall review, compile, and transmit the complete closeout package to the Owner upon verification that all required documentation has been received and is in compliance with this specification. In the absence of a Project Monitor, the Contractor shall submit all closeout documentation directly to the Owner.

The following documents shall be submitted after completion of abatement and prior to demobilization.

1. Final Clearance Results from the Contractor's third-party air monitoring firm (Class I work only).
2. Waste Shipment Records including chain-of-custody documentation and landfill receipts.
3. Daily Logs documenting manpower, work activities, and any deviations from the approved work plan.
4. Final Visual Inspection Report prepared by the Project Monitor (if owner has designated such individual)
5. Statement of Completion certifying that all work was performed in accordance with this specification and applicable regulations.

1.09 IDENTIFIED ASBESTOS-CONTAINING MATERIALS

THE HAZARDOUS MATERIALS SURVEY IDENTIFIED THE FOLLOWING ACM REQUIRING ABATEMENT:

A. Friable ACM (Class I):

The following materials shall be considered friable asbestos-containing material (ACM) unless otherwise noted. Materials listed as "assumed ACM" shall be treated as positive until laboratory analysis demonstrates otherwise.

1. Pipe Insulation
   a. Pipe insulation, associated wraps, and mudded fittings associated with water lines within the gymnasium building shall be presumed to be asbestos-containing material (ACM). This includes such materials located above ceilings, behind walls, at radiators, and within the crawlspace. These materials shall be presumed ACM throughout the gymnasium building and crawlspace unless laboratory analysis demonstrates that a specific material is non-ACM.

1) At the wall penetration where the piping enters the natatorium basement, the presumed-ACM designation for the gymnasium piping terminates. Pipe insulation, associated wraps, and mudded fittings within the natatorium basement that are represented by laboratory results in the referenced Hazardous Materials Survey are considered non-ACM.

B. Non-Friable ACM (Class II):

The following materials shall be considered non-friable asbestos-containing material (ACM) unless otherwise noted. Materials listed as "assumed ACM" shall be treated as positive until laboratory analysis demonstrates otherwise.

1. Base Cove
   a. White crumbled adhesive associated with 4-inch black base cove located in E29 – Weight Room, as shown on the drawings.
2. Fire Doors (Assumed ACM):
   a. Approximately fifteen (15) fire doors were identified at the subject building. All fire doors shall be assumed ACM.
3. Additional ACM
   a. Suspect ACM associated with mechanical, electrical, or plumbing systems that was not tested during the survey may be present hidden behind walls and within chases and shall be treated as ACM.
   b. An allowance is included for the assessment and abatement of suspect building envelope components that were not sampled as part of the referenced hazardous materials survey. Unless and until laboratory analysis demonstrates that a suspect material is non-ACM, each such material shall be presumed to contain asbestos and shall be managed as ACM in accordance with this Specification. Work performed under this allowance shall be authorized by the Owner and compensated using the applicable unit rates submitted by the Contractor and accepted as part of the Contract Documents. Payment shall be based on actual, field-verified quantities of authorized work performed.

1.10 MATERIAL CLASSIFICATION AND APPLICABILITY

MATERIALS IDENTIFIED OR ASSUMED TO CONTAIN ASBESTOS SHALL BE CLASSIFIED AND MANAGED AS CLASS I OR CLASS II ASBESTOS WORK, AS APPLICABLE, UNDER OSHA 29 CFR 1926.1101 AND THIS SPECIFICATION.

A. Thermal system insulation, surfacing material, and any ACM that is friable or becomes friable shall be managed as Class I asbestos work.

B. Non-friable ACM, including flooring, mastics, roofing materials, caulking, glazing, siding, fire doors, gaskets, and packings, shall be managed as Class II asbestos work unless a more protective classification or control is required by the material's condition, planned disturbance, or Section 3.05.

C. Category I non-friable ACM may be eligible for demolition-in-place only where permitted by applicable regulations and this Specification. The demolition-in-place allowance does not apply if the material is friable, in poor condition, or likely to become friable during the planned work.

1. Category I non-friable asbestos-containing materials (ACM), including resilient floor coverings, asphalt roofing products, packings, and gaskets, may remain in place during demolition provided they are not sanded, ground, cut, abraded, or otherwise rendered friable. Category I ACM may be demolished in place in accordance with ADEM and EPA NESHAP requirements and shall be handled in a manner that prevents visible emissions and maintains compliance with regulated asbestos-containing material (RACM) provisions.
2. If any Category I ACM becomes damaged, deteriorated, or friable during demolition, or if demolition methods would cause the material to crumble, pulverize, or release fibers, the

material shall be managed as RACM and handled in accordance with the applicable Class I or Class II work practices described in this specification. Disposal of Category I ACM shall comply with all ADEM waste-handling and landfill requirements.

3. Where Category I non-friable ACM is left in place during demolition, the Contractor shall comply with all applicable OSHA demolition requirements, including wet methods where feasible, prompt cleanup and waste handling, exposure assessment, and any additional controls required by the conditions encountered. If the material becomes friable or is likely to become friable during demolition, it shall be managed under the applicable asbestos removal requirements of this specification.

PART 2 - PRODUCTS

2.01 POLYETHYLENE SHEETING AND BARRIERS

A. Polyethylene sheeting shall be fire-retardant, seamless, and free of defects that compromise integrity. Sheeting used for critical barriers, wall coverings, and floor protection shall be a minimum of 6-mil thickness. All seams shall be overlapped by no less than 12 inches and sealed using duct tape or spray adhesive to create an airtight barrier. For Class I work, polyethylene sheeting shall be installed in multiple layers as required to construct a fully functional containment system capable of maintaining negative pressure.

2.02 AIR FILTRATION DEVICES (AFDS)

A. Air filtration devices used for Class I work shall be equipped with HEPA filters capable of removing 99.97% of particles 0.3 microns or larger. Units shall be capable of maintaining a minimum negative pressure of −0.02 inches water column within the containment. AFDs shall be maintained in good working order, with pre-filters replaced as needed to ensure adequate airflow. AFDs are not required for Class II non-friable work unless an upgrade trigger is reached.

2.03 HEPA VACUUM EQUIPMENT

A. HEPA vacuum equipment shall be specifically designed for asbestos abatement and shall include filters meeting NIOSH and OSHA requirements. All vacuum units shall be inspected prior to use to ensure seals, gaskets, and filters are intact. HEPA vacuums shall be used for cleanup of all ACM debris, dust, and residue during and after removal activities.

2.04 PERSONAL PROTECTIVE EQUIPMENT (PPE)

A. The Contractor shall provide all PPE required for safe execution of the work. PPE shall include disposable full-body protective suits, gloves, eye protection, and footwear covers. Respiratory protection shall be provided in accordance with OSHA 29 CFR 1926.1101 and the Contractor′s exposure assessment. For Class I work, workers shall wear full-face piece or half-mask air-purifying respirators equipped with P100 filters unless objective data supports the use of alternative protection. For Class II work, respirators shall be used as required by the Contractor′s negative exposure assessment.

2.05 DISPOSAL BAGS AND WASTE CONTAINERS

A. Asbestos waste shall be placed in 6-mil polyethylene bags or wrapped in 6-mil sheeting. All bags and wrapped materials shall be sealed to prevent leakage and labeled in accordance with OSHA and DOT requirements, including the required asbestos warning label. Rigid containers or drums shall be used for sharp or rigid ACM debris. Waste containers shall remain sealed until delivered to the approved landfill.

2.06 DECONTAMINATION UNIT (CLASS I WORK ONLY)

A. For Class I friable work, the Contractor shall provide a three-stage decontamination unit consisting of a clean room, shower room, and equipment room. The unit shall be constructed of rigid or semi-rigid framing and lined with 6-mil polyethylene sheeting. The shower shall be supplied with

hot and cold water and shall be fully operational throughout the duration of the work. Wastewater shall be filtered or otherwise managed in accordance with local requirements.

PART 3 - EXECUTION

3.01 PREPARATION OF WORK AREAS

A. Prior to beginning abatement activities, the Contractor shall establish regulated areas around all locations where ACM will be disturbed. Warning signs shall be posted at all entrances in accordance with OSHA requirements. For Class I work, the Contractor shall construct a full containment system using polyethylene sheeting and shall install AFDs to maintain negative pressure. For Class II work, localized protection such as drop cloths or floor sheeting shall be installed as needed to capture debris and protect building finishes.

B. Prior to the commencement of abatement activities in each containment area, the Project Monitor shall inspect the containment setup, including barriers, negative pressure equipment, decontamination facilities, signage, and access control measures, to confirm that the work area is prepared in accordance with this specification. No abatement work shall begin in any containment area until the Project Monitor has completed this inspection, where a Project Monitor has been retained.

3.02 GENERAL WORK PRACTICES

A. All Class I and Class II asbestos work shall be performed within a regulated area. The Contractor shall establish access controls, warning signs, and boundaries in accordance with OSHA 29 CFR 1926.1101. The Contractor's Competent Person shall conduct an initial exposure assessment before or at the initiation of each asbestos operation and shall implement personal exposure monitoring as required by OSHA. Unless a valid negative exposure assessment has been established for the operation, representative daily monitoring shall be conducted for employees performing Class I or Class II asbestos work.

3.03 CLASS I WORK PRACTICES (IF APPLICABLE)

A. General: Class I asbestos work includes the removal of thermal system insulation (TSI), surfacing material, and other friable ACM or presumed ACM. Class I work shall be performed within a regulated area under the supervision of a Competent Person and in accordance with OSHA 29 CFR 1926.1101. The Abatement Contractor shall use an OSHA-compliant containment and isolation system appropriate to the material quantity, configuration, location, condition, and exposure assessment.

The Abatement Contractor shall establish required access controls, warning signs, impermeable drop cloths or polyethylene sheeting, critical barriers or equivalent isolation measures, and decontamination procedures before disturbing Class I material. HVAC systems serving the regulated area shall be isolated, shut down, or otherwise controlled to prevent fiber migration.

B. Containment and Negative Pressure: Where a negative-pressure enclosure is used or required, the Abatement Contractor shall install critical barriers at openings, penetrations, and other pathways that could allow migration of asbestos fibers. The enclosure shall be maintained at no less than negative 0.02 inches water column relative to adjacent areas and shall maintain at least four air changes per hour. HEPA-filtered air filtration devices shall operate continuously during Class I removal and until the work area has passed final visual inspection and any required clearance sampling.

Before work begins and at the beginning of each shift, the Abatement Contractor shall inspect the containment for breaches and shall smoke-test or use an equivalent method to identify leaks and verify airflow direction. The Contractor shall immediately repair any breach or loss of negative pressure and shall stop affected work until the condition is corrected.

C. Removal, Cleanup, and Waste: Class I ACM shall be adequately wetted with amended water before and during disturbance, removal, handling, and packaging, except where wetting is infeasible or creates a greater safety hazard. The Abatement Contractor shall use tools and

methods that minimize breakage and fiber release. Dry sweeping, use of compressed air, and other practices that could release asbestos fibers are prohibited.

The Abatement Contractor shall promptly collect asbestos debris using HEPA vacuuming, wet wiping, wet scraping, or other approved methods; package waste in leak-tight, properly labeled containers; and prevent debris from falling, becoming airborne, or leaving the regulated area.

D. Monitoring, Inspection, and Clearance: The Abatement Contractor shall conduct the initial exposure assessment and personal air monitoring required by OSHA. Upon completion of Class I removal, the Abatement Contractor shall complete detailed cleaning and a final visual inspection. Final clearance air sampling shall be performed in accordance with Section 3.07 before removal of containment barriers, when clearance sampling is required by this Specification.

E. Thermal System Insulation (TSI): Thermal system insulation includes, but is not limited to, pipe insulation; insulation on fittings, valves, elbows, tees, reducers, transitions, and mudded joints; boiler insulation; tank insulation; duct insulation; breeching insulation; and other insulated mechanical-system components. TSI identified or assumed to contain asbestos shall be managed as Class I asbestos work.

The Abatement Contractor shall remove TSI using wet methods and a containment method appropriate to the work. For limited, localized removal from intact piping, the Abatement Contractor may use glove bag, negative-pressure glove bag, mini-enclosure, negative-pressure glovebox, water-spray process, or another OSHA-compliant control system when appropriate to the material condition, quantity, and exposure assessment. The Abatement Contractor shall not use glove bags where the condition, configuration, quantity, or employee-exposure potential makes that method inadequate.

TSI shall be removed in a manner that minimizes disturbance to adjacent materials. Cutting, breaking, grinding, drilling, or other aggressive methods are prohibited unless specifically addressed in the approved work plan and performed using controls that comply with OSHA and this Specification. Where feasible, insulated piping and associated components shall be removed in manageable sections while maintaining the insulation in an adequately wet condition and preventing debris from falling or becoming airborne.

TSI debris, fallen insulation, and visible asbestos-containing dust on adjacent surfaces, equipment, ceilings, floors, or HVAC components shall be removed with the TSI or cleaned using HEPA vacuuming, wet wiping, or other approved methods. Materials that cannot be adequately cleaned shall be removed and managed as asbestos-containing waste.

3.04 CLASS II WORK PRACTICES (NON-FRIABLE ACM)

A. General: Class II work shall be performed using methods appropriate for the specific material type and in accordance with OSHA 29 CFR 1926.1101. The Abatement Contractor shall use regulated-area controls, wet methods where feasible, HEPA cleanup, appropriate respiratory protection, and prompt packaging and disposal of asbestos-containing debris.

B. Flooring, Mastic, Linoleum, and Underlayment: Flooring materials shall be removed using wet methods and manual techniques that prevent the material from becoming friable. Heat, solvents, or manual prying may be used as appropriate. Mechanical grinding, sanding, abrasive blasting, or aggressive abrasion is prohibited. Residual adhesive and backing shall be scraped using wet methods.

C. Roofing Materials: Asbestos-containing roofing materials shall be removed intact to the greatest extent feasible. Wet methods shall be used for materials that are not intact or will be rendered not intact during removal, unless wetting is infeasible or creates a safety hazard. Cutting, grinding, sanding, or abrading roofing materials is prohibited unless specifically addressed in the Abatement Contractor’s approved work plan and performed using the required controls.

D. Caulking, Sealants, and Glazing: Caulking, sealants, and glazing compounds shall be removed using wet methods and hand tools to minimize disturbance. Localized polyethylene sheeting or equivalent debris-capture measures shall be installed as needed to prevent migration of debris from the regulated area. Full containment and negative pressure are not required unless required by the exposure assessment, the material condition, or Section 3.05.

E. Transite, Asbestos-Cement Siding, Panels, and Ductwork: The Contractor shall remove materials intact to the greatest extent feasible. Cutting, drilling, abrading, or breaking these materials is prohibited unless less fiber-releasing methods are infeasible. Each unit shall be wetted with amended water before removal and shall be promptly lowered, bagged, wrapped, or otherwise placed in leak-tight packaging to prevent fiber release.

F. Fire Doors, Gaskets, and Packings: Fire doors, gaskets, packings, and similar assumed ACM components shall be removed intact where feasible. Cutting, drilling, grinding, breaking, or other disturbance that may release asbestos fibers is prohibited unless the Contractor has implemented the controls required by the material condition and Section 3.05.

G. Changed Conditions: If any Class II material becomes friable, is damaged, cannot be removed substantially intact, results in visible dust or debris, or otherwise presents a potential for elevated employee exposure, the Contractor shall immediately stop the affected activity and implement the requirements of Section 3.05 before resuming work.

H.

3.05 UPGRADE TRIGGERS/CHANGED CONDITIONS

A. The Contractor shall immediately stop work and implement Class I controls if any of the following conditions occur:
   1. A non-friable ACM becomes friable or is damaged to the extent that it can be crumbled, pulverized, or reduced to powder by hand pressure.
   2. Removal activities result in visible dust, debris, or emissions.
   3. The Contractor engages in sanding, grinding, cutting, or abrading of ACM.
   4. The Competent Person determines that employee exposure may exceed the permissible exposure limit (PEL).

3.06 WASTE HANDLING AND PACKAGING

A. All ACM waste shall be promptly containerized in 6-mil bags or wrapped in 6-mil polyethylene sheeting. Waste shall be sealed, labeled, and stored in a designated waste staging area until transported to the approved landfill. The Contractor shall complete all required waste shipment records and maintain chain-of-custody documentation. Waste shall be transported in accordance with DOT regulations.

3.07 FINAL CLEARANCE AND VISUAL INSPECTION

A. Upon completion of removal activities, the Contractor shall perform a thorough cleaning of the work area. All surfaces shall be HEPA-vacuumed and wet-wiped as necessary. Polyethylene sheeting shall be removed carefully to prevent fiber release. The Project Monitor shall conduct a final visual inspection to confirm that no ACM residue, dust, or debris remains. In the event that a Project Monitor has not been utilized, the Competent Person shall conduct the final visual inspection.

B. For Class I work, the final visual inspection and PCM Clearance air sampling shall occur prior to removal of containment barriers. Where clearance air sampling is required by this specification such sampling shall be performed by the contractors independent third-party air monitoring firm only after the work area has passed final visual inspection. Final clearance shall be considered acceptable only when all air samples are at or below 0.01 fibers per cubic centimeter.

C. Where the Work is performed in multiple containment areas/zones, each containment area shall be individually cleaned, visually inspected, and conduct air clearance sampling (where required) prior to the removal of containment barriers and demobilization of that area.

3.08 DEMOBILIZATION

A. The Contractor shall not begin demobilization activities until all required final clearance inspections and, where applicable, final clearance air sampling have been completed by the Contractor's independent third-party air monitoring firm. The Work Area shall remain under containment and negative pressure (for Class I work) until the Contractor has received written confirmation from the Owner or Project Monitor that the abatement has been successfully completed in accordance with this specification.

B. Upon receipt of written approval of successful completion, the Contractor shall remove all equipment, materials, temporary barriers, polyethylene sheeting, air filtration devices, decontamination units, and waste containers from the site. Removal of containment materials shall be performed in a manner that prevents the release of residual dust or debris.

C. The Contractor shall restore any building components, finishes, or surfaces that were removed, altered, or damaged solely for the purpose of performing asbestos abatement, unless otherwise directed by the Owner. All restored areas shall be left in a condition suitable for subsequent demolition or renovation activities.

D. The Contractor shall ensure that the Work Area and adjacent spaces are left clean, orderly, and free of debris upon completion of demobilization.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:
1. Formwork.
2. Reinforcing.
3. Cast-in place concrete including mix design, placement procedures, and finishes.

B. Cast-in-place concrete includes the following:
1. Foundations and footings.
2. Slabs-on-grade.
3. Slab on deck.
4. Foundation and retaining walls.
5. Building frame members.
6. Equipment pads and bases.
7. Stairs.

C. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

D. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 02 20 00, "Earthwork": Drainage fill under slabs on grade.
2. Section 02 51 40, "Portland Cement Concrete Paving": Concrete paving and walks.
3. Section 03 4100, "Structural Precast Concrete Wall Panels."
4. Section 05 50 00, "Metal Fabrications": Metal items to be built into concrete.
5. Section 07 90 00, "Sealants and Joint Fillers": Sealants and joint fillers in concrete work.
6. Respective Sections of Division 15 and 16, as applicable, for furnishing of inserts, anchorage and erection items required for mechanical and electrical work.
7. Divisions 15 and 16, as applicable, for furnishing and setting of conduit, pipes and sleeves for mechanical and electrical equipment.

1.2 SUBMITTALS:

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
1. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.
2. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.
3. Shop drawings for formwork indicating fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually. Formwork drawings shall bear the seal and signature of a Professional Engineer registered in the State of Alabama.
4. Coordination drawings for all installed embeds, anchor bolts, embedded piping, etc.
5. Architect's review is for general architectural applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.
6. Samples of materials as requested by Architect, including names, sources, and descriptions, as follows:
   a. Color finishes.
   b. Normal weight aggregates.
   c. Reglets.

d. Waterstops.
e. Vapor retarder/barrier.

7. Laboratory test reports for concrete materials and mix design test.
8. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
9. Minutes of preinstallation conference.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. ACI 301, "Specifications for Structural Concrete for Buildings".
2. ACI 302, "Guide for Concrete Floor and Slab Construction".
3. ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
4. ACI 305, "Hot Weather Concreting".
5. ACI 306, "Cold Weather Concreting".
6. ACI 309, "Guide for Consolidation of Concrete".
7. ACI 311, "Recommended Practice for Concrete Inspection".
8. ACI 318, "Building Code Requirements for Reinforced Concrete".
9. ACI 347, "Recommended Practice for Concrete Formwork".
10. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
11. American Welding Society, AWS D1.4 "Structural Welding Code - Reinforcing Steel".

B. Concrete Testing Service: Engage a testing agency acceptable to Architect to perform material evaluation tests and to design concrete mixes.

1. Refer to Division 1 Section “Special Conditions” for additional information and requirements.

C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Owner's expense.

D. Pre-installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings" and the following:

1. At least 35 days prior to submitting design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Require representatives of each entity directly concerned with cast-in-place concrete to attend conference, including, but not limited to, the following:
   a. Contractor's superintendent.
   b. Agency responsible for concrete design mixes.
   c. Agency responsible for field quality control.
   d. Ready-mix concrete producer.
   e. Concrete subcontractor.
   f. Primary admixture manufacturers.

PART 2 - PRODUCTS

2.1 FORM MATERIALS:

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Care shall be taken with the formwork on the bottom of the slabs, which will be exposed ceilings, to avoid the need for patching or repairs following the removal of the formwork. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.
2. 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.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

E. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

D. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

1. For slabs-on-grade, use concrete bricks or supports with sand plates or horizontal runners where base material will not support chair legs.
2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

E. Bar and Rod Mats: ASTM A 184 "Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement".

F. Threaded Dowels: Continuous threaded high-strength steel bars equal to "Lasstud" by Richmond Screw Anchor Co., Inc. Provide inserts compatible with dowels, designed for ultimate pull-out force indicated on the drawings.

G. Mechanical Splices: Equal to "Cadweld Rebar Splices", as manufactured by Erico Products, Inc., "C" Series, for developing 125% of minimum ASTM specified yield strengths, unless otherwise noted on drawings.

H. Steel Shapes, Plates and Rods: Conform to ASTM A 36, "Specification for Structural Steel".

I. Do Not Weld Reinforcing Steel: Unless specifically noted on drawings. If welding is shown, conform to latest revision of AWS D12.1, "Reinforcing Steel Welding Code of the American Welding Society". Perform all welding with certified welders qualified per AWS.

2.3 CONCRETE MATERIALS:

A. Portland Cement: ASTM C 150, Type I, II or IL.

1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Fly Ash: ASTM C 618, Type F.

1. Limit use of fly ash to not exceed 25 percent of cement content by weight.

C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.

D. Water: Potable.

E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Air-Tite, Cormix Construction Chemicals.
   b. Air-Mix or Perma-Air, Euclid Chemical Co.
   c. Darex AEA or Daravair, W.R. Grace & Co.
   d. MB-VR or Micro-Air, Master Builders, Inc.
   e. Sealtight AEA, W.R. Meadows, Inc.
   f. Sika AER, Sika Corp.

G. Water-Reducing Admixture: ASTM C 494, Type A.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. PSI N, Cormix Construction Chemicals.
   b. Eucon WR-75, Euclid Chemical Co.
   c. WRDA, W.R. Grace & Co.
   d. Pozzolith Normal or Polyheed, Master Builders, Inc.
   e. Plastocrete 161, Sika Corp.

H. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Eucon 37, Euclid Chemical Co.
   b. WRDA 19 or Daracem, W.R. Grace & Co.
   c. Rheobuild or Polyheed, Master Builders, Inc.
   d. Sikament 300, Sika Corp.

I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Accelguard 80, Euclid Chemical Co.
   b. Daraset, W.R. Grace & Co.
   c. Pozzutec 20, Master Builders, Inc.

J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Eucon Retarder 75, Euclid Chemical Co.
   b. Daratard-17, W.R. Grace & Co.
   c. Pozzolith R, Master Builders, Inc.
   d. Protard, Prokrete Industries.

e. Plastiment, Sika Corporation.

K. Crystalline Capillary Waterproofing Admixture:

1. Xypex (or equal) at rate of 2% by weight of cement content indicated in construction documents. Coordinate locations with architectural waterproofing details.

2.4 RELATED MATERIALS:

A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (22 gage) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.

C. Waterstops: Provide strip applied, flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.

1. Flexible Butyl Rubber Strip Applied Waterstops:

a. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. Swellstop, as manufactured by Greenstreak.
2. Synkoflex.

2. Rubber Waterstops: Corps of Engineers CRD-C 513.

a. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. The Burke Co.
2. Progress Unlimited.
3. Williams Products, Inc.

3. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.

a. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. The Burke Co.
2. Greenstreak Plastic Products Co.
3. W.R. Meadows, Inc.
4. Progress Unlimited.
5. Schlegel Corp.
6. Vinylex Corp.

D. Vapor Barrier:

1. Vapor Barrier, General Use (except as indicated below):

a. Product: Plastic vapor barrier. Include manufacturer's recommended adhesive or pressure-sensitive tape for sealing joints, laps and penetrations, preformed boots for penetrations, and all other components required for a complete, proper and vaporproof installation in accordance with ASTM E1643.

1. Classification: Must exceed ASTM E 1745 Class "A".
2. Permeance: ASTM E96: 0.02 perms or less.
3. Thickness: Not less than 15 mils.

b. Manufacturer/Product:

1. "Moistop Ultra 15 mil", Fortifiber Building Systems Group.
2. "Perminator 15 mil", W.R. Meadows
3. "Griffolyn Type-105", Reef Industries, Inc.
4. "Stego Wrap 15 mil", Stego Industries, LLC.
5. "VaporBlock VB15", Raven Inc.
6. "Husky Yellow Guard 15 mil", Poly-America, L.P.

c. Locations for Use: Continuous below all building slabs, and other structural slabs, porches, stoops, pads, covered (below roofs) areas, etc., on grade, and turned-down to tops of footings.

2. Vapor Barrier, **Below Wood Flooring**: Provide below and 5'-0" beyond all wood flooring; Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic anti-stick sheet. Provide manufacturer's recommended mastics and gusset tape.
   a. Product/Manufacturer: Subject to compliance with requirements, provide "Premoulded Membrane Vapor Seal with Plasmatic Core," as manufactured by W.R. Meadows, Inc.; Austell, GA.
   b. Locations for Use: Continuous below and 5'-0" beyond all wood flooring.

E. Coordinate the use (or non-use) of membrane-forming compounds with the suppliers of finishes to be provided on concrete surfaces. Do not use membrane-forming compounds at locations where they may have a detrimental effect on the permanent installation of the finish materials, floor coverings, their adhesives, setting beds, etc. At such locations, utilize only dissipating type compounds.

F. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Spartan-Cote, The Burke Co.
   b. Day-Chem Cure and Seal, Dayton Superior Corp.
   c. Eucocure, Euclid Chemical Co.
   d. Horn Clear Seal, A.C. Horn, Inc.
   e. L&M Cure R, L&M Construction Chemicals, Inc.
   f. Masterkure, Master Builders, Inc.
   g. CS-309, W.R. Meadows, Inc.
   h. Kure-N-Seal, Sonneborn-Chemrex.

G. V.O.C. Compliant Acrylic Curing and Sealing Type (30 Percent): Liquid type membrane-forming curing compound complying with ASTM C 309, Type 1, Class A and B. Provide 30 percent solids minimum, for surfaces indicated to be sealed.

H. Safe Cure and Seal: 30 percent (J-19), Dayton Superior Inc.

I. Evaporation Control:

1. Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1. Eucobar, Euclid Chemical Co.
      2. E-Con, L&M Construction Chemicals, Inc.
      3. Confilm, Master Builders, Inc.

J. V.O.C. Compliant Evaporation Control: Sure Film (J-74), Dayton Superior Inc.

K. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. K-15, Ardex, Inc.
   b. LevelLayer II, Dayton Superior Corp.
   c. Flo-Top, Euclid Chemical Co.
   d. Gyp-Crete, Gyp-Crete Corp.
   e. Levelex, L&M Construction Chemicals, Inc.
   f. Underlayment 110, Master Builders, Inc.
   g. Thoro Underlayment Self-Leveling, Thoro System Products.

L. Bonding Agent: Polyvinyl acetate or acrylic base.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Polyvinyl Acetate (Interior Only):
      1. Superior Concrete Bonder, Dayton Superior Corp.
      2. Euco Weld, Euclid Chemical Co.
      3. Weld-Crete, Larsen Products Corp.
      4. Everweld, L&M Construction Chemicals, Inc.
      5. Ready Bond, Symons Corp.
   b. Acrylic or Styrene Butadiene:
      1. Acrylic Bondcrete, The Burke Co.
      2. Day-Chem Ad Bond, Dayton Superior Corp.
      3. SBR Latex, Euclid Chemical Co.
      4. Daraweld C, W.R. Grace & Co.
      5. Hornweld, A.C. Horn, Inc.
      6. Everbond, L&M Construction Chemicals, Inc.
      7. Acryl-Set, Master Builders Inc.
      8. Intralok, W.R. Meadows, Inc.
      9. Sonocrete, Sonneborn-Chemrex.

M. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Resi-Bond (J-58), Dayton Superior.
   b. Euco Epoxy System #452 or #620, Euclid Chemical Co.
   c. Epoxtite Binder 2390, A.C. Horn, Inc.
   d. Epabond, L&M Construction Chemicals, Inc.
   e. Concresive Standard Liquid, Master Builders, Inc.
   f. Rezi-Weld 1000, W.R. Meadows, Inc.
   g. Sikadur 32 Hi-Mod, Sika Corp.

N. Interior Epoxy Sealer: Use a maximum 35 percent type.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Epoxy-Plus; Dayton Superior Inc.
   b. Eucopoxy 1; Euclid Chemical
   c. Oauerseal 30E; Non-Crete, Inc.
   d. Rescon R117; Symons Corp.
   e. Son-No-Mar; Sonneborn, Div./Chem Rex Inc.
   f. Super Seal 35; L & M Const. Chem. Co.

O. V.O.C. Compliant Urethane Sealer:
1. Day Chem Urethane V.O.C. (J-39); Dayton Superior Inc.

2.5 PROPORTIONING AND DESIGNING MIXES:

A. Prepare design mixes for each type and strength of concrete by either laboratory trial mixtures or field experience methods as specified in ACI 301 AND ACI 318.

B. All concrete mix designs shall include the following information:
1. Proportions of cement, fine and coarse aggregate and water.
2. Water/cement ratio, design strength, slump and air content.
3. Type of cement and aggregates.
4. Type and dosage of all admixtures.
5. Type, color and dosage of integral coloring compounds, where applicable.
6. Special requirements for pumping.

7. Any special characteristics of the mix which require precautions in the mixing, placing or finishing techniques to achieve the finished product specified.

C. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.

D. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
1. 4000-psi, 28-day compressive strength.

E. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
1. Subjected to freezing and thawing: W/C 0.45.
2. Subjected to deicers/watertight: W/C 0.40.
3. Subjected to brackish water, salt spray, or deicers: W/C 0.40.

F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps 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 high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
4. Other concrete: Not more than 5 inches or less than 3 inches.

G. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.6 ADMIXTURES:

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg.F (10 deg.C).

C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.

D. 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 1-1/2 percent within the following limits:
1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
   a. 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4-inch maximum aggregate.
   b. 5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2-inch maximum aggregate.
2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.

E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

F. Xypex Admixture (or equal) at rate of 2% by weight of cement content as indicated in construction documents. Coordinate locations with architectural waterproofing details.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
1. When air temperature is between 85 deg.F (30 deg.C) and 90 deg.F (32 deg.C), reduce mixing and

delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg.F (32 deg.C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL:

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS:

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Formwork drawings shall bear the seal and signature of a Professional Engineer registered in the State of Alabama. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

1. Provide Class A tolerances for concrete surfaces exposed to view.
2. Provide Class C tolerances for other concrete surfaces.

Care shall be taken with the formwork on the bottom of the slabs, which will be exposed ceilings, to avoid the need for patching or repairs following the removal of the formwork.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

E. 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.

F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION:

A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

3.4 PLACING REINFORCEMENT:

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting

operations. Repair damages before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.

D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS:

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.

B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.

F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Joint fillers and sealants are specified in Section 07900, "Sealants and Joint Fillers".

G. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.

1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).

4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 INSTALLING EMBEDDED ITEMS:

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

C. Install dovetail anchor slots in concrete structures as indicated on drawings.

D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES:

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT:

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. 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 mix to segregate.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
3. Maintain reinforcing in proper position on chairs during concrete placement.

F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

G. When air temperature has fallen to or is expected to fall below 40 deg.F (4 deg.C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg.F (10 deg.C) and not more than 80 deg.F (27 deg.C) at point of placement.

1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg.F (32 deg.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. Using liquid nitrogen to cool concrete is Contractor's option.

2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.

3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.

4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.9 FINISHING FORMED SURFACES:

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. 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-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Care shall be taken with the formwork on the bottom of the slabs, which will be exposed ceilings, to avoid the need for patching or repairs following the removal of the formwork. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.

1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES:

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

1. After placing slabs, finish surface to tolerances specified in Section 3.11. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate

surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances specified in Section 3.11. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances specified in Section 3.11. Grind smooth any surface defects that would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 FLOOR FLATNESS/LEVELNESS REQUIREMENTS:

A. After placing slabs, finish surface to the following tolerances of F(F) (floor flatness) and F(L) (floor levelness) measured according to ASTM E 1155:

FINISH	SLAB-ON-GRADE				FRAMED FLOOR	
	OVERALL		LOCAL		OVERALL	LOCAL
	FF	FL	FF	FL	FF	FF
Scratch Finish	18	15	15	13	25	22
Float Finish	20	17	17	15	25	22
Trowel Finish	25	22	22	19	25	22

Specified overall F-numbers apply to the whole floor, taken as one. Minimum local F-numbers apply to each slab, bounded by construction joints.

3.12 MISCELLANEOUS CONCRETE ITEMS:

A. Filling In: 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. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.13 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

1. Provide moisture curing by the following methods:
   a. Keep concrete surface continuously wet by covering with water.
   b. Use continuous water-fog spray.
   c. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
2. Provide moisture-retaining 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 or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
   a. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
   b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

D. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

E. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.14 SHORES AND SUPPORTS:

A. General: Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified.

B. Shoring requirements shall designed be by a professional engineer registered in the State of Florida. All designs shall be submitted to the Architect bearing the seal and signature of the Professional Engineer.

C. Extend shoring from ground to roof for structures four stories or less, unless otherwise permitted.

D. Extend shoring at least three floors under floor or roof being placed for structures over four stories. Shore floor directly under floor or roof being placed, so that loads from construction above will transfer directly to these shores. Space shoring in stories below this level in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members where no reinforcing steel is provided. Extend shores beyond minimums to ensure proper distribution of loads throughout structure.

E. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.

F. Keep reshores in place a minimum of 15 days after placing upper tier, or longer, if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

G. For concrete exposed to view, all formwork shall be tight to prevent leaks and fins.

3.15 REMOVING FORMS:

A. General: 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 not less than 50 deg.F (10 deg.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. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. 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.

3.16 REUSING FORMS:

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.17 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.

B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

1. Cut out honeycombs, 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 less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend

into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.

4. Repair 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 and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

E. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.

F. Repair methods not specified above may be used, subject to acceptance of Architect.

3.18 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. General: The Owner will employ a testing agency to perform tests and to submit test reports.

B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
   a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
   b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
   c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg.F (4 deg.C) and below, when 80 deg.F (27 deg.C) and above, and one test for each set of compressive-strength specimens.
   d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

C. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day, or for each 5000 sq ft of surface are placed; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

1. Any additional cylinder required by the Contractor for early strength gain tests for form stripping or post-tensioning are Contractor’s responsibility and shall be paid for by Contractor.

2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

5. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

6. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

7. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF CAST-IN-PLACE CONCRETE

STRUCTURAL SEAL SHEET

01 4100 - STRUCTURAL TESTS AND SPECIAL INSPECTIONS
03 3000 - CAST-IN-PLACE CONCRETE
05 1200 - STRUCTURAL STEEL
05 2100 - STEEL JOIST AND JOIST GIRDERS
05 3100 - STEEL DECK
05 4500 - LIGHT GAUGE STEEL TRUSSES



11/06/2026

SECTION 03 3100
CONCRETE

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:
   1. Formwork.
   2. Reinforcing.
   3. Cast-in place concrete including mix design, placement procedures, and finishes.

B. Cast-in-place concrete includes the following:
   1. Foundations and footings.
   2. Slabs-on-grade.
   3. Equipment pads and bases.

C. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

D. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Section 05 5000, "Metal Fabrications": Metal items to be built into concrete.
   2. Section 07 9005, "Joint Sealers": Sealants and joint fillers in concrete work.
   3. Respective Sections of Division 22 through 26, as applicable, for furnishing of inserts, anchorage and erection items required for mechanical and electrical work.
   4. Divisions 22 through 26, as applicable, for furnishing and setting of conduit, pipes and sleeves for mechanical and electrical equipment.
   5. Section 31 2000, "Earth Moving": Drainage fill under slabs on grade.
   6. Section 32 1313, "Concrete Paving": Concrete paving and walks.
   7.

1.2 SUBMITTALS:

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.

C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

D. Shop drawings for formwork indicating fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joints or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually. Formwork drawings shall bear the seal and signature of a Professional Engineer registered in the State of Alabama.

E. Architect's review is for general architectural applications and features only. Designing formwork for structural stability and efficiency is Contractor's responsibility.

F. Samples of materials as requested by Architect, including names, sources, and descriptions, as follows:

1. Color finishes.
2. Normal weight aggregates.
3. Reglets.
4. Waterstops.
5. Vapor retarder/barrier.

G. Laboratory test reports for concrete materials and mix design test.

H. Material certificates in lieu of material laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

I. Minutes of preinstallation conference.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
1. ACI 301, "Specifications for Structural Concrete for Buildings".
2. ACI 302, "Guide for Concrete Floor and Slab Construction".
3. ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
4. ACI 305, "Hot Weather Concreting".
5. ACI 306, "Cold Weather Concreting".
6. ACI 309, "Guide for Consolidation of Concrete".
7. ACI 311, "Recommended Practice for Concrete Inspection".
8. ACI 318, "Building Code Requirements for Reinforced Concrete".
9. ACI 347, "Recommended Practice for Concrete Formwork".
10. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
11. American Welding Society, AWS D1.4 "Structural Welding Code - Reinforcing Steel".

B. Concrete Testing Service: Engage a testing agency acceptable to Architect to perform material evaluation tests and to design concrete mixes.

C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings" and the following:
1. At least 35 days prior to submitting design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Require representatives of each entity directly concerned with cast-in-place concrete to attend conference, including, but not limited to, the following:
a. Contractor's superintendent.
b. Agency responsible for concrete design mixes.
c. Agency responsible for field quality control.
d. Ready-mix concrete producer.
e. Concrete subcontractor.
f. Primary admixture manufacturers.

PART 2 - PRODUCTS

2.1 FORM MATERIALS:

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
   1. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.
   2. 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.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

E. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

D. Deformed-Steel Welded Wire Fabric: ASTM A 497.

E. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
   1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
   2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

F. Bar and Rod Mats: ASTM A 184 "Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement".

G. Threaded Dowels: Continuous threaded high-strength steel bars equal to "Lasstud" by Richmond Screw Anchor Co., Inc. Provide inserts compatible with dowels, designed for ultimate pull-out force indicated on the drawings.

H. Mechanical Splices: Equal to "Cadweld Rebar Splices", as manufactured by Erico Products, Inc., "C" Series, for developing 125% of minimum ASTM specified yield strengths, unless otherwise noted on drawings.

I. Steel Shapes, Plates and Rods: Conform to ASTM A 36, "Specification for Structural Steel".

J. Do Not Weld Reinforcing Steel: Unless specifically noted on drawings. If welding is shown, conform to latest revision of AWS D12.1, "Reinforcing Steel Welding Code of the American Welding Society". Perform all welding with certified welders qualified per AWS.

2.3 CONCRETE MATERIALS:

A. Portland Cement: ASTM C 150, Type I.
   1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Fly Ash: ASTM C 618, Type F or C.
   1. Limit use of fly ash to not exceed 20 percent of cement content by weight.

C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.
   1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.
   2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

D. Water: Potable.

E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Air-Tite, Cormix Construction Chemicals.
      b. Air-Mix or Perma-Air, Euclid Chemical Co.
      c. Darex AEA or Daravair, W.R. Grace & Co.
      d. MB-VR or Micro-Air, Master Builders, Inc.
      e. Sealtight AEA, W.R. Meadows, Inc.
      f. Sika AER, Sika Corp.

G. Water-Reducing Admixture: ASTM C 494, Type A.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. PSI N, Cormix Construction Chemicals.
      b. Eucon WR-75, Euclid Chemical Co.
      c. WRDA, W.R. Grace & Co.
      d. Pozzolith Normal or Polyheed, Master Builders, Inc.
      e. Plastocrete 161, Sika Corp.

H. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Eucon 37, Euclid Chemical Co.
      b. WRDA 19 or Daracem, W.R. Grace & Co.
      c. Rheobuild or Polyheed, Master Builders, Inc.
      d. Sikament 300, Sika Corp.

I. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Accelguard 80, Euclid Chemical Co.
      b. Daraset, W.R. Grace & Co.
      c. Pozzutec 20, Master Builders, Inc.

J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Eucon Retarder 75, Euclid Chemical Co.
      b. Daratard-17, W.R. Grace & Co.
      c. Pozzolith R, Master Builders, Inc.
      d. Protard, Prokrete Industries.
      e. Plastiment, Sika Corporation.

2.4 RELATED MATERIALS:

A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (22 gage) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.

C. Waterstops: Provide strip applied, flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.
   1. Flexible Butyl Rubber Strip Applied Waterstops:
      a. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
         1) Swellstop, as manufactured by Sika.
         2) Synkoflex.
   2. Rubber Waterstops: Corps of Engineers CRD-C 513.
      a. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
         1) The Burke Co.
         2) Progress Unlimited.
         3) Williams Products, Inc.
   3. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.
      a. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
         1) The Burke Co.
         2) Greenstreak Plastic Products Co.
         3) W.R. Meadows, Inc.
         4) Progress Unlimited.
         5) Schlegel Corp.
         6) Vinylex Corp.

D. Vapor Barrier:
   1. Vapor Barrier, General Use (except as indicated below):
      a. Product: Plastic vapor barrier. Include manufacturer's recommended adhesive or pressure-sensitive tape for sealing joints, laps and penetrations, preformed boots for

penetrations, and all other components required for a complete, proper and vaporproof installation in accordance with ASTM E1643.
1) Classification: Must exceed ASTM E 1745 Class “A”.
2) Permeance: ASTM E96: 0.02 perms or less.
3) Thickness: Not less than 15 mils.

b. Manufacturer/Product:
1) "Moistop Ultra 15 mil”, Fortifiber Building Systems Group.
2) "Perminator 15 mil”, W.R. Meadows
3) “Griffolyn Type-105”, Reef Industries, Inc.
4) "Stego Wrap 15 mil”, Stego Industries, LLC.
5) "VaporBlock VB15”, Raven Inc.
6) "Husky Yellow Guard 15 mil", Poly-America, L.P.

c. Locations for Use: Continuous below all new and opened building slabs, and other structural slabs, porches, stoops, pads, covered (below roofs) areas, etc., on grade, and turned-down to tops of footings.

2. Vapor Barrier, Below Wood Flooring: Provide below and 5’-0” beyond all wood flooring; Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic anti-stick sheet. Provide manufacturer's recommended mastics and gusset tape.
a. Product/Manufacturer: Subject to compliance with requirements, provide “Premoulded Membrane Vapor Seal with Plasmatic Core,” as manufactured by W.R. Meadows, Inc.; Austell, GA.
b. Locations for Use: Continuous below and 5’-0” beyond all wood flooring.

E. Nonslip Aggregate Finish: Provide fused aluminum oxide granules or crushed emery as the abrasive aggregate for a nonslip finish, with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide. Use material that is factory-graded, packaged, rustproof, nonglazing, and unaffected by freezing, moisture, and cleaning materials.

F. Colored Wear-Resistant Finish: Packaged dry combination of materials consisting of portland cement, graded quartz aggregate, coloring pigments, and plasticizing admixture. Use coloring pigments that are finely ground nonfading mineral oxides interground with cement. Color as selected by Architect from manufacturers' standards, unless otherwise indicated.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Quartz Tuff, Dayton-Superior.
b. Surflex, Euclid Chemical Co.
c. Colorundum, A.C. Horn, Inc.
d. Quartz Plate, L&M Construction Chemicals, Inc.
e. Colorcron, Master Builders, Inc.
f. Lithochrome Color Hardener, L.M. Scofield Co.
g. Harcol Redi-Mix, Sonneborn-Chemrex.
h. Hard Top, Symons Corp.

G. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

H. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
1. Waterproof paper.
2. Polyethylene film.
3. Polyethylene-coated burlap.

I. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Spartan-Cote, The Burke Co.
      b. Day-Chem Cure and Seal, Dayton Superior Corp.
      c. Eucocure, Euclid Chemical Co.
      d. Horn Clear Seal, A.C. Horn, Inc.
      e. L&M Cure R, L&M Construction Chemicals, Inc.
      f. Masterkure, Master Builders, Inc.
      g. CS-309, W.R. Meadows, Inc.
      h. Kure-N-Seal, Sonneborn-Chemrex.

J. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.
   1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
   2. Products: Subject to compliance with requirements, provide one of the following:
      a. Sealco - VOC, Cormix Construction Chemicals.
      b. Safe Cure and Seal, Dayton Superior Corp.
      c. Aqua-Cure, Euclid Chemical Co.
      d. Dress & Seal WB, L&M Construction Chemicals, Inc.
      e. Masterkure 100W, Master Builders, Inc.
      f. Vocomp-20, W.R. Meadows, Inc.

K. V.O.C. Compliant Acrylic Curing and Sealing Type (30 Percent): Liquid type membrane-forming curing compound complying with ASTM C 309, Type 1, Class A and B. Provide 30 percent solids minimum, for surfaces indicated to be sealed.

L. Safe Cure and Seal: 30 percent (J-19), Dayton Superior Inc.

M. Evaporation Control:
   1. Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
      a. Products: Subject to compliance with requirements, provide one of the following:
         1) Eucobar, Euclid Chemical Co.
         2) E-Con, L&M Construction Chemicals, Inc.
         3) Confilm, Master Builders, Inc.

N. V.O.C. Compliant Evaporation Control: Sure Film (J-74), Dayton Superior Inc.

O. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. K-15, Ardex, Inc.
      b. LevelLayer II, Dayton Superior Corp.
      c. Flo-Top, Euclid Chemical Co.
      d. Gyp-Crete, Gyp-Crete Corp.
      e. Levelex, L&M Construction Chemicals, Inc.
      f. Underlayment 110, Master Builders, Inc.
      g. Thoro Underlayment Self-Leveling, Thoro System Products.

P. Bonding Agent: Polyvinyl acetate or acrylic base.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Polyvinyl Acetate (Interior Only):

1) Superior Concrete Bonder, Dayton Superior Corp.
2) Euco Weld, Euclid Chemical Co.
3) Weld-Crete, Larsen Products Corp.
4) Everweld, L&M Construction Chemicals, Inc.
5) Ready Bond, Symons Corp.

b. Acrylic or Styrene Butadiene:
1) Acrylic Bondcrete, The Burke Co.
2) Day-Chem Ad Bond, Dayton Superior Corp.
3) SBR Latex, Euclid Chemical Co.
4) Daraweld C, W.R. Grace & Co.
5) Hornweld, A.C. Horn, Inc.
6) Everbond, L&M Construction Chemicals, Inc.
7) Acryl-Set, Master Builders Inc.
8) Intralok, W.R. Meadows, Inc.
9) Sonocrete, Sonneborn-Chemrex.

Q. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Resi-Bond (J-58), Dayton Superior.
b. Euco Epoxy System #452 or #620, Euclid Chemical Co.
c. Epoxtite Binder 2390, A.C. Horn, Inc.
d. Epabond, L&M Construction Chemicals, Inc.
e. Concresive Standard Liquid, Master Builders, Inc.
f. Rezi-Weld 1000, W.R. Meadows, Inc.
g. Sikadur 32 Hi-Mod, Sika Corp.

R. Interior Epoxy Sealer: Use a maximum 35 percent type.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Epoxy-Plus; Dayton Superior Inc.
b. Eucopoxy 1; Euclid Chemical
c. Oauerseal 30E; Non-Crete, Inc.
d. Rescon R117; Symons Corp.
e. Son-No-Mar; Sonneborn, Div./Chem Rex Inc.
f. Super Seal 35; L & M Const. Chem. Co.

S. V.O.C. Compliant Urethane Sealer:
1. Day Chem Urethane V.O.C. (J-39); Dayton Superior Inc.

2.5 PROPORTIONING AND DESIGNING MIXES:

A. Prepare design mixes for each type and strength of concrete by either laboratory trial mixtures or field experience methods as specified in ACI 318-89 Section 5.3. If trial mixtures method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing, unless otherwise acceptable to Architect.

B. Trial mix designs and strength tests, made by qualified independent material laboratory, in accordance with ACI 318-89 Section 5.3 are required for the following types of concrete:
1. Normal weight concrete with specified strength in excess of 4000 psi.
2. All concrete designs for which a suitable experience record is not available.

C. Mix design based on a record of past performance in accordance with ACI 318-89 Section 5.3, may be provided by qualified concrete supplier or precast concrete manufacturer for concrete designs. Mix design shall be certified by an independent testing laboratory.

D. All concrete mix designs shall include the following information:
   1. Proportions of cement, fine and coarse aggregate and water.
   2. Water/cement ratio, design strength, slump and air content.
   3. Type of cement and aggregates.
   4. Type and dosage of all admixtures.
   5. Type, color and dosage of integral coloring compounds, where applicable.
   6. Special requirements for pumping.
   7. Any special characteristics of the mix which require precautions in the mixing, placing or finishing techniques to achieve the finished product specified.

E. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.

F. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
   1. 4000-psi, 28-day compressive strength.
   2. 3000-psi, 28-day compressive strength.

G. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:
   1. Subjected to freezing and thawing: W/C 0.45.
   2. Subjected to deicers/watertight: W/C 0.40.
   3. Subjected to brackish water, salt spray, or deicers: W/C 0.40.

H. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
   1. Ramps 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 high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
   4. Other concrete: Not less than 3 inches and not more than 5 inches.

2.6 ADMIXTURES:

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg.F (10 deg.C).

C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.

D. 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 1-1/2 percent within the following limits:
   1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:

a. 4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2-inch maximum aggregate.
b. 4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1-inch maximum aggregate.
c. 5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4-inch maximum aggregate.
d. 5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2-inch maximum aggregate.

2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.

E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
1. When air temperature is between 85 deg.F (30 deg.C) and 90 deg.F (32 deg.C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg.F (32 deg.C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL:

A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS:

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Formwork drawings shall bear the seal and signature of a Professional Engineer registered in the State of Alabama. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
1. Provide Class A tolerances for concrete surfaces exposed to view.
2. Provide Class C tolerances for other concrete surfaces.
3. Care shall be taken with the formwork on the bottom of the slabs, which will be exposed ceilings, to avoid the need for patching or repairs following the removal of the formwork.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set

tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

E. 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.

F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION:

A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

B. Lap vapor barrier over footings and/or seal to foundation walls.

C. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

D. Seal all penetrations (including pipes) per manufacturer's instructions.

E. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.

F. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

3.4 PLACING REINFORCEMENT:

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect. Do not tack weld crossing reinforcing bars.

D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap adjoining pieces at least one full mesh and lace splices, and overlaps, with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS:

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect.

B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.

F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Joint fillers and sealants are specified in Section 07 9005, "Sealants and Joint Fillers".

G. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
   1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
   2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.
   3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).
   4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 INSTALLING EMBEDDED ITEMS:

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

C. Install dovetail anchor slots in concrete structures as indicated on drawings.

D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES:

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

1. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT:

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
   1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
   2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. 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 mix to segregate.

E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
   1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
   2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
   3. Maintain reinforcing in proper position on chairs during concrete placement.

F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

G. When air temperature has fallen to or is expected to fall below 40 deg.F (4 deg.C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg.F (10 deg.C) and not more than 80 deg.F (27 deg.C) at point of placement.
   1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg.F (32 deg.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. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.

3.9 FINISHING FORMED SURFACES:

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. 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-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
   1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES:

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
   1. After placing slabs, finish surface to tolerances specified in Section 3.10. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
   1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-

floating if area is small or inaccessible to power units. Finish surfaces to tolerances specified in Section 3.11. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances specified in Section 3.11. Grind smooth any surface defects that would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 FLOOR FLATNESS/LEVELNESS REQUIREMENTS:

A. After placing slabs, finish surface to the following tolerances of F(F) (floor flatness) and F(L) (floor levelness) measured according to ASTM E 1155:

B. FINISH	SLAB-ON-GRADE				FRAMED FLOOR	
C.	OVERALL		LOCAL		OVERALL	LOCAL
D.	FF	FL	FF	FL	FF	FF
E. Scratch Finish	18	15	15	13	25	22
F. Float Finish	20	17	18	15	25	22
G. Trowel Finish	25	22	20	17	25	22

H. Specified overall F-numbers apply to the whole floor, taken as one. Minimum local F-numbers apply to each slab, bounded by construction joints.

3.12 MISCELLANEOUS CONCRETE ITEMS:

A. Filling In: 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. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct

elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.13 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
   1. Provide moisture curing by the following methods:
      a. Keep concrete surface continuously wet by covering with water.
      b. Use continuous water-fog spray.
      c. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
   2. Provide moisture-retaining 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 or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   3. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
      a. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
      b. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

D. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

E. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
   1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.14 REMOVING FORMS:

A. General: 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 not less than 50 deg.F (10 deg.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. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. 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.

3.15 REUSING FORMS:

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect.

3.16 CONCRETE SURFACE REPAIRS:

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.

B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
   1. Cut out honeycombs, 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 less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
   2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
   1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
   1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to

the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
4. Repair 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 and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

E. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.

F. Repair methods not specified above may be used, subject to acceptance of Architect.

3.17 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. General: The Owner will employ a testing agency to perform tests and to submit test reports.

B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
   a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
   b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
   c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg.F (4 deg.C) and below, when 80 deg.F (27 deg.C) and above, and one test for each set of compressive-strength specimens.
   d. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

C. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day, or for each 5000 sq ft of surface are placed; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

1. Any additional cylinder required by the Contractor for early strength gain tests for form stripping or post-tensioning are Contractor’s responsibility and shall be paid for by Contractor.
2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
5. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
6. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
7. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION

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SECTION 03 3523
EXPOSED AGGREGATE CONCRETE FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exposed aggregate concrete finish.

1.2 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete.

1.3 REFERENCE STANDARDS

A. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

B. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.

C. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2025.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Samples: Submit one, 5 pound plastic bags of each aggregate specified, illustrating size, color and the extremes of color range.

1.5 MOCK-UPS

A. Construct mock-up comprised of one horizontal field sample panel, with as directed by the Architect, with full aggregate color range represented.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Provide pigment, surface retarder, and acid etch solution in manufacturer's original packaging, including use instructions.

PART 2 PRODUCTS

2.1 EXPOSED AGGREGATE CONCRETE FINISHING

A. Cement: ASTM C150/C150M, Type I - Normal portland type; color as specified by Architect.

B. Aggregate Supplier: Acquire aggregates for entire project from same source.
   1. Expressions-LTD: BASIS OF DESIGN; www.expressions-ltd.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

C. Aggregate: Crushed decorative glass.
   1. Color: As selected by Architect.

2.2 ACCESSORIES

A. High Gloss Clear Sealer: Non yellowing, transparent combination curing compound and sealer complying with ASTM C309.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that items to be cast into concrete are placed securely and will not impede placing concrete.

B. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.2 PREPARATION

A. Clean formwork surfaces.

3.3 CLEANING

A. When desired finish is achieved, wash and rinse exposed aggregate surfaces.

3.4 DEFECTIVE CONCRETE

A. Patch, cure, and finish imperfections to match adjacent areas.

B. Replace concrete not properly placed.

3.5 PROTECTION

A. Protect concrete from premature drying or staining, excessively hot or cold temperatures, or mechanical injury.

END OF SECTION

SECTION 03 3660
SEALED CONCRETE FLOOR

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Floors denoted on Finish Schedule as SC (Sealed Concrete).
   2. Furnish all labor, materials, equipment and services necessary for grinding and sealing concrete floors.
   3. PROTECTION OF CONCRETE SLABS DURING CONSTRUCTION.

1.2 RELATED SECTIONS

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

B. Section 03 3000 - Cast-in-Place Concrete: Concrete materials, placing, and finishing.

C. Section 03 3010 - Cast-in-Place Concrete for Exposed Concrete Floors.

D. Section 03 3680 - Concrete Polishing.

1.3 SUBMITTALS

A. Contractor shall submit specified manufacturer's complete technical data sheets for all products to be used, including installation instructions.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of specified sealer shall have a minimum TEN (10) years experience in the production of the specified products.

B. Contractor Qualifications: Contractor must have a minimum FIVE (5) years experience in sealing applications and successfully completed not less than SIX (6) projects comparable in scale and complexity.

C. Regulatory Requirements
   1. Products shall comply with the United States Clean Air Act for maximum Volatile Organic Compound (VOC) content as specified in PART 2 of this section.

D. Mockups and Field Samples: Prepare field sample at project site for architects review and approval.
   1. Samples shall be constructed on site and shall be 4'x4'. If there is existing concrete, the Architect shall select an area where the samples will be placed.
   2. Construct sample-using processes and techniques intended for use on permanent work, including curing procedures. Include samples of control, construction, and expansion joints in sample panels.
   3. Sample shall be sealed by the individual workers who will actually be performing the work for the project.
   4. Obtain written approval of the sample from project Architect before start of work.
   5. Retain approved samples through completion of the work for use as a quality standard for finished work.
   6. The mockup may remain part of the finished work if approved.

E. Mandatory Pre-Pour Installation Conference: Conduct conference at project site to comply with requirements in Section 01 0150 - Special Conditions.

F. Protection: General Contractor shall protect areas to receive polished concrete finishes at all times during construction to prevent oils, dirt, metal, excessive water and other potentially damaging materials from affecting the finished concrete surface. Protection measures listed below shall begin immediately after the concrete slab is poured:
   1. General Contractor to apply Ram Board or Econo-Cover temporary surface protection.
   2. All hydraulic powered equipment shall be diapered to avoid staining of the concrete.
   3. All vehicle parking shall be prohibited on the finish slab area. If necessary to complete their scope of work, drop cloths shall be placed under vehicles at all times.
   4. No pipe cutting machine shall be used on the finished floor slab.
   5. Steel shall not be placed on the finish slab to avoid rusting.
   6. Acids and acidic detergents will not come in contact with slab.
   7. All painters will use drop cloths on the concrete. If paint gets on the concrete, it must be immediately removed.
   8. All trades will be informed that the slab must be protected at all times.

G. Environmental Limitations
   1. Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation and other conditions affecting chemical performance.
   2. Flatness and levelness
      a. Finish Concrete shall have a minimum Floor Flatness rating of at least 45.
      b. Finish Concrete shall have a minimum Floor Levelness rating of at least 35.
      c. Finish Concrete shall be cured a minimum of 28 days or at which point equipment can be put on the slab and does not displace aggregate.
   3. Application of finish system shall take place a minimum of 21 days prior to fixture & trim installation and/or substantial completion.
   4. Finish Concrete area shall be closed to traffic during finish floor application and after application, for the time as recommended by manufacturer.

H. Concrete Mix Design:
   1. Concrete Mixture shall be 4,000 PSI or higher, non-air entrained.
      a. Any admixtures, plasticizers, slag, fly ash or anything taking the place of Portland-based cement shall be kept to a minimum.
      b. The cement shall be Portland Cement Type I, conforming to ASTM C 150.
      c. Maintain concrete temperature below 85 degrees. Keep concrete as cool and moist for as long as possible. In essence, decrease rate of hydration and drying to minimize cracking.
      d. Wet cures are most suitable, but if this cannot be achieved, use a dissipating cure and seal only.
      e. All mix designs must be approved by Architect. Send all approved mix designs to Installer/Applicator.
      f. The Engineer/Architect shall determine the saw cut pattern, color and layout.
      g. Color loads for integral color should never be smaller than three (3) cubic yards.
      h. Use one (1) source for cement, aggregates and pozzolans throughout the job. Monitor and control incoming material consistency. Do not use calcium chloride-based admixtures. Non-chloride admixtures may be used.
      i. Wash out all drums before loading. Keep slumps consistent with a maximum of four (4). Minimize driver added water maintaining a .45 water content ratio.

j. Place concrete to achieve as true and smooth a top surface as possible. Mounds, or dips are not acceptable. GC shall control overall flatness and levelness, including on sloping areas to within tolerances permitted by specification - ASTM E1155.
k. Slab shall be protected from indention and footprints during pour and curing.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver the specified products in original, unopened containers with legible manufacturer's identification and information.

B. Store specified products in conditions recommended by the manufacturer.

1.6 JOB SITE CONDITIONS

A. Environmental Conditions: Maintain an ambient temperature of between 50° F and 90° F during application and at least 48 hours after application.

B. Protection: Precautions shall be taken to avoid damage or contamination of any surfaces near the work zone. Protect completed stain work from moisture or contamination.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Euclid Chemical: www.euclidchemical.com.

B. Ameripolish 3D HS; Ameripolish, Inc.

C. Prosoco, Inc.: www.prosoco.com.

D. Dayton Superior Corporation: www.daytonsuperior.com.

E. Substitutions: See Section 01600 - Product Requirements.

2.2 PRODUCTS

A. Densifier: a concrete hardener chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless which hardens and densifies concrete surfaces to protect against abrasion, dusting, and absorption of liquids.
   1. Basis of Design: EUCO Diamond Hard.

B. Control Joint and Saw Cut Filler, two part polyurea.
   1. Hi-Tech HT-PE85; Hi-Tech Systems.
   2. Spal-Pro RS-88; Metzger/McGuire.
   3. Euclid QuickJoint 200, (Grey Only); Euclid Chemical Company.

C. Substitutions: The use of any products other than those specified will be considered providing that the contractor requests its use in writing within fourteen (14) days prior to bid date. This request shall be accompanied by:
   1. A certificate of compliance from the material manufacturer stating that the proposed products meet or exceed the requirements for this specification.
   2. Documented proof that the proposed material has a five (5) year proven record of performance for sealing, hardening and densifying concrete substrates, confirmed by at least two (2) local projects that the Architect can examine.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Contractor shall examine areas and conditions under which work will be performed and identify conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. New Concrete
   1. Apply sealer/densifier immediately after final finishing and installation of control joints (if manufacturer's recommendations permit); when the concrete surface won't be marred by foot traffic and after joints have been cut and cleaned or anytime thereafter. Remove soft cut saw debris prior to applying sealer/densifier. Surface shall be swept, and mopped or
   2. pressure-washed as necessary to insure no dirt, grit, trash, or similar items mar finished product. Remove all markings, including paint, marker or pencil marks. Inspect floor surface prior to application to be sure it is ready for sealer/densifier.

B. Existing Concrete
   1. Remove all dirt, debris, or curing compounds using appropriate surface prep cleaner. Allow cleaning waters used in surface preparation to dry.

C. Final Saw-Cutting
   1. Layout and cut precise edges at over-poured floor depressions and slab edges and remove excess concrete material to the depth of the depression.

3.3 APPLICATION OF SEALER

A. New Concrete
   1. The surface shall be sealed with a sealer produced of the type specified under Products above.
      a. Also apply manufacturer's protection coat as specified above.
   2. Apply at the rates and method recommended by manufacturer in written instructions which the installer shall have at the job site.
   3. Apply a single coat using low pressure sprayer fitted with 0.5 gal/min spray tip. Lightly apply sufficient product to wet the surface without producing puddles. Use clean, soft bristle push broom or microfiber pad to spread the product evenly and ensure uniform wetting. Avoid spreading once drying begins. Scrubbing is not necessary.
   4. If surfaces dry immediately, increase the rate of application. Surfaces should remain wet 5 to 10 minutes. Adjust rate of application to eliminate puddles. Any white residue must be removed immediately.
   5. Allow treated surfaces to dry.
   6. For uncured steel troweled concrete, immediately apply the specified curing compound or initiate specified curing procecure.
   7. When the curing process is complete, use an automatic floor scrubber equipped with cleaning pads or brushes appropriate for removal of accumulated construction soiling and surface residues. Avoid pads or brushes which may damage the finished floor.

B. Existing Concrete
   1. The surface shall be sealed with a sealer produced of the type specified under Products above.
      a. Also apply manufacturer's protection coat as specified above.
   2. Apply at the rates and method recommended by manufacturer in written instructions which the installer shall have at the job site.
   3. Apply a single coat using low pressure sprayer fitted with 0.5 gal/min spray tip. Lightly apply sufficient product to wet the surface without producing puddles. Use clean, soft bristle push broom or microfiber pad to spread the product evenly and ensure uniform wetting. Avoid spreading once drying begins. Scrubbing is not necessary.

4. If surfaces dry immediately, increase the rate of application. Surfaces should remain wet 5 to 10 minutes. Adjust rate of application to eliminate puddles. Any white residue must be removed immediately.
5. Allow treated surfaces to dry.
6. Remove any dried powder residue using a stiff broom, power sweeper, or auto-scrubbing machine.
7. Dry-Buff or burnish concrete surface in both directions with orbital floor machine or burnisher equipped with appropriate polishing pad for additional surface sheen.

3.4 PROTECTION

A. Protection: General Contractor shall protect areas to receive sealed concrete finish at all times during construction to prevent oils, dirt, metal, excessive water and other potentially damaging materials from affecting the finished concrete surface. Protection measures listed below shall begin immediately after the concrete slab is poured.

B. Do not allow any trade to park any vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.

C. Diaper all hydraulic powered equipment to avoid staining of the concrete.

D. Place no steel on interior slab to avoid rust stains and gouges. If construction dictates necessity of this, interior slab will be protected with 1/2-inch plyboard.

E. Do not allow acids and acidic detergents to come into contact with slab.

F. Inform all trades that the slab must be protected at all times.

G. Protect finished work until fully cured in accordance with manufacturer's recommendations.

H. Protect completed floor from damage until Substantial Completion.
   1. Do not allow vehicle and pedestrian traffic on unprotected floor.
   2. Do not allow construction materials, equipment, and tools on unprotected floor.

I. Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings, and other surface contaminants which could adversely affect completed floor.

J. Repair damaged areas of completed floor to satisfaction of Architect.

K. Protect floor from traffic for at least 72 hours after final application of sealer.

L. Plywood slab protection in traffic corridors, entry ways, and areas to receive sealer shall be provided by and maintained by General Contractor throughout construction until the finishing contractor takes ownership of the floor. Protection shall be sufficient to protect surface from damage due to traffic and impact from any and all construction activities with a minimum of 1/2" plywood. All seams of plywood shall be sealed to eliminate passage of debris to new floor.

M. Protect slab during masonry work and after completion of sealer work with minimum of 1/2-inch plyboard, with sealed seams.

N. Upon completion of sealer, the General Contractor and the finishing subcontractor shall replace the plywood protection for the duration of the project.

3.5 MAINTENANCE

A. Sealed floors should be maintained by sweeping. Spills should be cleaned when they occur and dirt shall be rinsed off with water. Heavily soiled areas may be wet-cleaned by mopping or by scrubbing with a rotary floor machine equipped with a scrubbing brush and a suitable, high quality commercial detergent. Interior floors that require polishing should be maintained using a compatible, premium-grade, emulsion-type, commercial floor polish, following manufacturer's instructions and safety requirements.

END OF SECTION

SECTION 03 3931
CURING, SEALING AND HARDENING CONCRETE FLOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Floors denoted on Finish Schedule as SC (Sealed Concrete).

B. Related Sections
   1. Drawings and general provisions of Contract, including General Conditions and Division 1 Specification Sections, apply to the work of this Section.
   2. Section 03 3100 - Concrete.

1.2 SUBMITTALS

A. Contractor shall submit specified manufacturer's complete technical data sheets for all products to be used, including installation instructions.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of specified sealer shall have a minimum 10 years experience in the production of the specified products.

B. Contractor Qualifications: Contractor must have a minimum 3 years experience in sealing applications and successfully completed not less than 6 projects comparable in scale and complexity.

C. Regulatory Requirements
   1. Products shall comply with the United States Clean Air Act for maximum Volatile Organic Compound (VOC) content as specified in PART 2 of this section.

D. Mockups and Field Samples: Prepare field sample at project site for architects review and approval.
   1. Include Curing, Sealing and Hardening Concrete Floors in Mock-Up as described in Section 01 4000 - Quality Requirements.
   2. Samples shall be constructed on site and shall be 4'x4'. If there is existing concrete, the Architect shall select an area where the samples will be placed.
   3. Construct sample-using processes and techniques intended for use on permanent work, including curing procedures. Include samples of control, construction, and expansion joints in sample panels.
   4. Sample shall be sealed by the individual workers who will actually be performing the work for the project.
   5. Obtain written approval of the sample from project Architect before start of work.
   6. Retain approved samples through completion of the work for use as a quality standard for finished work.
   7. The mockup may remain part of the finished work if approved.

E. Mandatory Pre Pour Installation Conference: Conduct conference at project site to comply with requirements in Division 1 Sections “Special Conditions” and “Administrative Requirements”.
   1. The mandatory preinstallation conference shall occur prior to any concrete pours.
   2. The purpose of the mandatory preinstallation conference is to review the criteria with the General Contractor, concrete subcontractor, concrete finish manufacturer, and concrete finish installer.
   3. The meeting shall establish the following:

a. Roles and expectations of each subcontractor.
b. Days and times of concrete pour schedules.
c. Sequencing of operations for pouring, curing, finishing and protection of finished concrete surfaces.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver the specified products in original, unopened containers with legible manufacturer's identification and information.

B. Store specified products in conditions recommended by the manufacturer.

1.5 JOB SITE CONDITIONS

A. Environmental Conditions: Maintain an ambient temperature of between 50° F and 90° F during application and at least 48 hours after application.

B. Protection: Precautions shall be taken to avoid damage or contamination of any surfaces near the work zone. Protect completed stain work from moisture or contamination.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Prosoco, Inc.: www.prosoco.com.

B. Dayton Superior Corporation: www.daytonsuperior.com.

C. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PRODUCTS

A. Consolideck LS/CS lithium silicate sealer, hardener & densifier for concrete [Basis of Design]: www.prosoco.com.
   1. Provide with premeasured color concentrate to tint floor, if scheduled. ColorHard by Prosoco [Basis of Design] for color. Color as selected by Architect.
   2. Provide with protection and sheen enhancer coat. LSGuard by Prosoco [Basis of Design].

B. Pentra-Hard Densifier lithium silicate densifier, sealer, dustproofer and hardener for concrete: www.daytonsuperior.com.
   1. Provide with color as selected by Architect, if scheduled.
   2. Provide with protection and sheen enhancer coat recommended by manufacturer.

C. Substitutions: The use of any products other than those specified will be considered providing that the contractor requests its use in writing within fourteen (14) days prior to bid date. This request shall be accompanied by:
   1. A certificate of compliance from the material manufacturer stating that the proposed products meet or exceed the requirements for this specification.
   2. Documented proof that the proposed material has a five (5) year proven record of performance for sealing, hardening and densifying concrete substrates, confirmed by at least two (2) local projects that the Architect can examine.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Contractor shall examine areas and conditions under which work will be performed and identify conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. New Concrete
   1. Apply sealer/densifier immediately after final finishing and installation of control joints (if manufacturer's recommendations permit); when the concrete surface won't be marred by foot traffic and after joints have been cut and cleaned or anytime thereafter. Remove soft cut saw debris prior to applying sealer/densifier. Surface shall be swept, and mopped or pressure-washed as necessary to insure no dirt, grit, trash, or similar items mar finished product. Remove all markings, including paint, marker or pencil marks. Inspect floor surface prior to application to be sure it is ready for sealer/densifier.

B. Existing Concrete
   1. Remove all dirt, debris, or curing compounds using appropriate surface prep cleaner. Allow cleaning waters used in surface preparation to dry.

3.3 APPLICATION OF SEALER

A. New Concrete
   1. The surface shall be sealed with a sealer produced of the type specified under Products above.
      a. Also apply manufacturer's protection coat as specified above.
   2. Apply at the rates and method recommended by manufacturer in written instructions which the installer shall have at the job site.
   3. Apply a single coat using low pressure sprayer fitted with 0.5 gal/min spray tip. Lightly apply sufficient product to wet the surface without producing puddles. Use clean, soft bristle push broom or microfiber pad to spread the product evenly and ensure uniform wetting. Avoid spreading once drying begins. Scrubbing is not necessary.
   4. If surfaces dry immediately, increase the rate of application. Surfaces should remain wet 5 to 10 minutes. Adjust rate of application to eliminate puddles. Any white residue must be removed immediately.
   5. Allow treated surfaces to dry.
   6. For uncured steel troweled concrete, immediately apply the specified curing compound or initiate specified curing procecure.
   7. When the curing process is complete, use an automatic floor scrubber equipped with cleaning pads or brushes appropriate for removal of accumulated construction soiling and surface residues. Avoid pads or brushes which may damage the finished floor.

B. Existing Concrete
   1. The surface shall be sealed with a sealer produced of the type specified under Products above.
      a. Also apply manufacturer's protection coat as specified above.
   2. Apply at the rates and method recommended by manufacturer in written instructions which the installer shall have at the job site.
   3. Apply a single coat using low pressure sprayer fitted with 0.5 gal/min spray tip. Lightly apply sufficient product to wet the surface without producing puddles. Use clean, soft bristle push broom or microfiber pad to spread the product evenly and ensure uniform wetting. Avoid spreading once drying begins. Scrubbing is not necessary.
   4. If surfaces dry immediately, increase the rate of application. Surfaces should remain wet 5 to 10 minutes. Adjust rate of application to eliminate puddles. Any white residue must be removed immediately.
   5. Allow treated surfaces to dry.

6. Remove any dried powder residue using a stiff broom, power sweeper, or auto-scrubbing machine.
7. Dry-Buff or burnish concrete surface in both directions with orbital floor machine or burnisher equipped with appropriate polishing pad for additional surface sheen.

3.4 PROTECTION

A. Protection: General Contractor shall protect areas to receive sealed concrete finish at all times during construction to prevent oils, dirt, metal, excessive water and other potentially damaging materials from affecting the finished concrete surface. Protection measures listed below shall begin immediately after the concrete slab is poured.

B. Plywood slab protection in traffic corridors, entry ways, and areas to receive sealer shall be provided by and maintained by General Contractor throughout construction until the finishing contractor takes ownership of the floor. Protection shall be sufficient to protect surface from damage due to traffic and impact from any and all construction activities with a minimum of 1/2" plywood. All seams of plywood shall be sealed to eliminate passage of debris to new floor.

C. Protect slab during masonry work and after completion of sealed concrete finish work with minimum of 1/2-inch plyboard, with sealed seams.

D. Do not allow any trade to park any vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.

E. Diaper all hydraulic powered equipment to avoid staining of the concrete.

F. Place no steel on interior slab to avoid rust stains and gouges. If construction dictates necessity of this, interior slab will be protected with 1/2-inch plyboard.

G. Do not allow acids and acidic detergents to come into contact with slab.

H. Inform all trades that the slab must be protected at all times.

I. Protect finished work until fully cured in accordance with manufacturer's recommendations.

J. Protect completed floor from damage until Substantial Completion.
   1. Do not allow vehicle and pedestrian traffic on unprotected floor.
   2. Do not allow construction materials, equipment, and tools on unprotected floor.

K. Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings, and other surface contaminants which could adversely affect completed floor.

L. Repair damaged areas of completed floor to satisfaction of Architect.

M. Protect floor from traffic for at least 72 hours after final application of sealer.

N. Upon completion of sealer, the General Contractor and the finishing subcontractor shall replace the plywood protection for the duration of the project.

3.5 MAINTENANCE

A. Sealed floors should be maintained by sweeping. Spills should be cleaned when they occur and dirt shall be rinsed off with water. Heavily soiled areas may be wet-cleaned by mopping or by scrubbing with a rotary floor machine equipped with a scrubbing brush and a suitable, high quality commercial detergent. Interior floors that require polishing should be maintained using a compatible, premium-grade, emulsion-type, commercial floor polish, following manufacturer's instructions and safety requirements.

END OF SECTION

SECTION 04 2000
UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete block.

B. Concrete building brick.

C. Clay facing brick.

D. Mortar and grout.

E. Reinforcement and anchorage.

F. Flashings.

G. Accessories.

H. Water Repellent and Efflorescence Control Admixtures.

1.2 RELATED REQUIREMENTS

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

B. Section 01 4000 - Quality Requirements: Requirements for Mock-ups.

C. Section 03 3660 - Sealed Concrete Floor: Protection of concrete slabs during masonry work.

D. Section 03 3931 - Curing, Sealing, and Hardening Concrete Floors: Protection of concrete slabs during masonry work.

E. Section 05 5000 - Metal Fabrications: Loose steel lintels.

F. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.

G. Section 07 1400 - Fluid Applied Air Barriers: Spray-applied Air Barriers on masonry surfaces.

H. Section 07 2100 - Thermal Insulation: Insulation for cavity spaces.

I. Section 07 8400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.

J. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2026.

C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2026.

D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019 (Reapproved 2025).

E. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

F. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2026.

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.

H. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.

I. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction; 2022.

J. ASTM C55 - Standard Specification for Dry-Cast Concrete Building Brick; 2025.

K. ASTM C67/C67M - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2026.

L. ASTM C90 - Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units; 2024a.

M. ASTM C91/C91M - Standard Specification for Masonry Cement; 2025.

N. ASTM C129 - Standard Specification for Dry-Cast Nonloadbearing Concrete Masonry Units; 2026.

O. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2026a.

P. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2026.

Q. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.

R. ASTM C199 - Standard Test Method for Pier Test for Refractory Mortars; 2022.

S. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2024.

T. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2026a.

U. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2026.

V. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2026.

W. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

X. ASTM C652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale); 2022.

Y. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2025a.

Z. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength; 2026.

AA. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2024.

BB. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2020.

CC. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

DD. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.

EE. BIA Technical Notes No. 28B - Brick Veneer/Cold-Formed Steel Framed Walls; 2025.

FF. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

GG. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

HH. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
   1. Include calculations or selections from the manufacturer's prescriptive design tables that indicate compliance with the applicable building code and project conditions.
   2. Include the design engineer's stamp or seal on each sheet of shop drawings.

D. Samples: Submit four samples of decorative block and facing brick units to illustrate color, texture, and extremes of color range.

E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

F. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.

G. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

H. Manufacturer's Qualification Statement.

I. Installer's Qualification Statement.

J. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

B. Fire Rated Assemblies: Comply with applicable code for UL requirements for fire rated masonry construction.

C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum five years of documented experience.

D. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience with demonstrated relevant experience defined as having successfully completed a minimum of five (5) projects of similar size and complexity. Where requested by the Architect, the Subcontractor shall furnish the names and contact information for the General Contractors for relevant experience confirmation.

E. Single Source Responsibilities.
   1. Water Repellents: Obtain each type of integral water repellant from a single manufacturer for the entire project.
      a. Compatibility Confirmation: Verify water repellent is compatible with all masonry wall system compenents including, but not limited to, flashings and coatings, facing brick and masonry units, mortars and grouts. Notify Architect in writing in detail of

any non-compatible products prior to any application of the product and await Architect's instruction before proceeding.

2. Through-Wall Flashings: Self-adhering membrane flashings associated with through-wall flashings in the Section shall be manufactured by the manufacturer of the Air/ Water Barrier specified in Section 07 1400 - Fluid Applied Air Barrier for material compatibility and single-source manufacturing responsibility.

1.7 MOCK-UPS

A. Integrate materials of this Section into the Exterior Assembly Mock-up per the drawing requirements, including mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.

B. Locate where directed.

C. Mock-up may not remain as part of work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Store cementitous material and insulation off the ground and under cover in a dry location.

C. Store aggregates where grading and similar required characteristics can be maintained and contamination avoided.

D. Store masonry accessories in a manner that prevents accumulation of dirt and oil.

E. Store water repellants in strict accordance with manufacturer's printed instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530.1/ ASCE 6/ TMS 602 and applicable Building Code.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
   2. Special Shapes: Provide nonstandard blocks configured for corners, lintels, headers, control joint edges, and other detailed conditions.
      a. Provide bullnose units for all outside corners that are exposed at the interior of the building.
   3. Load-Bearing Units: ASTM C90, lightweight or normal weight as required.
      a. Hollow block, as indicated.
      b. Exposed Faces: Manufacturer's standard color and texture.
      c. Unit Compressive Strength: Provide units with minimum compressive strength as indicated on the drawings.
      d. Provide normal weight units where required for compliance with UL Rated Assemblies at fire-rated walls and partitions.
   4. Nonloadbearing Units: ASTM C129, lightweight or normal weight as required.
      a. Hollow block, as indicated.
      b. Exposed Faces: Manufacturer's standard color and texture.
      c. Unit Compressive Strength: Provide units with minimum compressive strength as indicated on the drawings.

d. Provide normal weight units where required for compliance with UL Rated Assemblies at fire-rated walls and partitions.

B. Concrete Brick:
1. Size: As indicated on drawings.
2. Concrete Building Brick: ASTM C55; lightweight, solid, for interior or concealed use.

2.2 BRICK UNITS

A. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
1. Color and Texture: To Be Selected.
2. Nominal size: As indicated on drawings.
3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
4. Compressive strength: As indicated on drawings, measured in accordance with ASTM C67/C67M.

2.3 MORTAR AND GROUT MATERIALS

A. Manufacturers:
1. Argos US; www.argos-us.com..
2. Amerimix; www.amerimix.com..
3. Lehigh Hanson; www.lehighhanson.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Colored Masonry Cement: ASTM C91/C91M, Type N.
1. Colored Masonry Cement: Premixed cement as selected by Archtect from manufacturer's full sample range of at lease thirty (30) colors.

C. Portland Cement: ASTM C150/C150M, Type I.

D. Hydrated Lime: ASTM C207, Type S.

E. Mortar Aggregate: ASTM C144.

F. Grout Aggregate: ASTM C404.

G. Water: Clean and potable.

H. Accelerating Admixture: Nonchloride type for use in cold weather.

I. Water Repellent and Efflorescence Control Admixture for Mortar at Brick Veneer only: Polymeric liquid or powder admixture added to mortar at the time of manufacture compliant with ASTM E 514.
1. Acceptable Products: Master Builders "MasterPel 240 Mortar Admizture", or equivalent.
2. Substitutions: See Section 01 6000 - Product Requirements.

2.4 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
1. Basis of Design: Hohmann & Barnard, Inc: www.h-b.com/#sle.
2. Other Acceptable Manufacturers:
a. WIRE-BONDwww.wirebond.com/#sle.
b. York Manufacturing Inc.: www.york-mfg.com.
c. Heckmann Building Products: www.heckmannbuilding products.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.

C. Joint Reinforcement: Use ladder type joint reinforcement unless truss type is specifically indicated.

D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Product: 220 Ladder Mesh - SHD.
   2. Type: Ladder.
   3. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
   4. Size: 0.1875 inch side rods with 0.1875 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

E. Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Product: 230 Ladder Tri-Mesh - SHD.
   2. Type: Ladder.
   3. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
   4. Size: 0.1875 inch side rods with 0.1875 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

F. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Product: 270-2X Ladder Eye-Wire - SHD.
   2. Type: Ladder, with adjustable ties or tabs spaced at 16 in on center.
   3. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
   4. Size: 0.1875 inch side rods with 0.1875 inch cross rods and adjustable components of 0.1875 inchwire, width of components as required to provide not less than 5/8 inch of mortar coverage from each masonry face.
   5. Vertical adjustment: Not more than 1 1/4 inches.
   6. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.

G. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 3/16 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.
   1. Product: 344 Rigid Partition Anchor.

H. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
   1. Concrete frame: Dovetail anchors of bent steel strap, nominal 1 inch width x 0.024 in thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
      a. Product: 305 Dovetail Slot with 315 Flexible Dovetail Brick Tie.
   2. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch thick, with trapezoidal wire ties 0.1875 inch thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
      a. Product: 359 Weld-on Anchor Rod with 301W Column Web Ties.

I. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not less than 5/8 inch of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in.
   1. Product: HB-5213 Adjustable Veneer Anchor.
   2. Anchor plates: Not less than 0.105 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.

3. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
4. Vertical adjustment: Not less than 1-1/4 inches.

J. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not less than 5/8 inch of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in.
1. Product: HB-213 Adjustable Veneer Anchor.
2. Anchor plates: Not less than 0.105 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
3. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
4. Vertical adjustment: Not less than 1-1/4 inches.

K. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws; corrosion resistant finish or hot dip galvanized to ASTM A153/A153M.

2.5 FLASHINGS

A. Manufacturers:
1. Basis of Design: Hohmann & Barnard, Inc: www.h-b.com/#sle.
2. Other Acceptable Manufacturers:
a. WIRE-BONDwww.wirebond.com/#sle.
b. York Manufacturing Inc.: www.york-mfg.com.
c. Heckmann Building Products: www.heckmannbuilding products.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

B. Metal Flashing Materials:
1. Stainless Steel Flashing: ASTM A666/A666M, Type 304, soft temper; 26 gauge, 0.0187 inch thick; finish 2B to 2D.

C. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
1. Stainless Steel/Polymer Fabric Flashing - Self-adhering: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on inward facing side to a sheet of polymer fabric that has a clear adhesive with a removable release liner.
a. Product: Mighty-Flash Stainless Flashing - SA.

D. Membrane Non-Asphaltic Flashing Materials:
1. Application: Conditions where stainless steel flashings may corrode or adversely affect adjacent building products only.
2. Product: Textroflash.
3. Composite Polymer Flashings - Self-Adhering: Composite polyethylene; 40 mil thick with pressure-sensitive butyl adhesive and release paper.

E. Factory-Fabricated Flashing Corners and End Dams: Stainless steel.
1. Product: MFL Metal Flashing.
2. Thickness: 26 gage.

F. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.

G. Termination Bars: Stainless steel; compatible with membrane and adhesives.
1. Product: T1 of T2 Terminiation Bar as applicable to condition.

H. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.
   1. Product: MLF Metal Flashing.
   2. Thickness: 26 gage.

I. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.6 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Product: RS Series Rubber Control Joints.
   2. Size: As required based on condition.

B. Joint Filler: Closed cell polyethylene; oversized 50 percent to joint width; self expanding; in maximum lengths available.
   1. Product: Backer Rod - Standard.
   2. Size: As required based on condition.

C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   1. Product: Mortar Trap.
   2. Size: As required based on condition.

D. Weeps:
   1. Product: 343 Weep Hole.
   2. Type: Molded PVC grilles, insect resistant.
   3. Color(s): As selected by Architect from manufacturer's full range.

E. Cavity Vents:
   1. Product: Quadro-Vent.
   2. Type: Molded PVC grilles, insect resistant.
   3. Color(s): As selected by Architect from manufacturer's full range.

F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.7 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Masonry below grade and in contact with earth: Type M.
   2. Exterior, loadbearing masonry: Type S.
   3. Exterior, non-loadbearing masonry: Type N.
   4. Interior, loadbearing masonry: Type S.
   5. Interior, non-loadbearing masonry: Type N.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.1 EXAMINATION

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

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

D. Do not proceed until all unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

C. Masonry work shall be coordinated with electrical, mechanical, plumbing, and any other trade that will have in-wall work.

D. Where adjacent flooring is to receive concrete sealing and staining, polishing and/or dyeing, provide minimum 1/2" plywood protection over the floor slab, which should be protected under Section 03 3660 - Sealed Concrete Floor, and Section 03 3680 - Concrete Polishing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.4 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

D. Brick Units:
   1. Bond: Running.
   2. Coursing: Three units and three mortar joints to equal 8 inches.
   3. Mortar Joints: Concave.

3.5 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.6 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

B. Install cavity vents in veneer and cavity walls at 48 inches on center horizontally below shelf angles and lintels and near top of walls.

3.7 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions.
   1. Verify that airspace width is no more than 3/8 inch greater than panel thickness.
   2. Hold cavity mortar control panel tight to face wythe.
   3. Install horizontally between joint reinforcement.
   4. Stagger end joints in adjacent rows.
   5. Fit to perimeter construction and penetrations without voids.

D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.8 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHE MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.

E. Lap joint reinforcement ends minimum 6 inches.

F. Reinforce joint corners and intersections with strap anchors 24 inches on center.

G. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

H. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.9 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 32 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.10 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Terminate flashing up 8 inches minimum on vertical surface of backing:
   1. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer’s directions.
   2. Anchor vertical leg of flashing into backing with a termination bar and sealant.
   3. Apply cap bead of sealant on top edge of self-adhered flashing.

C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.

D. Extend metal flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.

E. Support flexible flashings across gaps and openings.

F. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.11 LINTELS

A. Install loose steel lintels over openings.

B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled in compliance with the requirements of the Structural drawings.

3.12 GROUTED COMPONENTS

A. Lap splices minimum 24 bar diameters.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.13 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Provide Control Joints at locations indicated, but not to exceed the following as continuous straight runs of masonry construction:
   1. Exterior and Interior Brick Walls: 25' - 0" o.c. maximum continuous run of brick masonry.
   2. CMU Walls: 25' - 0" o.c. maximum continuous run of CMU walls.
   3. Corners: Provide one (1) Control Joint within 2' - 0" of each corner constructed of Brick or CMU walls.

C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

D. Size control joints as indicated on drawings; if not indicated, 3/8" inch wide up to 16' - 0" spacing, 1/2" wide up to 22' - 0" spacing, and 5/8" wide up to 30' - 0" spacing.

E. Form expansion joint as detailed on drawings.

F. Joints shall be clear of mortar. Seal with silicone sealant with optional compressible joint filler.

3.14 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.15 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

H. Maximum Variation for Vertical Alignment of Head Joints: 1/4 inch in 10 ft, 1/2" maximum.

3.16 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.17 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - QUALITY REQUIREMENTS.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for compliance with requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.18 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.19 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

B. Protect masonry cavity during erection from exposure to rainfall each day until the cavity is permanently sealed.

C. Protect competed masonry work from staining and or damage from construction activities.

END OF SECTION

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SECTION 04 7200
CAST STONE MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Architectural cast stone.

B. Units required are indicated on drawings as "cast stone".

C. Units required are:
   1. Modular exterior wall units, including wall caps, coping, lintels, sills, water tables, and veneer.
   2. Other items indicated on drawings.

1.2 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry: Installation of cast stone in conjunction with masonry.

B. Section 07 9200 - Joint Sealants: Sealing joints indicated to be left open for sealant.

1.3 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code for Structural Concrete—Code Requirements and Commentary; 2025.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2026.

C. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2024.

D. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2025.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.

F. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2024a.

G. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.

H. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2026.

I. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2024.

J. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2021.

K. ASTM C1364 - Standard Specification for Architectural Cast Stone; 2025.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Test results of cast stone components made previously by the manufacturer.

C. Shop Drawings: Include elevations, dimensions, layouts, profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, and piece numbers.

D. Mortar Color Selection Samples.

E. Verification Samples: Pieces of actual cast stone components not less than 6 inches square, illustrating range of color and texture to be anticipated in components furnished for the project.

F. Full-Size Samples, For Review:
   1. Basic Shapes: One of each.
   2. Accent, Trim and Specialty Shapes: One of each.

G. Source Quality Control Test Reports.

H. Manufacturer's Qualification Data: Documentation showing compliance with specified requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. A firm with a minimum of 5 years experience producing cast stone of types required for project.
   2. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.

1.6 MOCK-UPS

A. Provide full size cast stone components for installation in mock-up of exterior wall.

B. See Section 01 4000 - QUALITY REQUIREMENTS for additional requirements.

C. Approved mock-up will become standard for appearance and workmanship.

D. Remove mock-up not incorporated into the work and dispose of debris.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.

B. Number each piece individually to match shop drawings and schedule.

C. Store cast stone components and installation materials in accordance with manufacturer's instructions.

D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.

E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.

F. Store mortar materials where contamination can be avoided.

G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Architectural Cast Stone:
   1. Basis of Design: RockCast Architectural Stone including "Modular Veneer Units" and "Custom Accents".
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 ARCHITECTURAL CAST STONE

A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural granite, complying with ASTM C1364.
   1. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece.

2. Freeze-Thaw Resistance: Demonstrated by laboratory testing in accordance with ASTM C1364.
3. Surface Texture: Fine grained texture, with no bugholes, air voids, or other surface blemishes visible from distance of 20 feet.
4. Color: Match sample on file at Architect 's office.
5. Remove cement film from exposed surfaces before packaging for shipment.

B. Shapes: Provide shapes indicated on drawings.
1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
2. Unless otherwise indicated on drawings, provide:
a. Wash or slope of 1:12 on exterior horizontal surfaces.
b. Drips on projecting components, wherever possible.
c. Raised fillets at back of sills and at ends to be built in.

C. Reinforcement: Provide reinforcement as required to withstand handling and structural stresses; comply with ACI CODE-318.

2.3 MATERIALS

A. Portland Cement: ASTM C150/C150M.
1. For Mortar: Type I or II, except Type III may be used in cold weather.

B. Coarse Aggregate: ASTM C33/C33M, except for gradation; granite, quartz, or limestone.

C. Fine Aggregate: ASTM C33/C33M, except for gradation; natural or manufactured sands.

D. Admixtures: ASTM C494/C494M.

E. Water: Potable.

F. Reinforcing Bars: ASTM A615/A615M, deformed bars, galvanized.
1. Galvanized in accordance with ASTM A767/A767M, Class I.

G. Steel Welded Wire Reinforcement: ASTM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated.

H. Embedded Anchors, Dowels, and Inserts: Type 304 stainless steel, of type and size as required for conditions.

I. Mortar: Portland cement-lime, ASTM C270 Type N ; do not use masonry cement.

J. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.4 SOURCE QUALITY CONTROL

A. Test compressive strength and absorption of specimens selected at random from plant production.
1. Test in accordance with ASTM C642.
2. Select specimens at rate of 3 per 500 cubic feet, with a minimum of 3 per production week.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine construction to receive cast stone components. Notify Architect if construction is not acceptable.

B. Do not begin installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Install cast stone components in conjunction with masonry, complying with requirements of Section 04 2000.

B. Mechanically anchor cast stone units indicated; set remainder in mortar.

C. Setting:
   1. Drench cast stone components with clear, running water immediately before installation.
   2. Set units in a full bed of mortar unless otherwise indicated.
   3. Fill vertical joints with mortar.
   4. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

3.3 TOLERANCES

A. Joints: Make all joints 3/8 inch, except as otherwise detailed.
   1. Rake mortar joints 3/4 inch for pointing.
   2. Remove excess mortar from face of stone before pointing joints.
   3. Point joints with mortar in layers 3/8 inch thick and tool to a slight concave profile.
   4. Leave the following joints open for sealant:
      a. Head joints in top courses, including copings, parapets, cornices, sills, and steps.
      b. Joints in projecting units.
      c. Joints between rigidly anchored units, including soffits, panels, and column covers.
      d. Joints below lugged sills and stair treads.
      e. Joints below ledge and relieving angles.
      f. Joints labeled "expansion joint".

B. Installation Tolerances:
   1. Variation from Plumb: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.
   2. Variation from Level: Not more than 1/8 inch in 10 feet or 1/4 inch in 20 feet, or 3/8 inch maximum.
   3. Variation in Joint Width: Not more than 1/8 inch in 36 inches or 1/4 of nominal joint width, whichever is less.
   4. Variation in Plane Between Adjacent Surfaces (Lipping): Not more than 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.4 REPAIR

A. Repair chips and other surface damage noticeable when viewed in direct daylight at 20 feet.

B. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.

C. Repair methods and results subject to Architect 's approval.

3.5 CLEANING

A. Clean completed exposed cast stone after mortar is thoroughly set and cured.
   1. Wet surfaces with water before applying cleaner.

2. Apply cleaner to cast stone in accordance with manufacturer's instructions.
3. Remove cleaner promptly by rinsing thoroughly with clear water.
4. Do not use acidic cleaners.

3.6 PROTECTION

A. Protect completed work from damage.

B. Clean, repair, or restore damaged or mortar-splashed work to condition of new work.

END OF SECTION

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SECTION 05 1200
STRUCTURAL STEEL

PART 1 – GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Structural steel work including schedules, notes and details showing size and location of members, typical connections, and type of steel required.
2. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
3. Related work specified elsewhere:
   a. Miscellaneous Metal Fabrications are specified elsewhere in Division 5
   b. Refer to Division 3 for anchor bolt installation in concrete, Division 4 for anchor bolt installation in masonry.

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

C. Related Sections: The following Sections contain requirements that relate to this Section:
1. Section 05500, "Metal Fabrications": Loose steel bearing plates and miscellaneous steel framing.

1.2 PERFORMANCE REQUIREMENTS:

A. Structural Performance: Engineer structural steel members and connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated.

B. Design of Members and Connections: Details shown are typical, similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1.3 SUBMITTALS:

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1. Submit all shop drawings on one reproducible print (sepia) and two blue line prints only. The reproducible print will be returned. All blue line prints required by the contractor are the responsibility of the Contractor and shall be made after reproducible is returned.

B. Product Data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards). This data is submitted for information only.

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
2. High-strength bolts (each type), including nuts and washers.
   a. Include Direct Tension Indicators if used.
3. Structural steel primer paint.
4. Shrinkage-resistant grout.
5. Welder's certificates
6. Submit evidence of fabricator and erector qualifications.

C. Shop Drawings prepared under the supervision of, signed and sealed by a Licensed Professional Engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams.

1. Include details of cuts, connections, camber, holes, and other pertinent data.
2. Welds: Indicate welds by standard AWS A2.1 and A2.4 symbols. Distinguishing between shop and field welds, and show size, length, and type of each weld.

3. Bolts: 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. Setting Drawings: Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorage's to be installed by others.
5. Erection Drawings: Prepare and furnish to the Architect for review, erection drawings, detailed shop drawings and connection design calculations for all structural steel. Manufacturing of any material or performing of any work before final review of shop drawings will be entirely at risk.
6. Contract documents shall not be used for shop drawing, including erection plans or details.
7. All shop drawings which are resubmitted for any reason shall have all revised items clouded or identified for each submittal.
8. Fabrication, assembly and erection shall conform to reviewed shop drawings.

D. Connection Calculations:

1. All structural steel connections not specifically detailed on the drawings shall be designed to resist forces indicated, by the Contractor, under the direct supervision of a professional engineer registered in the State of Alabama.
2. Design calculations for the connections designed by the Contractor shall be submitted for the files of the Architect and Engineer. Calculations shall bear the seal of a professional engineer registered in the State of Alabama. Shop drawings containing connections for which calculations have not been received will be returned unchecked as an incomplete submittal.
3. For each connection, the following shall be noted on the shop drawings:
4. Required design reaction.
5. Calculation sheet number for design.
6. Capacity of detailed connection.

E. 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.

F. Mill test reports signed by manufacturers certifying that their products, including the following, comply with requirements.

1. Structural steel, including chemical and physical properties.
2. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
3. Direct-tension indicators.
4. Shear stud connectors.
5. Shop primers.
6. Nonshrink grout.

1.4 QUALITY ASSURANCE:

A. Erector Qualifications: Engage an experienced Erector 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.

1. Erector must participate in the AISC Certification Program and is designated an AISC Certified Erector (CSE).

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, as well as sufficient production capacity to fabricate structural steel without delaying the Work.

1. Fabricator must participate in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

C. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. AISC's "Specification for Structural Steel Buildings—Allowable Stress Design and Plastic Design."
2. AISC's "Load and Resistance Factor Design (LFRD) Specification for Structural Steel Buildings."
3. AISC "Specifications for Structural Steel Buildings, Section 10, Architecturally Exposed Structural Steel."
4. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
5. AISC's "Specification for Load and Resistance Factor Design of Single-Angle Members."
6. AISC's "Seismic Provisions for Structural Steel Buildings."
7. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges", dated June 10, 1992
   a. General:AISC "Code of Standard Practice" shall apply except to the extend that references are made to the responsibility of the Owner and/or Architect or Engineer in which event those references shall have no applicability. Where a conflict exists between the Code of Standard Practice and the Contract Documents, the Contract Documents shall govern.
   b. Paragraph 3.1:Add the following: "3.1.8 Include in the bid price for the work structural steel members shown on drawings, but not identified as to size, section, and material grade by assuming sizes, sections, and material grades shown for similarly loaded members having approximately the same overall length except on areas that are noted on the drawings as incomplete. Identify such members and their associated cost in the bid for the work".
   c. Paragraph 3.3:Delete the first sentence, "In case of discrepancies between plans and specifications for buildings, the specifications govern", and insert the following in its place, "In case of discrepancies between drawings and specifications for buildings, the drawings govern".
   d. Paragraph 3.4:In the first sentence, delete the phrase "and made to a scale not less than 1.8" to the foot".
   e. Paragraph 5.1:Delete the first sentence, "When the fabricator receives 'released for construction' plans and specifications, the fabricator may immediately place orders for the material necessary for fabrication". and insert the following in its place "when the fabricator receives 'issued for structural steel mill order of wide flange beams, girders and columns only' plans and specifications, the fabricator may immediately place orders for the material necessary for fabrication". Delete the second sentence, "The contract documents must note any materials or areas which should not be ordered due to a design which is incomplete or subject to revision".
8. ASTM A 6 (ASTM A 6M) "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
9. Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
10. Research Council on Structural Connections' (RCSC) "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code—Steel."

E. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification in the past year.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver structural steel to Project site in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. 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.

1.6 SEQUENCING:

A. Supply anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

1.7 TESTING SERVICES:

A. Provide the Testing Laboratory with the following:
1. A complete set of shop and erection drawings reviewed by the Architect.
2. Mill test reports, cutting lists, order sheets, material bills and welder's certificates.
3. Full and ample means and assistance for testing all material.
4. Proper facilities, including scaffolding, temporary work platforms, hoisting facilities, etc., for inspection of the work in the mills, shop and field.

B. Propose procedures, acceptable to the Architect, to correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements.

C. Provide additional tests, by the Quality Control Testing Laboratory, as may be necessary, to reconfirm any noncompliance of the original work, and as may be necessary to show compliance off corrected work.

PART 2 – PRODUCTS

2.1 STEEL MATERIALS:

A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that 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 applying surface finishes.

B. Structural Steel Shapes, Plates, and Bars: As follows:
1. Carbon Steel: ASTM A 36 (ASTM A 36M).
2. High-Strength, Low-Alloy Columbium-Vanadium Steel: ASTM A 572 (ASTM A 572M), Grade 50.

C. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.

D. Hot-Formed Structural Steel Tubing: ASTM A 501.

E. Steel Pipe: ASTM A 53, Type E or S, Grade B.
1. Finish: Black, except where indicated to be galvanized.

F. Connection Material: Unless noted otherwise on the drawings, stiffener plates, doubler plates, gusset plates and the connecting plates shall be the same grade of steel as members being connected.
1. Finish: Black, except where indicated to be galvanized.

G. Shear Connectors: ASTM A 108, Grade 1015 through 1020, headed-stud type, cold-finished carbon steel, AWS D1.1, Type B.

H. Anchor Rods, Bolts, Nuts, and Washers: As follows:
1. Unheaded Rods: ASTM A 36 (ASTM A 36M).
2. Headed Bolts: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel, hex-head bolts; and carbon-steel nuts.
3. Washers: ASTM A 36 (ASTM A 36M).

I. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Plain, uncoated.

J. Welding Electrodes: Comply with AWS requirements.

2.2 PRIMER:

A. Primer: SSPC-Paint 15, Type I, red oxide.

2.3 GROUT:

A. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application, and a 30-minute working time. Subject to compliance with requirements, provide one of the following:

1. High Performance (Non-Metallic):
   a. "Masterflow 928"; Master Builders.
   b. "Crystex"; L & M Const. Chemical Co.
2. Construction Grade (Non-Metallic):
   a. "Set Grout"; Master Builders.
   b. "Euco-NS Grout"; Euclid Chemical Co.
   c. "Duragrout"; L & M Const. Chemical Co.
   d. "Horn Non-Corrosive Non-Shrink Grout"; A.C. Horn, Inc.
   e. "588 Grout"; W.R. Meadows, Inc.
   f. "Five Stair Grout"; Five Star Products, Inc.

2.4 FABRICATION:

A. Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.

1. Camber structural steel members where indicated.
2. Identify high-strength structural steel according to ASTM A 6 (ASTM A 6M) and maintain markings until steel has been erected.
3. Mark and match-mark materials for field assembly.
4. Fabricate for delivery a sequence that will expedite erection and minimize field handling of structural steel.
5. Complete structural steel assemblies, including welding of units, before starting shop-priming operations.
6. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
7. Piping and/or cracks in flanges or webs of all rolled shapes or plates are to be removed and welded solid by AISC procedures.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded.

C. Finishing: Accurately mill ends of columns and other members transmitting loads in bearing.

D. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's printed instructions.

E. Steel Wall Framing: Select true and straight members for fabricating steel wall framing to be attached to structural steel framing. Straighten as required to provide uniform, square, and true members in completed wall framing.

F. Welded Door Frames: Build up welded door frames attached to structural steel framing. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches (250 mm) o.c., unless otherwise indicated.

G. Holes: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on Shop Drawings.

1. 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. Weld threaded nuts to framing and other specialty items as indicated to receive other work.

H. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

I. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Shop weld shear connectors, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

2.5 SHOP CONNECTIONS:

A. Simple Beam Connections: Standard double angle framed beam connections using bolts as specified.

1. Seated Beam Connections and Stiffened Seated Beam Connections shall not be used unless indicated on the drawings or unless Engineer approval is obtained to verify capacity of supporting member for the resulting eccentricity. The fabricator must verify and bear responsibility that the use of such connections does not interfere with architectural or MEP requirements.

B. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1. Connection Type: Snug tightened, unless indicated as slip-critical, direct-tension, or tensioned shear/bearing connections.

C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp.

2.6 SHOP PRIMING:

A. Shop prime steel surfaces, except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed-on fireproofing, [unless otherwise specified].
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Prepare surfaces according to SSPC specifications as follows:
1. SSPC-SP 2 "Hand Tool Cleaning."

2.7 SOURCE QUALITY CONTROL:

A. Independent Testing and Inspecting Laboratory: Owner will engage an Independent Testing and Inspecting Laboratory to perform shop inspections and tests and to prepare test reports.

1. Testing laboratory will conduct and interpret tests and state in each report whether test specimens comply with or deviate from requirements.

2. Provide testing laboratory with access to places where structural steel work is being fabricated or produced so required inspection and testing can be accomplished.

B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

D. Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts".

E. In addition to visual inspection, shop-welded connections will be inspected and tested according to AWS D1.1 and the inspection procedures listed below, at testing laboratory's option.

1. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.

2. Ultrasonic Inspection:ASTM E 164.

PART 3 –EXECUTION:

3.1 INSPECTION:

A. Before erection proceeds, and with the steel erector present, verify elevations of concrete [and masonry bearing surfaces] and locations of anchorages for compliance with requirements.

B. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

B. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

3.3 ERECTION:

A. Set structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.

B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.

1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.

2. 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.

3. Pack grout solidly between bearing surfaces and plates so no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
   a. Comply with manufacturer's instructions for proprietary grout materials.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

2. 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.

E. Splice members only where indicated.

F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

G. Do not use thermal cutting during erection.

H. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS:

A. Install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.

B. Install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

1. Comply with AISC specifications referenced in this Section for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

2. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds ½ inch (13 mm) and larger. Grind flush butt welds. Dress exposed welds.

D. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld shear connectors in field, spaced as shown, to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

3.5 FIELD QUALITY CONTROL:

A. Testing Laboratory Responsibility: The Owner's Testing Laboratory will perform field special inspections and tests on and to prepare test reports as follows:

1. Testing Laboratory shall also approve welding certificates. Contractor shall submit three (3) copies of welding certificates and procedures for each welder involved in the Work.

2. Testing Laboratory shall conduct and interpret tests, certificates and procedures and state in each report whether tested Work complies with or deviates from requirements.

B. Quantity of Required Inspections and Tests: Testing Laboratory shall perform inspections or tests in accordance with AISC specification:

1. Shop Bolted Connections: Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.

2. Shop Welded Connections: Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.

3. Field-Bolted Connections: Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.

4. Field Welding: Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.

5. Other Inspections as required by AISC and indicated on Special Inspection Schedule in Construction Documents.

C. Provide access for Testing Laboratory to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. Deficiencies: Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

E. Field Inspections and Tests: check steel as received in the field for possible shipping damage workmanship, piece making and verification of required camber.

F. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

3.6 CLEANING

A. 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.

1. Apply by brush or spray to provide a minimum dry film thickness of 1.5 mils (0.038 mm).

B. Touch up Painting: Cleaning and touch up painting of field welds, bolted connections, and abraded areas of shop paint on structural steel are included in Section 09900, "Painting."

END OF STRUCTURAL STEEL

SECTION 05 2100
STEEL JOISTS AND JOIST GIRDERS

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:
   1. K-series open-web steel joists.
   2. Joist girders.
   3. Joist accessories.

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

C. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Section 01 4100, "Testing and Inspection Services - General": Independent testing agency procedures and administrative requirements.
   2. Section 03 3000," Concrete": Installing anchors set in concrete.
   3. Section 04 2000, "Unit Masonry": Installing anchors set in unit masonry.
   4. Section 05 1200, "Structural Steel": Field quality-control procedures .
   5. Section 03 4100, Structural Precast Concrete Wall Panels.
   6. Section 05 5000, "Metal Fabrications": Loose, steel bearing plates and miscellaneous steel framing.
   7. Section 09 9000, "Painting": Surface preparation and prime painting.

1.2 PERFORMANCE REQUIREMENTS:

A. Structural Performance: Engineer, fabricate, and erect joists and connections to withstand design loads within limits and under conditions required.
   1. Design Loads: As indicated.
   2. Design joists to withstand design loads without deflections greater than the following:
      a. Roof Joists: Vertical deflection of 1/360 of the span.

B. Engineering Responsibility: Engage a joist manufacturer who utilizes a qualified professional engineer to prepare design calculations, shop drawings, and other structural data for steel joists.

1.3 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 joist, accessory, and product specified.

C. Shop Drawings showing layout, mark, number, type, location, and spacing of joists. Include joining and anchorage details, bracing, bridging, accessories, splice and connection details, and attachment to other units of Work.
   1. Indicate locations and details of anchorage devices and bearing plates to be embedded in other construction.
   2. For joists indicated to comply with certain design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Design calculations submit for record one copy of design calculations, sealed by an engineer registered in the state where the project is located, for joist and joist girders with cantilevers or concentrated loads or joist sizes for which standard load tables are not applicable.

E. Material certificates signed by joist manufacturer certifying that joists comply with SJI's "Specifications."

F. Mill certificates signed by manufacturers of bolts certifying that their products comply with specified requirements.

G. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

H. 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.

I. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence joists' compliance with building code in effect for Project.

1.4 QUALITY ASSURANCE:

A. Manufacturer Qualifications: Engage a firm experienced in manufacturing joists similar to those indicated for this Project and that have a record of successful in-service performance.
   1. Manufacturer must be certified by SJI to manufacture joists conforming to SJI standard specifications and load tables.

B. SJI Design Standard: Comply with recommendations of SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders," applicable to types of joists indicated.

C. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel."
   1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the 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 joists that are similar to those indicated for this Project in material, design, and extent.

E. Inspection: Inspect joists and girders in accordance with SJI "Specifications."

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.6 SEQUENCING:

A. Deliver steel bearing plates and other devices to be built into concrete and masonry construction.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Steel: Comply with requirements of SJI's "Specifications" for chord and web section material.

B. Steel Bearing Plates: ASTM A 36 (ASTM A 36M).

C. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
   1. Finish:
      a. Plain, noncoated.

D. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
   1. Finish:
      a. Plain, noncoated.

E. Welding Electrodes: Comply with AWS standards.

2.2 PRIMERS:

A. Steel Prime Paint: Manufacturer’s standard.

2.3 STEEL JOISTS:

A. Manufacture joists according to SJI's "Specifications," with steel angle top and bottom chord members, of joist types, end arrangements, and top chord arrangements indicated.

B. Manufacture joists according to SJI's "Specifications," with steel angle top and bottom chord members, and as follows:
   1. Joist Type:
      a. K-series steel joists.
   2. End Arrangement:

a. Underslung.
b. Underslung with bottom chord extensions.

3. Top Chord Arrangement:
   a. Parallel.
   b. Top chord single pitched

C. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
D. Provide holes in chord members where shown for securing other work to steel joists. However, deduct area of holes from the area of chord when calculating strength of member.
E. Extend top chords of joists with SJI Type S top chord extensions where indicated, complying with SJI's "Specifications" and load tables.
F. Extend bearing ends of joists with SJI Type R extended ends where indicated, complying with SJI's "Specifications" and load tables.
G. Camber K-series steel joists according to SJI's "Specifications."
H. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes when joist slope exceeds 1/4 inch in 12 inches (1:48).

2.4 JOIST ACCESSORIES:

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span.
   1. Supply additional bridging to ensure stability of structure during construction period.
B. Fabricate steel bearing plates with integral anchorage's as indicated and finish as follows:
   1. Finish: Shop prime paint.
C. Steel bearing plates with integral anchorages are specified in Section 05500, "Metal Fabrications."
D. Supply miscellaneous accessories, including splice plates and bolts required by the joist manufacturer to complete the joist installation.

2.5 SHOP PAINTING:

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories to be primed as follows:
   1. Surface Preparation:
      a. Either hand tool cleaning, SSPC-SP 2, or power tool cleaning, SSPC-SP 3.
B. Apply one shop coat of primer to joists and joist accessories to be primed to provide a continuous, dry paint film thickness of not less than 1 mil (0.025 mm).

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of joists. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

A. Do not install joists until supporting construction is in place and secured.
B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's recommendations, and the requirements of this Section.
C. Before installation, splice joists delivered to Project site in more than one piece.
D. Space, adjust, and align joists accurately in location before permanently fastening.
E. Install temporary bracing and bridging, connections, and anchors to ensure joists are stabilized during construction.
F. Anchors: Furnish anchor bolts, steel bearing plates, and other devices to be built into concrete masonry construction.
G. Provide unfinished threaded fasteners for anchor bolts, unless high strength bolts indicated.

H. Field weld joists to supporting steel framework and steel bearing plates. Coordinate welding sequence and procedure with placing of joists.
I. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
J. Bolt joists to supporting steel framework using carbon-steel bolts, unless otherwise indicated.
K. Comply with the Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
L. Comply with the Research Council on Structural Connections' (RCSC) "Load and Resistance Factor Design Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
M. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.

3.3 FIELD QUALITY CONTROL:

A. Testing Laboratory Responsibility: The Owner's Testing Laboratory will perform field special inspections and tests on and to prepare test reports as follows:
   1. Testing Laboratory shall also approve welding certificates. Contractor shall submit three (3) copies of welding certificates and procedures for each welder involved in the Work.
   2. Testing Laboratory shall conduct and interpret tests, certificates and procedures and state in each report whether tested Work complies with or deviates from requirements.
B. Testing and verification procedures will be required of high-strength bolted connections and field welds per Special Inspection requirements per 2012 IBC. Refer to Special Inspection Schedule in Construction Documents.
C. Correct deficiencies in Work that inspections and test reports have indicated are not in compliance with specified requirements.
D. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.2 REPAIRS AND PROTECTION:

A. Touch Up Painting: Following installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, accessories, bearing plates, and abutting structural steel.
   1. Clean and prepare surfaces by hand tool cleaning, SSPC-SP 2, or power tool cleaning, SSPC-SP 3.
   2. Apply a compatible primer of the same type as the shop primer used on adjacent surfaces.
B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at the time of Substantial Completion.

END OF STEEL JOISTS AND JOIST GIRDERS

SECTION 05 3100
STEEL DECK

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:
   1. Roof deck.
   2. Composite floor deck

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

C. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Section 03 3000, “Concrete”.
   2. Section 05 1200, "Structural Steel": Shop-welded shear connectors.
   3. Section 05 5000, "Metal Fabrications": Framing openings with miscellaneous steel shapes.
   4. Section 05 2100, “Steel Joists and Joist Girders”.
   5. Section 07 8150, "Sprayed-On Fireproofing".
   6. Section 09 9000, "Painting":
      a. Touch-up and repair painting of deck.
      b. Touch-up and repair of special deck coatings.

1.2 SUBMITTALS:

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Submit all shop drawings on one reproducible print (sepia) and one blue line print only. The reproducible print will be returned. All blue line prints required by the Contractor will be the responsibility of the Contractor and shall be made after reproducible is returned.

C. Product data for each type of deck, accessory, and product specified.
   1. Provide test data for mechanical fasteners used in lieu of welding for fastening deck to supporting structures.

D. Shop drawings showing layout and types of deck panels, anchorage details, reinforcing channels, pans, cut openings, closure strips, deck openings, special jointing, accessories, and attachments to other construction.

E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

F. Product test reports from qualified independent testing agencies evidencing compliance with requirements of the following based on comprehensive testing:
   1. Mechanical fasteners.

G. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence steel deck's compliance with the building code in effect for the Project.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated:
   1. American Iron and Steel Institute (AISC), “Specification for the Design of Cold-Formed Steel Structural Members”.
   2. American Welding Society (AWS), D1.3 “Structural Welding Code - Sheet Steel”.
   3. Steel Deck Institute (SDI), ‘’Design Manual for Composite Decks, Form Decks and Roof Decks’’.

B. Installer Qualifications: Engage an experienced Installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

C. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code-Steel" and AWS D1.3 "Structural Welding Code-Sheet Steel."
   1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

D. Welded decking in place is subject to inspection and testing. Owner will bear expense of removing and replacing portions of decking for testing purposes if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work.

E. Fire-Test-Response Characteristics: Where indicated, provide steel deck panels identical to those tested as part of an assembly for fire resistance per ASTM E 119 by a testing and inspection agency performing testing and follow-up services, that is acceptable to authorities having jurisdiction.

F. Fire-Resistance Ratings: As indicated by design designations listed in UL "Fire Resistance Directory," or by Warnock Hersey or another testing and inspecting agency.

G. Labeling: Identify steel deck with appropriate markings of applicable testing and inspecting agency.

H. Installation Tolerances: Conform to the installation tolerances specified in Part 3.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1.5 COORDINATION:

A. Coordinate installation of sound-absorbing insulation strips in acoustic deck ribs with related units of Work specified in other Sections to ensure that the insulation is protected against damage from effects of the weather and other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Steel Deck:
      a. Vulcraft Div. of Nucor Corp.
      b. New Millennium Building Systems.
      c. Canam Steel Corporation (CSC).
      d. Epic Metals Corp.
      e. Wheeling Corrugating Co., Div. of Wheeling-Pittsburgh Steel Corp.

2.2 ROOF DECK:

A. Steel Roof Deck: Fabricate panels without top-flange stiffening grooves conforming to SDI Publication No. 28 "Specifications and Commentary for Steel Roof Deck" and the following:
   1. Galvanized-Steel Sheet: ASTM A 446, Grade A, G 60 (ASTM A 446M, Grade A, Z 180) zinc coated according to ASTM A 525 (ASTM A 525M).
   2. Deck Profile:
      a. Type WR, wide rib. Acoustical wide rib deck at gymnasium. Vented deck at light gauge roof trusses.
   3. Profile Depth:
      a. 1-1/2 inches.

4. Design Uncoated-Steel Thickness:
   a. 0.0358 inch.
5. Span Condition:
   a. Triple span or more.
6. Side Joints:
   a. Overlapped or interlocking seam at Contractor's option.

B. Composite Steel Floor Deck: Fabricate panels with integrally embossed or raised pattern ribs and interlocking side laps, conforming to SDI Publication No. 31 "Specifications and Commentary for Composite Steel Floor Deck," the minimum section properties indicated, and the following:
1. Galvanized-Steel Sheet: ASTM A 446, Grade A, G 60 (ASTM A 446M, Grade A, Z 180) zinc coated according to ASTM A 525 (ASTM A 525M).
2. Profile Depth:
   a. 3 inches.
3. Design Uncoated-Steel Thickness:
   a. 0.0474 inch.
4. Span Condition:
   a. Triple span or more.

2.3 FABRICATION AND ACCESSORIES:

A. General: Form deck units in lengths of three or more spans, with flush, telescoped, or nested 2-inch laps at ends and interlocking or nested side laps, unless noted. End laps shall occur over a support.

B. Roof Deck Units: Provide deck configurations that comply with SDI "Specifications and Commentary for Steel Roof Deck".

C. Cant Strips: Fabricate cant strips of not less than 20 gage galvanized sheet steel of same quality as the deck units. Bend cant strips to form a 45 degree cant not less than 5 inches wide with top and bottom flanges not less than 2 inches wide, unless noted. Provide cant strips in 10 foot lengths where possible.

D. Ridge and Valley Plates: Fabricate ridge and valley plates of not less than 20 gage galvanized sheet steel of the same quality as deck units. Bend to provide tight-fitting closure with deck units. Each leg of bend shall not be less than 3 inches. Provide plates in 10 foot lengths where possible.

E. Accessories: Provide accessory materials for steel deck that comply with requirements indicated and recommendations of the steel deck manufacturer.

F. Mechanical Fasteners: Manufacturer's standard, corrosion-resistant, low-velocity, powder-actuated or pneumatically driven carbon steel fasteners; or self-drilling, self-threading screws.

G. Side Lap Fasteners: Manufacturer's standard, corrosion-resistant, hexagonal washer head; self-drilling, carbon steel screws, No. 10 (4.8 mm) minimum diameter.

H. Rib Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.

I. Miscellaneous Roof Deck Accessories: Steel sheet, 0.0359-inch (0.91-mm) thick minimum ridge and valley plates, finish strips, and reinforcing channels, of same material as roof deck.

J. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material and thickness as deck panels, unless otherwise indicated.

K. Weld Washers: Manufacturer's standard uncoated-steel sheet weld washers, shaped to fit deck rib, 0.0598 inch (1.5 mm) thick with 3/8-inch (9.5-mm) minimum diameter prepunched hole.

L. Recessed Sump Pans: Manufacturer's standard size, single piece steel sheet 0.071-inch- (1.8-mm-) thick minimum, of same material as deck panels, with 1-1/2-inch- (38-mm-) minimum deep level recessed pans and 3-inch- (76-mm-) wide flanges. Cut holes for drains in the field.

M. Flat Receiver Pan: Manufacturer's standard size, single-piece steel sheet, 0.071-inch- (1.8-mm-) thick minimum units, of same material as deck panels. Cut holes for drains in the field.

N. Shear Connectors: ASTM A 108, Grade 1010 through 1020 headed stud type, cold-finished carbon steel, AWS D1.1, Type B.

O. Steel Sheet Accessories: ASTM A 446, G 60 (ASTM A 446M, Z 180) coating class, galvanized according to ASTM A 525 (ASTM A 525M).

P. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine supporting framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of steel deck.

3.2 PREPARATION:

A. Do not place deck panels on concrete supporting structure until concrete has cured and is dry.

B. Locate decking bundles to prevent overloading of supporting members.

3.3 INSTALLATION, GENERAL:

A. Install deck panels and accessories according to applicable specifications and commentary of SDI Publication No. 28, manufacturer's recommendations, and requirements of this Section.

B. Install temporary shoring before placing deck panels when required to meet deflection limitations.

C. Place deck panels on supporting framing and adjust to final position with ends accurately aligned and bearing on supporting framing before being permanently fastened. Do not stretch or contract side lap interlocks.

1. Do not place deck units on concrete supporting structure until concrete has cured and is dry.
2. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
3. Do not use deck units for storage or working platforms until permanently secured.
4. Place deck panels flat and square and fasten to supporting framing without warp or deflection.
5. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to the decking.
6. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.
7. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
8. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's instructions.

D. Deck Edge Tolerances: Perimeter deck edges shall be within =/- 1/2 inch of the indicated lines.

3.4 ROOF DECK INSTALLATION:

A. Fasten roof deck panels to steel supporting members by mechanical fasteners as indicated in the structural drawings:

1. Comply with mechanical fastener manufacturer requirements and procedures for installation.
2. Mechanical fasteners: See structural drawings.
3. Fastener attachment pattern: See structural drawings.
4. Weld Washers: Install weld washers at each weld location.
5. Side Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding 12 inches, using one of the following methods:
   a. Mechanically fasten with screws as indicated in the structural drawings.

B. End Bearing: Install deck ends over supporting framing with a minimum end bearing of 1-1/2 inches (38

mm), with end joints as follows:

1. End Joints:
   a. Lapped 2 inches (51 mm) minimum.

C. Uplift Loading: See structural drawings for the required uplift loading.

D. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.

E. Roof Sump Pans and Sump Plates: Install over openings provided in roof decking, and weld flanges to top of deck. Space welds not more than 12 inches (305 mm) apart with at least one weld at each corner.

F. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's recommendations. Weld to substrate to provide a complete deck installation.

3.5 FLOOR DECK INSTALLATION:

A. Fasten floor deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
1. Weld Diameter: 5/8 inch (16 mm), nominal.
2. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches (305 mm) apart, but not more than 18 inches (457 mm) apart.
3. Weld Washers: Install weld washers at each weld location.
4. Side Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, or at intervals not exceeding 36 inches, using one of the following methods:
   a. Mechanically fasten with self-drilling No. 10 diameter or larger carbon steel screws.

B. Shear Connectors: Weld shear connectors through deck to support framing according to AWS D1.1 and manufacturer's instructions. Butt end joints of deck panels; do not overlap.

C. End Bearing: Install deck ends over supporting framing with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
1. End Joints:
   a. Lapped.

D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

3.6 Floor Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck according to SDI recommendations to provide tight-fitting closures at open ends of ribs and sides of decking. Weld cover plates at changes in direction of floor deck panels, unless otherwise indicated.

3.7 FIELD QUALITY CONTROL:

A. Testing Agency: A qualified independent testing agency employed and paid Owner will perform field quality-control testing.
1. Field welds will be subject to inspection.

B. Testing Agency will report test results promptly and in writing to Contractor and Architect.

C. Remove and replace work that does not comply with specified requirements.

D. Additional testing will be performed to determine compliance of corrected work with specified requirements.

3.8 REPAIRS AND PROTECTION:

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces with galvanized repair paint according to ASTM A 780 and the manufacturer's instructions.

END OF STEEL DECK

SECTION 05 4000
COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Formed steel stud interior wall and interior load-bearing wall framing.

1.2 RELATED REQUIREMENTS

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

B. Section 04 2000 - Unit Masonry: Veneer masonry supported by wall stud metal framing.

C. Section 06 1000 - Rough Carpentry: Wood blocking and miscellaneous framing.

D. Section 07 2100 - Thermal Insulation: Insulation within framing members.

E. Section 07 9005 - Joint Sealers.

F. Section 09 2116 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.

G. Section 09 5100 - Acoustical Ceilings: Ceiling suspension system.

1.3 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2024.

B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2020.

C. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

F. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.

G.

H. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020 (Reapproved 2024).

I. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to metal framing systems, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.5 SYSTEM DESCRIPTION

A. Horizontal Deflection: Design to permit maximum deflection of 1/600 of span at locations with brick or stucco veneer, and 1/360 at all other locations.

B. Vertical Deflection: Design non-axial loadbearing framing to accommodate not less than 1/2 in vertical deflection.

C. Design wall system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

D. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

E. Work described in this Section includes galvanized steel stud framing systems for use at any new exterior metal stud walls and framing, interior load-bearing walls, and other locations as indicated on drawings.
   1. Studs and runner tracks at exterior walls and interior load-bearing walls (if any) shall be 6-inches depth x 1-5/8-inches width, and spaced at sixteen inches (16") o.c., unless otherwise indicated, with continuous bridging channels and/or stud tracks as bridging channels, as indicated, and framed structural headers at all openings.
   2. Joists and rafters (if any) and their stringers (at ends over bearing locations), bridging, and web stiffeners shall be as indicated herein, unless indicated otherwise on the Drawings; joists shall be spaced sixteen (16) inches o.c., directly over bearing studs or immediately adjacent to studs where anchored to sides of stud walls, unless otherwise indicated or accepted in writing by Architect.
   3. Typical stud and joist sections shall be C-shape, and at least 1-5/8-inches width.
   4. Galvanized steel strap bracing shall be provided, continuous at top and bottom runner tracks and at bridging locations at all curved stud walls.
   5. Structural channels, studs, and joists, and other framing shall be as indicated on the Structural Drawings.

1.6 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.

C. Product Data: For lateral-force resisting systems, provide product data sheets on hold-down, showing compliance with requirements.

D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Indicate stud and ceiling joist layout.
   2. Describe method for securing studs to tracks and for bolted or welded framing connections.

E. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

F. Shop drawings shall bear the current State seal and license number of the manufacturer's and/or fabricator's Design Engineer.

1.7 QUALITY ASSURANCE

A. Designer Qualifications: Design framing system under direct supervision of a professional structural engineer experienced in designing this work and licensed in the State in which the Project is located.

B. Calculate structural properties of framing members in accordance with requirements of AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

C.

D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

E. Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

1.8 MOCK-UPS

A. See Section 01 4000 - QUALITY REQUIREMENTS for additional requirements.

B. Include Cold-Formed Metal Framing in mock-up as described in Section 01 4000 - Quality Requirements.

1.9 PROJECT CONDITIONS

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

B. Coordinate work of this section with the placement of components within the stud framing system as specified in Section 09 2116 - Gypsum Board Assemblies.

1.10 DELIVERY, STORAGE AND HANDLING

A. Protect metal framing units from rusting and damage. Deliver to project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade. Store off ground in a dry ventilated space or protect with breathable waterproof tarpaulins.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Structural Framing:
   1. Aegis Metal Framing, LLC.
   2. ClarkDietrich Building Systems LLC: www.clarkdietrich.com.
   3. MBA Metal Framing: www.mbastuds.com.
   4. SEMCO, Southeastern Metals, Div. of Gibraltar Industries.
   5. Southeastern Stud & Components, Inc.: www.sestud.com.
   6. Steel-Con; Div. of Steel Construction Systems: www.steelconsystems.com.
   7. Telling Industries, LLC: www.tellingindustries.com.
   8. U.S. Gypsum Co
   9. Substitutions: See Section 01 6000 - Product Requirements.

B. Connectors:
   1. Same manufacturer as metal framing.

2.2 PERFORMANCE REQUIREMENTS

A.

B. Cold-Formed Metal Eave and Fascia System: Structural vented eave and fascia system. Galvanized steel, ASTM A 653, G-90, Grade 40, structural quality. Kynar 500 finish.
   1. Manufacturer/Product:
      a. "Structeavent" [Basis of Design], manufactured by ACS, LLC: www.structeavent.com.
      b. Precision Fabricators: 404-965-9341.
      c. Architectural Products Co.: 800-837-1001.
      d. Substitutions: See Section 01 6000 - Product Requirements.

C. Design Requirements: Design cold-formed framing systems, components and connectors to withstand specified design loads in compliance with ICC (IBC), ASCE 7, AISI S100, and AISI S240.

D.

2.3 STRUCTURAL FRAMING COMPONENTS

A. Wall Studs and Track Sections: AISI S240; c-shaped studs and u-shaped track sections in stud-matching nominal width and compatible height.

B. System Components: With each type of metal framing and headers required, provide manufacturer's standard steel runners (tracks), blocking, bridging, lintels, clip angles, shoes, reinforcements, fasteners, and accessories as recommended by manufacturer for applications indicated, as needed to provide a complete metal framing system.

C. Materials and Finishes:
   1. For 16-gage and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 psi; ASTM A 446, A 570, or A 611.
   2. For 18-gage and lighter units, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi; ASTM A 446, A 570, or A 611.
   3. Provide galvanized finish to metal framing components complying with ASTM A 653 for minimum G60 coating.
      a. Finish of installation accessories to match that of main framing components, unless otherwise indicated.
      b.
   4.

2.4 ACCESSORIES

A. Stud Wall Bridging: 1-1/2-inches x 16-gage Cold Rolled Channel, unless otherwise indicated, anchored to each stud with 16-gage clip angles, or welded connections (where allowed by manufacturer), and 16-gage splice plates, with spacing at 4'-0" or 4'-6" o.c. vertically, through pre-punched slots in studs.

B. Solid Joist Bridging: 1-5/8-inches x same gauge and depth as joists, unless otherwise indicated, anchored to joists webs with 2-inch x 2-inch x 16-gauge clip angles, or welded (where allowed by manufacturer) with continuous rows spaced at mid-span minimum, or 5'-0" o.c. maximum at clear span where span exceeds 10'-0".

C. Strap Bracing: 1-1/2-inches x 20-gage galvanized steel, anchored at ends, splices, and each stud with typical framing screws. Placement at curved walls shall align with radius or curve indicated at each such location.

D. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

E. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.

F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.5 FASTENERS

A. Anchorage Devices: Power actuated and Screws with sleeves.

B. Electrodes for Welding: Comply with AWS Code.

2.6 FABRICATION

A. General: Framing components may be prefabricated into assemblies before erection. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.

B. Fabricate units in jig templates to hold members in proper alignment and position and to assure consistent component placement.

C. Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting, or screw fasteners, as standard with manufacturer. Wire tying of framing components is not permitted.
   1. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

D. Fabrication Tolerances: Fabricate units to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8-inch in 10 feet, and as follows:
   1. Spacing: Space individual framing members no more than plus or minus 1/8-inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
   2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8-inch (3 mm).

E. Headers: Form from at least two equal size C-shapes in a back-to-back or box type configuration.

2.7 SHOP FABRICATED ASSEMBLIES

A. Shop fabricate metal framing to the greatest extent possible.

B. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION - GENERAL

A. Manufacturer's Instructions: Install metal framing system in accordance with manufacturer's current printed or written instructions and recommendations, unless otherwise indicated.

B. Runner Tracks:
   1. Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks at all walls anchored to concrete floor and roof structure with threaded studs in expansion shields spaced 18-inches o.c., unless otherwise indicated.
   2. Track shall be spliced with channel insert fastened with two (2) sheet metal screws, bolts or rivets at each side, each flange, each corner. Provide fasteners at corners and ends of tracks.

C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.

D. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners and bridging to supporting structure.

E. Install supplemental framing, blocking and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.

F. Erection Tolerances: Bolt or weld panels (at both horizontal and vertical junctures) to produce flush, even, true to line joints.
   1. Step in face and jog in alignment between panels not to exceed 1/16-inch.

3.3 INSTALLATION OF STUDS

A. Install wall studs plumb and level.

B. Frame wall openings larger than 2'-0" square with double stud at each jamb of frame except where more than two (2) are either shown or indicated in manufacturer's written instructions. Install cripple studs below and king studs and jack studs on each side/end of headers, minimum same size and gauge as wall studs where occurs, and anchor together securely. Install runner tracks and jack studs above and below headers at wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated. Attach structural sheathing to each component.

C. Install horizontal bridging in all walls, and the additional strap bracing at curved walls as steel framing progresses. Install at spacing indicated and in compliance with stud manufacturer's written recommendations.

D. Frame both sides of expansion and control joints, with separate studs; do not bridge the joint with components of stud system

E. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.

F. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.

G. Install load-bearing studs; brace, and reinforce to develop full strength and achieve design requirements.

H. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

I. Install intermediate studs above and below openings to align with wall stud spacing.

J. Provide deflection allowance in stud track, directly below horizontal building framing at non-loadbearing framing.

K. Attach cross studs to studs for attachment of fixtures anchored to walls.

L. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

M. Touch-up field welds and damaged corrosion protected surfaces with primer.

3.4 FIELD QUALITY CONTROL

A. Testing (if required): All field quality-control testing shall be performed by a qualified independent testing agency. Refer to Section 01 0150 - “Special Conditions” and Section 01 4000 - "Quality Requirements" for additional information and requirements.
   1. Field and shop welds will be subject to inspection and testing.
   2. Testing agency will report test results promptly and in writing to Contractor and Architect.
   3. Remove and replace Work that does not comply with specified requirements.

4. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal 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 cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

3.6 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Variation of any Member from Plane: 1/16 inch.

END OF SECTION

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SECTION 05 4500
LIGHT GAUGE STEEL TRUSSES

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:
   1. Gable-shaped trusses.
   2. Cold-formed steel framing accessories.
   3. Anchorage, bracing and bridging.

B. Definitions:
   1. Pre-engineered light gauge steel trusses include planar structural units consisting of welded, screwed or bolted connected members which are fabricated, cut and assembled prior to delivery to the job site.

C. Miscellaneous Metal Fabrications including embed plates shown on the drawings are specified elsewhere in Division 5.

D. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work specified in this section.

E. Related Sections:
   1. Section 05 3100 – Steel Deck
   2. Section 05 4000 – Cold-formed Metal Framing

F. Design Requirements:
   1. Design system components in accordance with AISI references.
   2. Conform to the requirements of the Standard Building Code.
   3. Maximum allowable deflections:
      a. $1/240^{th}$ of span under total loads
      b. $1/360^{th}$ of span under live loads.

1.2 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
   1. Submit all shop drawings on one reproducible print (sepia) and one blue line print only.
   2. The reproducible print will be returned. All blue line prints required by the Contractor are the responsibility of the Contractor and shall be made after reproducible is returned.

B. Product Data: Submit fabricator's technical data covering materials, shapes, hardware, fabrication process, handling and erection.

C. Shop Drawings: Submit shop drawings showing shapes and dimensions of members to be used including pitch, span, camber configuration and spacing for each type or configuration of truss required. Show all bearing and anchorage details. Specify and detail all supplemental strapping, bracing clips and other accessories required for proper installations, including temporary bracing and permanent member bracing. Shop drawings shall include all placement sequences and instructions.
   1. Submit design analysis and test reports indicating loading, section properties, allowable stress, stress diagrams and calculations, and similar information needed for analysis and to insure trusses comply with requirements.
   2. All designs shall bear the name and seal of a Structural Engineer licensed to practice in the State of Alabama Shop drawings which do not contain this information will be returned unchecked.

D. Quality Control Programs:
   1. Submit written and bound quality control program that includes procedures for product certification and truss engineering, fabrication, handling, delivery, temporary storage, and erection procedures.
   2. Quality Control Manual will be used as basis for inspection by a testing agency engaged by the Owner to determine compliance with the Quality Control Manual and other tests and observations noted herein.

E. Architect's Shop Drawing Review:
   1. Review of shop drawings will be for general considerations only. Compliance with requirements for materials, fabrication, and erection of structural steel is the Contractor's responsibility.
   2. Submit all shop drawings on one reproducible copy and two blueline prints only. Only the reproducible will be returned. Additional bluelines required by the Contractor are the Contractor's responsibility and shall be made after reproducible is returned. If additional bluelines are submitted, they will be returned unmarked.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the following except as otherwise indicated.
   1. AISI "Specification for the Design of Cold-Formed Steel Structural Members," dated August 19, 1986 with December 11, 1989 addendum and design guide for cold formed steel trusses, Publication RG=9518.
   2. ASTM A370 "Standard Test Methods and Definitions for Mechanical Testing of Steel Products."
   3. ASTM A446 "Specifications for Sheet Steel, Zinc Coated (Galvanized) by the Hot-Dip Process, Physical (Structural) Quality"
   4. ASTM A500 "Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural tubing in Rounds and Shapes."
   5. ASTM A653 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) of Zinc Alloy Coated by the Hot-Dip Process."
   6. ASTM A780-93a "Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings."
   7. AWS D1.1 "Structural Welding Code for Steel
   8. AWS D1.3 "Structural Welding Code for Sheet Steel."

B. Qualifications For Welding Work: Quality welding processes and welding operations in accordance with AWS D1.3 "Structural Welding Code for Sheet Steel."
   1. Provide certification that welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous 12 months.
   2. If recertification of welders is required, retesting will be the Contractor's responsibility.

C. Design Of Members And Connections: All details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at the site without causing delay in the work.
   1. Promptly notify the Architect whenever design of members and connections for any portion of the structure are not clearly indicated.

D. Trusses shall be designed, fabricated, and erected by a firm which has a record including a minimum of five years of successfully designing, fabricating, and erecting trusses assemblies similar to scope required and which practices a quality control program.
   1. Engineer Qualifications: A professional engineer legally authorized to practice in the jurisdiction where the project is located and is experienced in the services of the kind indicated.

E. Fabricators who wish to qualify for approval under this Section of the specification shall submit evidence of compliance with this specification no later that ten (10) days prior to the bid date. Only those fabricators approved in writing by the Architect prior to the bid date will be accepted.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to the site at such intervals to insure uninterrupted progress of the work.

B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

C. Do not store materials on structure in a manner that might cause distortion or damage to supporting structures.

D. Deliver and handle products in exact accordance with the manufacturer's latest published requirements and specifications to avoid damage from bending, overturning, or other cause for which truss is not designed to resist or endure.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Sheet Steel: ASTM A446 "specification for Sheet Steel, Zinc Coated Galvanized by the hot-Dip Process, Physical (Structural) Quality."
1. Grade A, Fy = 33ksi; 18 gage and lighter
2. Grade D, Fy = 50 ksi; gage and heavier
3. Galvanizing: G-60 Coating Class

B. Galvanizing: ASTM A653

C. Fasteners: ITW Buildex pan head screws and bolts or others submitted and approved by the Architect.

D. Electrodes for Welding: Comply with AWS Code

E. Paint: Zinc Chromate, Oil-alkyd; TT-P-57, Type I.

2.2 DESIGN:

A. All calculations and procedures pertaining to design, analysis, and computation of section properties shall be in accordance with the Specification for the Design of Cold-Formed Steel Structural Members of the American Iron and Steel Institute.

B. Design trusses for loads indicated on drawings plus concentrated loads hung from or supported on trusses. Refer to mechanical, electrical and plumbing drawings and specifications for loading information and location. Loading as required by other subcontractors, such as fire protection, shall be coordinated by the general contractor.

C. Holes in Members: Design for holes in members where shown for securing other work to trusses; however, deduct area of holes from the area of chord when calculating strength of member.

D. Design bridging and other temporary and permanent bracing for same loads as used to design trusses plus any temporary loads and permanent loads resulting laterally bracing of members.

2.3 FABRICATION:

A. Light gage steel trusses may be fabricated either on the jobsite or at fabricator's shop.

B. All trusses shall be fabricated and erected in strict accordance with the current printed instructions of the approved subcontractor or fabricator.

C. All truss components shall be straight and true prior to fabrication. Flattening or straightening of components, when necessary, shall be accomplished in a manner so as to not damage the component.

D. All truss components shall be cut neatly to fit snugly against adjacent members.

E. No splices will be allowed in trusses except as authorized in writing by the Architect or as shown on the approved shop drawings.

F. Framing components shall be field or shop fabricated and joined to one another by means of welding or through the use of screws.

G. Completed trusses shall be free from twists, bends, or open joints with all members straight and true to line.

H. Welds must be thoroughly cleaned and wire brushed and primed and painted with a high zinc content paint capable of providing an equal or greater degree of protection than the original G-60 galvanized coating.

2.4 BRIDGING:

A. Fabricate horizontal or diagonal type bridging for trusses as required to prevent buckling of members where sheathing applied to the truss members is not present or is not adequate to brace the truss member. Bridging shall transfer all forces to roof diaphragm.

2.5 END ANCHORAGE:

A. Fabricate end anchorage to secure trusses to adjacent construction.

B. Fabricate all clips, angles, henways and other miscellaneous pieces necessary to attach light gage steel trusses to the substructure or to attach other components within this section to one another.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Erector must examine areas, dimensions and conditions under which the trusses are to be installed, and notify Contractor and Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Erector. Additionally, the following items shall be installed and inspected prior to roof truss installation.

3.2 CONDITIONS OF SURFACES:

A. Exterior and Interior Bearing Plates
   1. Properly positioned.
   2. Installed so as to allow complete and adequate contact with truss connection member.

B. Exterior and Interior Bearing Plates installed in proper elevations so as to permit the installation of the truss system without the use of shims or adjustability.

3.3 PREPARATION:

A. Structural Adequacy: Contractor shall prepare the structure to insure proper and adequate structural support for the materials specified.

3.4 ERECTION:

A. Prefabricated trusses shall be braced against racking. Lifting of trusses shall be done so as to not cause local distortion in any member.

B. All light gage steel framing shall be erected using equipment of adequate capacity to safely perform the work.

C. The Contractor is responsible for checking the dimensions and assuring the fit of all members and trusses before erection begins.

D. All work shall be erected plumb and level and to dimensions and spacings indicated on the drawings. Provide bridging as shown in the shop drawings.

E. Assemblies shall be of the size and spacing shown on the approved shop drawings.

F. Provide web stiffeners and reinforcement at reaction points where required by analysis or to suit details.

G. Hoist units in place by means of lifting equipment suited to sizes and types of trusses required, applied at designated lift points as recommended by fabricator, exercising care not to damage truss members.

H. Provide temporary bracing as required to maintain trusses plumb, parallel and in location indicated, until permanent bracing is installed.

I. Anchor trusses securely at all bearing points to comply with methods and details indicated.

J. Install permanent bracing and related components to enable trusses to maintain design spacing, withstand design loads, and comply with other indicated requirements.

K. Do not cut or remove truss members.

3.5 TEMPORARY PLANKING:

A. Provide temporary planking and working platforms as necessary to effectively complete work.

3.6 FIELD ASSEMBLY:

A. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening.

3.7 QUALITY CONTROL:

A. The Owner will engage an independent testing agency to perform shop and field inspection of trusses during fabrication.

B. Testing Agency shall conduct and interpret tests and state in each report whether observations and tests comply with the requirements and specifically state any deviations therefrom.

C. Provide Access for testing agency to places where truss work is being fabricated or produced so that required inspections, observations and testing can be accomplished.

D. Architect reserves the right, at any time before final acceptance, to reject material not complying with specified requirements regardless of when testing agency completed inspection, observation or testing.

E. Correct deficiencies in truss work which inspections and 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 correct work.

END OF LIGHT GAUGE STEEL TRUSSES

SECTION 05 5000
METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated steel items.

1.2 RELATED REQUIREMENTS

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

B. Section 03300 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

C. Section 04810 - Unit Masonry Assemblies: Placement of metal fabrications in masonry.

D. Section 05520 - Handrails and Railings.

E. Section 09900 - Paints and Coatings: Paint finish.

F. Section 09 9600 - High Performance Coatings.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2012.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.

F. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2010.

G. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2013.

H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2012.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010 w/Errata.

K. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).

L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

M. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.4 DESCRIPTION OF WORK

A. Work described in this section includes metal fabrications, which include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural

steel or other metal systems specified elsewhere. Types of work in this section includes metal fabrications for:

1. Rough hardware.
2. Loose bearing and leveling plates.
3. Loose steel lintels.
4. Miscellaneous framing and supports.
5. Guard posts (bollards), with concrete fill and matching metal domed cap welded on post.
6. Anchor plates, channels and/or angles with anchor bolts; galvanized.

1.5 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

C. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

D. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

E. Samples: Submit representative samples of materials and finished products as may be requested by Architect.

1.6 QUALITY ASSURANCE

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.7 PROJECT CONDITIONS

A. Field Measurements: Where fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting acceptable to fabricator's professional engineer, and in a manner that will not affect structural performance, deflection, safety, etc.

1.8 COORDINATION

A. Coordinate installation of anchorages for metal fabrications and supports. 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, without delaying the work of this section or the Work of the project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

2.2 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A500/A500M, Grade B cold-formed structural tubing.

C. Plates: ASTM A283.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153/A153M where connecting galvanized components.

F. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.

G. Galvanized Structural Sheet Steel: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.

H. Steel Pipe: ASTM A 53; Type and grade (If applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.

I. Gray Iron Castings: ASTM A 48, Class 30.

J. ASTM A 47, grade as selected by fabricator.

K. Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

L. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153

M. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

N. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

O. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.3 MATERIALS - ACCESSORIES

A. Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining,
   1. non-corrosive, non-gaseous grout complying with CE-CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

B. Fasteners:
   1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

C. Paint:
   1. Southern Coating "Heavy Duty RIP Primer 1-0900", Tnemec "10-99 Primer", or approved equivalent.
   2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900 - PAINTING.
   3. High zinc dust content paint for re-galvanizing welds in galvanized steel, complying with Military Specifications MIL-P-21035 (Ships), or SSPC-Paint-20.

4. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers, or cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings (if any): Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

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

2.5 FABRICATED ITEMS

A. Bollards: Steel pipe, concrete filled, crowned metal cap, as detailed; galvanized finish.

B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking, joists, and masonry; prime paint finish.

C. Lintels: As detailed; galvanized finish.

D. Miscellaneous framing and supports:

E. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.

F. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

G. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Except as otherwise shown, space anchors 24-inches o.c. and provide minimum anchor units of 1-1/4-inches wide x 1/4-inch x 8-inch long steel straps.

H. Galvanize exterior miscellaneous frames and supports

I. Rough hardware:

J. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in DIVISION 6 sections.

K. Fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.6 FINISHES - STEEL

A. Prime paint steel items.

B. Exceptions: Galvanize items to be embedded in concrete or masonry and items specified for exterior finish.

C. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

D. Prepare surfaces to be primed in accordance with SSPC-SP2.

E. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

F. Surface Preparation:
   1. Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specification and environmental exposure conditions of installed metal fabrications:
   2. SSPC-SP6 "Commercial Blast Cleaning."
   3. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning."

G. Prime Painting: One coat.

H. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

I. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

J. Bollards: Paint after installation.

K. ASTM A 386 for galvanizing assembled steel products.

2.7 FABRICATION GENERAL

A. Workmanship:
   1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
   2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32-inch unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
   3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
   4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown, or if not shown, Phillips flat-head (countersunk) screws or bolts.
   5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
   6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
   7. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

2.8 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

C. Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

D. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete insets, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Install manufactured items in accordance with manufacturer's directions.

C. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Field weld components as indicated on drawings.

E. Perform field welding in accordance with AWS D1.1/D1.1M.

F. Obtain approval prior to site cutting or making adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 TOLERANCES

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

B. Maximum Offset From True Alignment: 1/4 inch.

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

END OF SECTION

SECTION 05 5133
METAL LADDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop-fabricated metal ladders and ships ladders, including associated handrails.

1.2 RELATED REQUIREMENTS

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

1.3 REFERENCE STANDARDS

A. 29 CFR 1910.23 - Ladders; Current Edition.

B. 29 CFR 1926.1053 - Ladders; Current Edition.

C. ANSI A14.3 - American National Standard for Ladders - Fixed - Safety Requirements; 2008 (Reaffirmed 2018).

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

H. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.

I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

J. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

K. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

L. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

M. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.

N. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2026.

O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

P. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

R. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2026.

S. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019, with Editorial Revision (2025).

T. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

U. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

V. SSPC-SP 2 - Hand Tool Cleaning; 2024.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Shop drawings for components that must comply with specific Code required loading (i.e. handrails, stairs, ladders, guardrails) shall bear the seal of a registered Structural Engineer.

1.5 QUALITY ASSURANCE

A. Design ladders, handrails, and guardrails under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

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

C. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

F. Bolts, Nuts, and Washers: ASTM A307, plain.

G. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by intermittent welds and plastic filler.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

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

2.3 FABRICATED LADDERS

A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; galvanized finish.
   1. Materials: Steel.
   2. Side Rails: 3/8 by 2 inches members spaced at 20 inches.
   3. Rungs: One inch diameter solid round bar spaced 12 inches on center.
   4. Space rungs 7 inches from wall surface.

B. Ships Ladders: Steel; in compliance with ANSI A 14.3; with mounting brackets and attachment; galvanized finish.
   1. Components: Manufacturers standard rails, rungs, treads, handrails, returns, platforms and safety devices comlpying with the requirements of the MATERIALS article of this section.
   2. Materials: Steel.
   3. Incline: 75 degrees unless otherwise indicated.
   4. Finish: Hot-dipped Galvanized, comply with ASTM A153/ A153M.

2.4 FINISHES - STEEL

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

C. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.5 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, touch-up welds, abrasions, and surfaces not galvanized .

3.4 TOLERANCES

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

B. Maximum Offset From True Alignment: 1/4 inch.

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

END OF SECTION

SECTION 05 5213
PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wall-mounted railings.

B. Stair railings and guardrails.

C. Handrailings not specified with stairs.

D. Free-standing railings at ramps, steps, or as noted.

1.2 RELATED REQUIREMENTS

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

B. Section 01 2300 - Alternates.

C. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.

D. Section 04 2000 - Unit Masonry: Placement of anchors in masonry.

E. Section 05 5000 - Metal Fabrications: Metal angles, and metal panel infill material.

F. Section 05 5100 - Metal Stairs: Handrails specified with metal stairs.

G. Section 05 7200 - Ornamental Railings: Railing system other than standard pipe and tube railings.

H. Section 09 9100 - Painting: Paint finish.

I. Section 09 9600 - High Performance Coatings.

1.3 REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

F. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012.

G. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2023.

H. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric); 2012.

I. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2022.

J. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2020.

K. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tube and Drawn Pipe for General Purpose Applications; 2021.

L. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2024.

M. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

N. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's product specifications and installation instructions for products and processes used in handrails and railings, including finishes and grout.

C. Shop Drawings shall indicate loading requirements as specified herein and be certified, sealed, and signed by a Registered Structural Engineer in the State in which the Project is located, to be in conformance with all requirements as specified herein and in accordance with all State and local codes and regulations.
   1. Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
   2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   3. Include the design engineer's stamp or seal on each sheet of shop drawings.

D. Samples: Submit samples for each type of metal finish indicated. Prepare samples on metal of same gauge and alloy to be used in work. Where normal color and texture variations are to be expected, provide "range" samples showing limits of such variations.
   1. Include samples of fittings and brackets proposed for use.
   2. Include sample of typical welded connection.

E. Samples: Submit two, 12 inch long samples of each type of handrail. Submit two samples of elbow, Tee, wall bracket, escutcheon, and end stop.

1.5 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in Design-Builder, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store handrails and railing systems in clean, dry location away from uncured concrete and masonry, protected against damage of any kind. Cover with waterproof tarpaulin or polyethylene sheeting; allow for air circulation inside the covering.

B. Refer to Division 1 Sections "Summary of Work" and "Special Conditions" for additional information and minimum requirements regarding stored materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Handrails and Railings:
   1. Viva Railings; Wall Rail: www.vivarailings.com/.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 RAILINGS - GENERAL REQUIREMENTS

A. Structural Performance: Design, engineer, fabricate, and install the following metal fabrications to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and conections. Apply each load to produce the maximum stress in each respective component of each metal fabrication.
   1. Top Rail or Guard Rail: Design to be capable of withstanding the following loads:
      a. Concentrated load of 200 pounds applied at any point non-concurrently, vertically downward, or horizontally.
      b. Uniform load of 50 pounds per lineal foot applied non-concurrently, vertically downward, or horizontally.
      c. Concentrated and uniform loads above need not be assumed to act concurrently.
   2. Handrails Not Serving as Top Rails or Guard Rails: Design to be capable of withstanding the following loads:
      a. Concentrated load of 200 pounds applied at any point non-concurrently, vertically downward, or horizontally.
      b. Uniform load of 50 pounds per lineal foot applied non-concurrently, vertically downward, or horizontally.
      c. Concentrated and uniform loads above need not be assumed to act concurrently.
   3. Infill Area of Handrail and Screenwall System: Capable of withstanding a horizontal concentrated load of 200 pounds applied to one square foot at any point in the system including panels, intermediate rail balusters, or other elements composing the infill area.
      a. Above load need not be assumed to act concurrently with uniform horizontal loads on top rails of railing systems in determining stress on guardrails.

B. Dimensions: See drawings for configurations and heights.
   1. Top Rail: Profile, as detailed.
   2. Bottom Rail: Profile, as detailed.
   3. Posts: Profile as detailed.
   4. Balusters: As detailed.
   5. Infill: As detailed.
   6. Pickets:
      a. Horizontal Spacing: Maximum 4 inches on center, unless shown otherwise.
      b. Top Mounting: Welded to underside of top rail.
      c. Bottom Mounting: Welded to bottom rail, unless otherwise indicated on drawings.

C. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
   1. For anchorage to concrete, provide inserts to be cast into concrete, for welding anchors.

D. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.3 ALUMINUM MATERIALS

A. Aluminum Pipe: Schedule 40; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.

B. Aluminum Tube: Minimum wall thickness of 0.127 inch; ASTM B429/B429M, ASTM B241/B241M, or ASTM B483/B483M.

C. Solid Bars and Flats: ASTM B211/B211M.

D. Welding Fittings: No exposed fasteners; cast aluminum.

2.4 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.

B. Steel Pipe: ASTM A 53/A 53M Grade B Schedule 40, galvanized finish.

C. Wall-Mounted Rails: Steel fabrications, as detailed.

D. Top Rail: Steel fabrications, as detailed.

E. Bottom Rail: Steel fabrications, as detailed.

F. Infill: Metal panel infill material.

G. Posts: As detailed.

H. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

I. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

J. Straight Splice Connectors: Steel concealed spigots.

K. Galvanizing: In accordance with requirements of ASTM A123/A123M.
   1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.

L. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.5 MISCELLANEOUS MATERIALS

A. Nonshrink Nonmetallic Grout: Pre-mixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

B. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS Specifications, and as required for color match, strength, and compatibility in fabricated items.

C. Fasteners:
   1. Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals which are corrosive or imcompatible with materials joined.
   2. Provide concealed fasteners for interconnection of handrail and railing components where welding is not feasible and for their attachment to other work, except where otherwise indicated.

D. Anchors and Inserts: Provide anchors of proper type, size, and material for type of loading and installation condition shown, as recommended by manufacturer, unless otherwise indicated. Use non-ferrous metal or hot-dipped galvanized anchors and inserts for exterior locations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.6 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:
   1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
   2. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

2.7 FINISHES

A. Interior Railings: Shop primed, for Paint Finish:
   1. Preparation: Remove mill scale, and clean substrate in accordance with manufacturer's recommendations.

B. Exterior Railings: Shop galvanized, for Paint Finish:
   1. Preparation: Remove mill scale, and clean substrate in accordance with manufacturer's recommendations.

C. Repair galvanized coatings with galvanizing repair paint: High zinc dust content paint for regalvanizing welds in galvanized steel, complying with Military Specification MIL-P-21035 (Ships) or SSPC Paint 20.

D. Intermediate Coat: One coat of the following, shop applied Tnemec "Series 66 HI-BUILD EPOXOLINE".

E. Finish Coats: See Section 09 9100 - PAINTING.

2.8 ALUMINUM FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

C. Apply one coat of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

D. Take field measurements prior to fabrication.

3.3 INSTALLATION

A. Fit exposed connections accurately together to form tight, hairline joints.

B. Perform cutting, drilling and fitting required for installation of handrails and railings. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.

C. Install in accordance with manufacturer's instructions.

D. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

E. Install railings in compliance with ADA Standards for accessible design at applicable locations.

F. Anchor railings securely to structure.

G. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
   1. Comply with applicable AWS specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth, fill, sand, apply cold-process galvanizing repair paint, and touch-up shop paint coat.

H. Conceal anchor bolts and screws whenever possible.

I. Adjust handrails and railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated, but not less than that required by design loadings.

3.4 ANCHORING POSTS

A. Anchor posts to metal surfaces with manufacturer's standard fittings designed for this purpose, unless otherwise indicated.

B. Anchor posts in concrete and stone by core drilling holes not less than 5" deep (excluding depth of stone veneer), and 3/4" greater than outside dimensions of posts. Clean holes of all loose material, insert posts and fill annular space between post and concrete with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.
   1. Seal around rail penetration with pourable sealer, as specified in Section 07900 - Joint Sealers.
   2. Cover anchorage joint with flange or escutcheon plate attached to post after filling of annular space.

3.5 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100-percent contact or use manufacturer's standard fittings designed for this purpose.

3.6 ANCHORING RAILING ENDS

A. Anchor railing ends into concrete or masonry with manufacturer's standard fittings designed for this purpose, unless otherwise indicated.

B. Anchor railing ends to metal surfaces by welding using manufacturer's standard concealed fittings, unless otherwise indicated.

C. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip-joint internal sleeve, extending 2" beyond joint on either side; fasten internal sleeve securely to one side, locate joint within 6" of post.

3.7 ATTACHMENT OF HANDRAILS TO WALLS

A. General: Secure handrails to walls with manufacturer's standard wall brackets and end fittings, unless otherwise indicated.

B. For concrete and solid masonry, use drilled-in expansion shields and concealed hanger bolts, unless otherwise indicated.

C. For hollow masonry anchorage, use toggle bolts with square heads, unless otherwise indicated.

D. For stud partitions, use lag bolts fastened to 2 x 12 treated wood blocking between studs. Coordinate with spacing of studs for accurate location of blocking members.

3.8 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

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

3.9 PROTECTION

A. Protect finishes of railings and handrails from damage during construction period by use of temporary protection coverings approved by railing manufacturer. Remove protective covering at project completion or when directed by Architect.

B. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

C. Remove all burrs and uneven surfaces, fill gaps, and insure a smooth rail.

END OF SECTION

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SECTION 05 7300
DECORATIVE METAL RAILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Railing systems.

1.2 REFERENCE STANDARDS

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

B. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.

C. NAAMM AMP 500-06 - Metal Finishes Manual; 2006.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene preinstallation meeting one week before starting work of this section. Attendees include:
   1. Contractor.
   2. Architect.
   3. Other subcontractors of adjacent work.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's product data, including description of materials, components, finishes, fabrication details, glass, anchors, and accessories.

C. Shop Drawings: Indicate railing system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, brazed connections, transitions, and terminations.

D. Samples: Submit one of each item below for each type and condition shown.
   1. Railing: 12-inch long section of each railing member, including top rails and posts; show color, finish, and connection details.
   2. Cable Infill: 12-inch long section, including fittings.

E. Manufacturer's Instructions: Indicate installation methods, templates, and special procedures.

F. Maintenance Data: Manufacturer's instructions for care and cleaning.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum 3 years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified, with minimum 3 years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in factory-provided protective coverings and packaging.

B. Protect materials against damage during transit, delivery, storage, and installation at site.

C. Inspect materials upon delivery for damage. Replace damaged items.

D. Prior to installation, store materials and components under cover in dry location.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Do not install railings until project is enclosed and ambient temperature of space is minimum 65 degrees F and maximum 95 degrees F.
   2. Maintain ambient temperature of space at minimum 65 degrees F and maximum 95 degrees F for 24 hours before, during, and after railing installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Metal Cable Infill:
   1. Viva Railings, LLC; CIRCA: www.vivarailings.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 RAILING SYSTEMS

A. General: Factory- or shop-fabricated to suit project conditions, for proper connection to building structure, and in largest sizes practical for delivery to site.

B. Performance Requirements:
   1. General: For engineering decorative metal railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
      a. Stainless Steel: 45 percent of minimum yield strength.
      b. Steel: 72 percent of minimum yield strength.
   2. Structural Requirements: Design and fabricate railings and anchorages to resist loads without failure, damage, or permanent set.
      a. Handrail and Top Rails: Applying loads simultaneously not required:
         1) Distributed Load: 50 lbf/ft minimum, applied horizontally and vertically at top of handrail.
         2) Concentrated Load: 200 lbf, minimum, when applied to handrail horizontally and vertically.
      b. Infill:
         1) Concentrated Load: 50 lbf, minimum, when applied to infill horizontally and vertically.

C. Assembly: Use slip-on, nonweld mechanical fittings, flanges, escutcheons, and wall brackets to join lengths, seal open ends, and conceal exposed mounting bolts and nuts.

D. Joints: Machined smooth with hairline seams; tightly fitted and secured.

E. Field Connections: Provide sleeves to accommodate site assembly and installation.

2.3 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
   1. Provide stainless steel wall brackets with flange tapped for concealed anchorage with vertical and horizontal adjustment capability.

2.4 MATERIALS

A. Steel Components:
   1. Sections, Shapes, Plate and Bar: ASTM A666.
   2. Tubing: ASTM A554 structural tubing, round and shapes as indicated.

3. Pipe: ASTM A312/A312M, _____.

2.5 FABRICATION

A. Welded and Brazed Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
   1. Ease exposed edges to small uniform radius.
   2. Welded Joints:

2.6 FINISHES

A. General: Comply with NAAMM AMP 500-06.
   1. Complete mechanical finishes before fabrication. After fabrication, finish joints, bends, abrasions, and surface blemishes to match sheet.
   2. Protect mechanical finishes on exposed surfaces from damage.
   3. Apply organic and anodic finishes to formed metal after fabrication.
   4. Appearance: Limit variations in appearance of adjacent pieces to one-half of range represented in approved samples. Noticeable variations in same piece are not acceptable. Install components within range of approved samples to minimize contrast.

B. Steel Finishes:
   1. Color: As selected by Architect from manufacturer's standard range.

C. Stainless Steel Finishes:
   1. Remove tool marks, die marks, and stretch lines before finishing.

2.7 ACCESSORIES

A. Welding Fittings: Factory- or shop-welded from matching pipe or tube; joints and seams ground smooth.

B. Anchors and Fasteners: Provide anchors, fasteners, and other attachment devices required to attach to structure.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate and site conditions are acceptable and ready to receive work.

B. Verify field dimensions of locations and areas to receive work.

C. Notify Architect immediately of conditions that would prevent satisfactory installation.

D. Do not proceed with work until detrimental conditions are corrected.

3.2 PREPARATION

A. Protection of In-Place Conditions: Protect existing work before proceeding with installation.

B. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions, and directions for installation of anchorages and fasteners.

C. Clean surfaces to receive railings. Remove materials and substances detrimental to installation.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.

C. Anchor securely to structure.

D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

E. Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

3.4 FIELD QUALITY CONTROL

A. See Section 01 4000 - QUALITY REQUIREMENTS for additional requirements.

B. Test railings for structural performance in accordance with ASTM E935.

C. Manufacturer Services: Provide services of manufacturer's field representative to observe railing installation.

3.5 CLEANING

A. Remove protective film from exposed metal surfaces.

B. Metal: Clean exposed metal finishes with potable water and mild detergent in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage material or finish.

3.6 PROTECTION

A. Protect installed components and finishes from damage after installation.

B. Repair damage to exposed, making finishes indistinguishable from undamaged areas.

C. Replace finishes and components that have irreparable damage. Ensure damaged areas are indistinguishable from undamaged finishes and surfaces.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Rough opening framing for doors, windows, and roof openings.

B. Communications and electrical room mounting boards.

C. Concealed wood blocking, nailers, and supports.

D. Miscellaneous wood nailers, furring, and grounds.

1.2 RELATED REQUIREMENTS

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

B. Section 05 1200 - Structural Steel: Prefabricated beams and columns for support of wood framing.

C. Section 05 3100 - Steel Deck.

D. Section 05 5000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.

E. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings, and self-adhered membrane flashing over sheathing.

F. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing, light gage interior wall assemblies.

G. Division 26-28 - Electrical: Mounting Boards furnished and installed under the electrician's scope of work.

1.3 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

B. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2024).

C. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. PS 20 - American Softwood Lumber Standard; 2025.

E. SPIB (GR) - Standard Grading Rules; 2021.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide technical data on insulated sheathing and application instructions.

C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

D. Submit data sheets and samples of all fasteners.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

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

B. Lumber fabricated from old growth timber is not permitted.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   1. Northeastern Lumber Manufacturer's Association (NeLMA).
   2. National Lumber Grades Authority (NLGA).
   3. Redwood Inspection Service (RIS).
   4. Southern Pine Inspection Bureau (SPIB).
   5. West Coast Lumber Inspection Bureau (WCLIB).
   6. Western Wood Products Association (WWPA).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

2.3 EXPOSED BOARDS

A. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.

B. Moisture Content: Kiln-dry (15 percent maximum).

C. Surfacing: S4S.

D. Species: Southern Pine.

E. Grade: No. 2, 2 Common, or Construction.

2.4 ACCESSORIES

A. Metal and Finish of Fasteners:
   1. Untreated Wood: Unfinished steel.

B. Fasteners and Anchors:
   1. Metal and Finish: AISI Type 304 or 316 Stainless steel for fire-retardant wood and preservative-treated wood locations; hot-dipped galvanized steel per ASTM A 153/ A 153M for rough carpentry exposed to weather, in ground contact, or area of high relative humidity; unfinished steel elsewhere. Acceptable to manufacturer of wood treatment materials and manufacturer of fasteners.
   2. Anchors: Toggle bolt type for anchorage to hollow masonry.

C. Metal Framing Anchors:
   1. General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:

a. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.
b. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehnsive testing performed by a qualified independent testing laboratory.

2. Galvanized Steel Sheet: Steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G90 and with ASTM A 446, Grade A (structural quality); ASTM A 526 (commercial quality); or ASTM A 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.
   a. Use galvanized steel framing anchors for rough carpentry exposed to weather, in ground contact, or in area of high relative humidity, and all other locations, and at every point of bearing.
   b. Minimum Thickness: 18-gauge.

D. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

E. Panel Sheathing Clips: Provide panel sheathing clips in quantity and location recommended by manufacturer. For use for all unsupported edges. Simpson Stong-Tie Panel Sheathing Clips PSCA, 20 gauge, galvanized. Substitutions: Section 01 6000 - Product Requirements.

F. Nails, Wire, and Brads: FS FF-N-105.

G. Power Driven Fasteners (screws): National Evalution Report NER-272.

H. Wood Screws: ANSI B18.6.1.

I. Lag Bolts: ANSI B18.2.1.

J. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

K. Anchors shall be manufactured by American manufacturer.

L. Sill Flashing: See Section 07 6200.

PART 3 - EXECUTION

3.1 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.

B. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.3 INSTALLATION OF CONSTRUCTION PANELS

3.4 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.5 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 5000.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.

B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 2000
FINISH CARPENTRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Finish carpentry items.

B. Wood casings and moldings.

1.2 RELATED REQUIREMENTS

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

B. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

C. Section 06 4000 - Architectural Woodwork: Wood frames, countertops, etc.

D. Section 09 9100 - Painting: Paint finish.

1.3 REFERENCE STANDARDS

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

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2026.

C. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2024.

D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

E. WI (CCP) - Certified Compliance Program (CCP); Current Edition.

F. WI (MCP) - Monitored Compliance Program (MCP); Current Edition.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide instructions for attachment hardware.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.

D. Samples: Submit one sample of lumber or finish plywood, 12 by 12 inch in size, and two samples 3 by 3 inch in size, illustrating wood grain and specified finish.

E. Samples: Submit two samples of wood trim 6 inch long.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Premium grade.

B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire retardant requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect from moisture damage.

1.8 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI Architectural Woodwork Quality Standards Illustrated for Premium Grade.

2.2 SUSTAINABILITY CHARACTERISTICS

2.3 LUMBER MATERIALS

A. Softwood Lumber: SYP species, maximum moisture content of 6 percentof quality suitable for transparent finish.

B. Hardwood Lumber: white or yellow poplar species (coordinate with other wood trim), maximum moisture content of 6 percent.

2.4 SHEET MATERIALS

A. Softwood Plywood: PS 1 Grade A-B; Veneer core; SYP face species, (or similar species permitted by reference standards).

B. Hardwood Plywood: HPVA HP-1, Grade AA, Type I at exterior, Type II at Interior; Veneer core, type of glue recommended for application; Natural Birch face species, Rotary cut.

2.5 PLASTIC LAMINATE MATERIALS

A. Plastic Laminate: See Finish Legend.

2.6 ADHESIVE

A. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.

2.7 FASTENINGS

A. Fasteners: Of size and type to suit application; galvanized finish in concealed locations and stainless steel finish in exposed locations.

B. Concealed Joint Fasteners: Threaded steel.

2.8 ACCESSORIES

A. Lumber for Shimming, Blocking: Softwood lumber of SYP species.

B. Primer: Alkyd primer sealer.

C. Wood Filler: Solvent base, tinted to match surface finish color.

2.9 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Cap exposed plastic laminate finish edges with material of same finish and pattern.

C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

2.10 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.

B. Apply wood filler in exposed nail and screw indentations.

C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.

D. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Stain: As selected by Architect.
      c. Sheen: Flat.
   2. Opaque:
      a. System - 1, Lacquer, Nitrocellulose.
      b. Color: As selected by Architect.
      c. Sheen: Flat.

E. Prime paint surfaces in contact with cementitious materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify wall surface is free of bows, humps, and other deficiencies that will be emphasized by the trim work. Report these issues to the Prime Contractor.

3.2 INSTALLATION

A. Set and secure materials and components in place, plumb and level.

B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

C. Install interior trim with wall adhesive by gun application. Install exterior trim and components with hot-dipped galvanized or stainless steel nails at 12" o.c., unless recommended otherwise by manufacturer.

D. Match grains and color so that individual pieces do not stand out.

3.3 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09 9100 - Painting.

C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.4 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

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SECTION 06 4000
ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Laminate covered cabinets.

B. Wood cabinets, desks, and paneling.

C. Solid surface countertops, backsplashes and trim, where indicated; and vertical panels, where indicated.
   1. Provide with integral sink bowl where indicated.

D. Closet and utility shelving (paint on site, under Section 09 9100).

E. Wood frames, sidelights, panels, base, window sills, and miscellaneous trim (paint on site, under Section 09 9100), stained (transparent finish) or painted (opaque finish) where indicated.

F. Hardware for architectural woodwork.

G. Related work and trim for above items.

H. Extent of each type of architectural woodwork is indicated on drawings and in schedules.

I. Architectural woodwork and components for opaque finish are intended to be finish painted on-site, under Section 09 9100.

J. Architectural woodwork and components for natural, stained and/or transparent finish are intended to be painted in woodwork fabricator's shop under controlled conditions, under the work of this Section.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Related work specified elsewhere includes:
   1. Section 06 1000 - Rough Carpentry.
   2. Section 06 2000 - Finish Carpentry.
   3. Section 07 9005 - Joint Sealers.
   4. Section 08 1416 - Flush Wood Doors.
   5. Section 09 9100 - Painting.
   6. Section 12 3219 - Laminate Casework.

1.3 SUBMITTALS:

A. Shop Drawings: Submit shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices, blocking requirements and other components.
   1. Manufacturer's current and complete product data, for manufactured units of work, including color selection data, samples, and anchorage systems.

B. Samples: Submit the following samples:
   1. Lumber and panel products with or for transparent finish; 6-inches x 3/4-inch x 18-inches, for each species and cut, finished on 1-side and 1-edge. Also submit two 3 by 3 inch samples with finish on 1-side.
   2. Cabinet Hardware: One unit of each type and finish, which will be returned for use on the project, upon request by the Contractor.

3. Solid Surfacing and Plastic Laminate Products: Manufacturer's standard samples, approximately 4-inches x 6-inches, with finish as required for this project, and representative color range anticipated.

1.4 QUALITY ASSURANCE:

A. AWS: Comply with applicable requirements of "Architectural Woodwork Standards" published by the Architectural Woodwork Standards.

B. Fabricator Qualifications: Fabricators shall be experienced firms specializing in the types of architectural woodwork required for this project for at least 5-verifiable years and on at least 10-verifiable projects of similar size, scope, complexity, and quality as this project.
   1. Quartz Fabricator: 5-years and 10-verifiable projects.
   2. Solid Surfacing Fabricator: 5-years and 10-verifiable projects.

C. Installer Qualifications: Arrange for installation of architectural woodwork by the fabricator, or by a firm under the control and direction of the fabricator, which can demonstrate at least 5-verifiable years successful experience in installing architectural woodwork items on at least 5-verifiable projects, similar in type and quality to those required for this project.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

B. Do not deliver woodwork, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.6 PROJECT CONDITIONS:

A. Conditioning: Woodwork Manufacturer and Installer shall advise Contractor of temperature and humidity requirements for woodwork installation and storage areas. Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.

B. Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within a 1.0-percent tolerance of optimum moisture content, from date of installation through remainder of construction period. Require Woodwork Manufacturer to establish optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Laminate Clad and Wood Cabinet Manufacturers: Subject to compliance with requirements, provide premium grade, custom made cabinets and woodwork from a millwork shop complying with requirements of "Quality Assurance" article above.

B. Plastic Laminate Manufacturer: See Finish Legend for Manufacturers and colors.

C. Solid-Surfacing Material/Manufacturer: Homogeneous solid sheets of cast, filled acrylic resin complying with material and performance requirements in ANSI Z124.3, for Type 6.
   1. Standard full product line of "Corian" as manufactured by DuPont.
   2. Durasein: www.durasein.com
   3. Formica: www.formica.com.
   4. Hi Macs: www.lghimacs.com.
   5. Wilsonart: www.wilsonart.com. (Basis of Design, Quality and Warranty)

2.2 FABRICATION, GENERAL:

A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber at time of fabrication and for relative humidity conditions in the installation areas.

B. Fabricate woodwork to dimensions, profiles, and details indicated with dowel, dado, glue and screw construction, with openings and mortises precut, where possible, to receive hardware and other items and work.
   1. Ease edges to a 1/16-inch radius, for corners of cabinets and edges of solid wood (lumber) members less than 1-inch in nominal thickness, 1/8-inch radius for edges of rails and similar members over 1-inch in nominal thickness.

C. Complete fabrication, assembly, hardware application, and other work before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Pre-Cut Openings: Fabricate architectural woodwork with pre-cut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth edges of cutoffs and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating.

E. Measurements: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain field measurements and verify dimensions and shop drawing details as required for accurate fit. A tight fit of less than 1/8-inch is expected.

F. Products in this Section shall be constructed only of materials that are formaldehyde-free.

2.3 FIRE-RETARDANT MATERIALS:

A. Where fire-retardant treated lumber is indicated, provide materials which are pressure impregnated with fire-retardant chemicals and comply with the following requirements:
   1. As required to comply with referenced standards and finish classifications necessary as per the Standard Building Code, NFPA 101 - Life Safety Code, authorities having jurisdiction, and acceptable in all respects for indoor use and finish requirements.
   2. Fire-Retardant Chemicals: Use chemicals of type and for applications indicated which do not bleed-through or otherwise adversely affect finishes. Do not use colorants in solution to distinguish treated lumber from untreated lumber.

B. Fire Performance Characteristics: Provide materials which are identical to those tested per ASTM methods and time periods indicated, are marked and listed for fire performance characteristics by Underwriters Laboratories, Inc., or other testing and inspecting agency acceptable to authorities having jurisdiction, and comply with the following requirements:
   1. Mill lumber after treatment, within limits set for wood removal which does not affect listed fire performance characteristics, using a woodworking plant certified by testing and inspecting agency.

C. Marking: Identify treated lumber with separable paper classification marking of inspecting and testing agency, unless otherwise indicated.

D. Surface Burning Characteristics: Not exceeding values required by latest edition of the "Standard Building Code" and "NFPA 101" (with amendments), tested per ASTM E 84 for standard time period.
   1. Flame Spread: Per Code.
   2. Smoke Developed: Per Code.

E. Kiln-dry woodwork after treatment to levels required for non-fire-retardant treated woodwork materials. Maintain moisture content required by kiln drying, before and after treatment.
   1. Discard treated lumber which does not comply with requirements of referenced woodworking standard. Do not use twisted, warped, bowed, discolored, or otherwise damaged or defective lumber.

2.4 STANDING AND RUNNING TRIM:

A. Quality Standard: Comply with AWS Section 6 - Interior Millwork.

B. Rout or groove backs of flat trim members, kerf backs of other wide flat members, except for members with ends exposed in finished work.

C. Assemble Casings in plant except where limitations of access to place of installation require field assembly.

D. Interior Trim for Transparent Finish (typical finish unless specifically indicated otherwise): Comply with the following requirements:
   1. Grade: Premium, Grade I.
   2. Lumber Species: Match wood doors.
   3. Cut: Plain Sliced.
   4. Locations: Provide stained transparent finish within rooms which have new woodwork with transparent finish, at indicated areas. Refer to Elevations.

E. Interior Trim for Opaque Finish (only where specifically indicated, if any): Comply with the following requirements:
   1. Grade: Custom. Grade II.
   2. Lumber Species: Any closed-grain hardwood listed in referenced woodworking standard.
   3. Cut: Plain or Rotary cut.
   4. Locations: Provide opaque finish within rooms which have new woodwork with opaque finish, unless indicated otherwise. Refer to Elevations and Finish Legend.

2.5 ARCHITECTURAL COUNTER TOPS:

A. Quality Standard: Comply with AWS, Edition 2 - Section 11-Countertops.

B. Types of Top (and/or panel): Solid Surfacing.
   1. Colors, Patterns and Finishes: As indicated, or if not indicated, as selected from any of manufacturer's standard finishes and colors.
   2. Edge Treatment: As indicated on the Drawings.
   3. Integral sink bowl.
   4. Thickness - Tops and Substrates:
      a. Tops (and any flat vertical panels): 3/4-inch, with 1-1/4-inch built-up edges unless indicated otherwise on the Drawings.
      b. Backsplash: 1/2-inch.
      c. Edge Treatment: As indicated on the Drawings, or if not indicated, ease all exposed edges to 1/16" radius, and seam width of less than 1/8".
         1) DuPont-approved adhesive to create color-matched seam.
      d. Substrates: Refer to the Drawings for thickness of plywood below solid surface tops, splashes, etc., or if not indicated, at least 3/4-inch thick at horizontal and sloped surfaces (and at least 1/2-inch thick at any vertical panels).
   5. Allowable tolerances:
      a. Flat and true to within 1/8" of a flat surface over a 10' length.
      b. Allow a minimum of 1/16" to a maximum of 1/8" clearance between surface and each wall.

c. Variation in Component Size: 1/8" over a 10' length.
d. Location of Openngs: 1/8" from indicated location.

6. Provide manufacturer's 10-year warranty against defects in materials.
   a. Warranty shall provide material to repair or replace defective materials.
   b. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.
   c. The above warranty shall be in addition to, shall be in effect simultaneously with, and shall not limit or alter other project or product warranties or guarantees, nor shall it serve as limitation to other remedies available to the Owner.

2.6 FINISHING OF INTERIOR ARCHITECTURAL WOODWORK:

A. Quality Standard: Comply with AWS Section 5, unless otherwise indicated.

B. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing of concealed surfaces and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.

C. Interiors for wood cabinets: To match wood veneer.

D. Melamine cladded interiors for wood cabinets: To match HPDL.

2.7 ARCHITECTURAL WOOD VENEER CABINETS:

A. Quality Standard:
   1. Comply with AWS Section 10.
   2. Grade: Premium.
   3. Design: Flush Overlay - Type A- Frameless construction.

B. Wood Veneer Cladding: As follows:
   1. Grade; Premium, Grade I.
   2. Lumber Species: Select White Birch, unless scheduled otherwise.
   3. Cut: Plain sliced.

C. Hardboard: AHA A135.4 (tempered).

D. Core Materials:
   1. MR Moisture Resistant Medium Density Fiberboard: Average 47-pound density grade, ANSI A208.2.
   2. Grade AB Plywood.

2.8 ARCHITECTURAL LAMINATE CLAD CABINETS:

A. Quality Standard:
   1. Comply with AWS Section 10.
   2. Grade: Premium.
   3. Design: Flush overlay - Type A- Frameless construction.

B. Laminate Cladding: High pressure decorative laminate complying with NEMA LD 3 and as follows:
   1. Colors, Patterns and Finishes: As indicated or, if not otherwise indicated, as selected by Architect from laminate manufacturers' standard products in the following categories: Solid, stippled, textured, wood grain and/or patterned colors; Thru-color type.
   2. Provide specific types as scheduled.
      a. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as scheduled, finish as scheduled.

b. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
c. Post-Formed Horizontal Surfaces: HGP, 0.039 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
d. Post-Formed Vertical Surfaces: VGP, 0.028 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
e. Flame Retardant Surfaces: HGF, 0.048 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
f. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
g. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

C. Hardboard: AHA A135.4 (tempered).

D. Melamine cladded interiors in laminate cabinets.

E. Core Materials:
1. MR Moisture Resistant Medium Density Fiberboard: Average 47-pound density grade, ANSI A208.2.

2.9 INTERIOR FRAMES AND JAMBS

A. Quality Standard: Comply with AWS Section 10.
1. Grade: Premium.

B. Wood Species:
1. For Opaque Finish: Any closed-grain hardwood listed in referenced woodworking standard.
2. For Transparent Finish (stained): Match wood doors.

C. Fire Rated Frames:
1. 20 min and 45 min rated types. Refer to Door Schedule.

D. Jamb Type: Flat jamb, unless indicated otherwise.

2.10 CLOSET AND UTILITY SHELVING:

A. Plastic laminate shelving where indicated.

B. Quality Standard: Comply with AWS Section 6.

C. Shelving for Opaque Finish: Comply with the following requirements:
1. Grade: Custom.
2. Shelving Material: Birch faced veneer core plywood.
3. Exposed Edging: Solid hardwood.
4. Thickness: 1-inch at wood shelves, unless indicated otherwise

D. Shelving for Transparent Finish: Comply with the following requirements:
1. Location: Only in rooms where specifically indicated on Drawings.
2. Grade: Custom.
3. Species: AWS Veneer Grade A, Select Red Oak, or White or Yellow Poplar, Rotary Cut (unless scheduled otherwise).
4. Thickness (plywood): 1-inch (minimum), with solid wood nosing.
5. Lumber for shelving, only where indicated on the Drawings: 5/4-inch with nosings as indicated.

2.11 FASTENERS AND ANCHORS:

A. Screws: Select material, type, size and finish required for each use. Comply with FS FF-S-111 for applicable requirements.

B. Nails: Select material, type, size and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

C. Anchors: Select material, type, size and finish required by each substrate for secure anchorage. Provide non-ferrous metal or hot- dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion-resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts and anchors, as required, to be set into concrete or masonry work for subsequent woodwork anchorage.

2.12 CABINET HARDWARE AND ACCESSORY MATERIALS:

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items which are specified in Section 08 7100 - Finish Hardware.

B. Hardware Standard: Comply with ANSI/BHMA A156.9 "American National Standard for Cabinet Hardware" for items indicated by reference to BHMA numbers or referenced to this standard.

C. Hardware Finishes: Comply with BHMA 1301 for finishes indicated by BHMA Code Numbers or if not otherwise indicated, provide finishes complying with requirements indicated.
   1. For exposed hardware comply with requirements indicated for finish and base indicated at the end of this Section.
   2. For concealed hardware provide manufacturer's standard finishes which comply with product class requirements of ANSI/BHMA A156.9, and which match exposed hardware on same cabinet unit.

2.13 SHELVING SUPPORTS AND RODS

A. Wall Mounted Brackets and Standards:
   1. Adjustable, double slotted, extra-heavy duty:
      a. Equivalent to K&V No. 85/185 Series Extra Duty Standards & Brackets.
         1) Standards: 1-1/4" wide x 1/2" deep x length indicated. 16 ga. steel. Finish & Color: TBS.
         2) Brackets: Vertically adjustable in 1" increments. 14 ga. & 16 ga. steel. Finish & Color: TBS.
   2. Clothes Rods:
      a. Closet Hanger Rod and Support:
         1) Rod: Equivalent to K&V No. 770-1. Extra-Duty. Steel. Chrome double-plated finish. Provide with end caps.
         2) Flanges: Equivalent to K&V No. 734 and No. 735, two (2) each per rod. Zinc cast. Finish: Match rod.
         3) Supports: Fixed closet rod and shelf brackets. Extra-Duty. Equivalent to K&V No. 1198. 10 ga. steel construction. Finish & Color: TBS.

B. Pilaster Standards and Supports: Provide adjustable shelf standards and related supports of type indicated, with matching finish on fasteners and accessories.
   1. Vertical Slotted Standard:
      a. Mortise mounted, 5/8-inch wide x 3/16-inch deep x length indicated; high strength steel.
      b. Equivalent to K&V No. 255, Finish & Color: TBS.
   2. Shelf Support:

a. Shelf support clip; High strength steel.
b. Equivalent to K&V No. 256, Finish & Color: TBS.

2.14 COUNTERTOP SUPPORT

A. Countertop support brackets, undercounter support frames, legs and miscellaneous metal parts shall be furniture steel, welded, degreased, cleaned, treated and epoxy powder painted. Color shall be as selected by Architect from manufacturer's standard colors.
   1. Support brackets shall be equal to Rakks EH Counter Support Bracket unless otherwise noted.
      a. For concealed support, provide Inside Wall Flush-Mount bracket.

2.15 CABINET HARDWARE

A. Cabinet Hinges: 170-degrees adjustable "CLIP System" concealed self-closing hinges as manufactured by Julius Blum, Inc., or equivalent by Grass or Stanley.
   1. Finish shall match hardware finish specified in Section 08 7100 - Finish Hardware in room(s) where occurs.

B. Cabinet Hinges: Equivalent to 5-knuckle exposed self-closing hinges as manufactured by Julius Blum, Inc., Grass or Stanley.
   1. Finish shall match hardware finish specified in Section 08 7100 - "Finish Hardware" in room(s) where occurs.

C. Cabinet Door and Drawer Pulls:
   1. Wire pulls, equivalent to Stanley No. 4484, (ANSI B12012), 4-inches long, with 1-inch clearance; unless indicated otherwise. Pull design shall comply with the Americans with Disability Act (ADA).
      a. Finish shall match hardware finish specified in Section 08 7100 - Finish Hardware.

D. Cabinet Door Catches: Manufacturer's standard 2-screw sill mounted unit made of molded nylon, lipped over sill to form bumper and hold in place, with 2-screw mounted heavy door mounted unit with nylon roller; provide spring-mounted units where required.
   1. Acceptable Manufacturers: Any of manufacturers listed for other cabinet hardware.

E. Cabinet Drawer Slides: Heavy Duty, non-corrosive (galvanized) full extension ball bearing slides rated at 100-pounds, with positive stop, and self-closing and lift-out disconnect features; Model No. 1429, as manufactured by Knape & Vogt, or equivalent by Blum or Grant.
   1. At legal size drawers, use K&V No. 1483 or equivalent, rated at 150-pounds, with same features as noted above.

F. Cabinet Shelf Standards: Manufacturer's standard steel units with anchors and supports 5/8-inch wide x 3/16-inch high, adjustable on 1/2-inch centers; Series 255, as manufactured by K&V, or equivalent by Grant or Stanley.
   1. Wood Cabinets: Model No. 255 BRN with No. 256 BRN supports and matching fasteners.
   2. Omit standards where fixed shelves are indicated.
   3. All standards to be recess mounted (flush in routed dados), unless specifically indicated otherwise.

G. Cabinet Locks: Where indicated on the Drawings, provide cabinet manufacturer's standard 5-disc tumbler, cam type, keyed differently at each room , with metal strike screwed to wood surface, and master keyed.
   1. Furnish 2-keys for each lock.
   2. Furnish 5-master keys
   3. Finish to match Section 08 7100 - Finish Hardware finish in room(s) where occurs.

4. Location: Where indicated.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.

B. Pre-Installation Meeting: Meet at project site prior to delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Include in meeting the Contractor; Architect and other Owner Representatives (if any); Installers of architectural woodwork, wet work such as plastering, other finishes, painting, mechanical work and electrical work; and firms or persons responsible for continued operation (whether temporary or permanent) of HVAC system as required to maintain temperature and humidity conditions. Proceed with woodwork installation only when everyone concerned agrees that required ambient conditions can be maintained.

C. Deliver concrete inserts and similar anchoring devices to be built into substrates, well in advance of time substrates are to be built.
   1. Coordinate location and placement of concealed treated blocking (by others) prior to finish materials installations.

D. Prior to installation of architectural woodwork, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION:

A. Quality Standard: Install woodwork to comply with AWS Section 2, 6, 10, 11 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8-inch in 8'-0" for plumb and level (including tops); and with no variations in flushness of adjoining surfaces.

C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
   1. Seal all hardware cuts, routed slots, etc., before installation of hardware.

D. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork, and matching final finish where transparent finish is indicated.

E. Standing and Running Trim, and Sills: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners and comply with referenced Quality Standards for joinery.

F. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Maintain veneer sequence matching (if any) of cabinets with transparent finish.
   1. Install cabinets with no more than 1/8-inch in 96-inches sag, bow, or other variation from a straight line.

G. Wood Storage Shelving: Complete the assembly of units and install in the areas indicated, including hardware and accessories as indicated.

H. Tops: Anchor securely to base units and other support systems indicated. Caulk space between backsplash and wall with specified sealant.
   1. Install countertops with no more than 1/8-inch in 96-inches sag, bow, or other variation from a straight line.

I. Wood Panels: Anchor panels to supporting substrate with concealed panel-hanger clips and by blind nailing on backup strips, splined-connection strips, and similar associated trim and framing. Do not face nail unless otherwise indicated.
   1. Install flush panels with no more than 1/16-inch in 96-inches vertical cup or bow and 1/8-inch in 96-inches horizontal variation from a true plane.

J. Install shelf brackets according to manufacturer's written instructions, spaced not more than 32 inches o.c. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.

K. Install standards for adjustable shelf supports according to manufacturer's written instructions. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Space fasteners not more than 12 inches o.c.

L. Install standards for adjustable shelf brackets according to manufacturer's written instructions, spaced not more than 36 inches o.c. and within 6 inches of ends of shelves. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.

M. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled. Install shelves, fully seated on brackets, and supports.
   1. Fasten shelves to brackets to comply with bracket manufacturer's written instructions.

N. Install rod flanges for rods as indicated. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Install rods in rod flanges.

O. Refer to Section 09 9100 - Painting, for final finishing of installed architectural woodwork which is indicated to be painted on-site.

3.3 ADJUSTMENT, CLEANING, FINISHING, AND PROTECTION:

A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate and adjust hardware.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

D. Complete the finishing work specified as work of this section, to whatever extent not completed at shop or prior to installation of woodwork.

E. Provide final protection and maintain conditions, in a manner acceptable to Fabricator and Installer, which ensures architectural woodwork being without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 07 1300
SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Butyl rubber sheet membrane.

1.2 RELATED REQUIREMENTS

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

B. Section 03 3100 - Concrete: Concrete substrate (floors and walls).

C. Section 07 6200 - Sheet Metal Flashing and Trim: Metal termination bar.

D. Section 07 9005 - Joint Sealers: Sealant for joints in substrates.

E. Section 31 2000 - Earth Moving.

1.3 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

B. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.

C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

D. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.

C. Samples: Submit representative samples of the following for approval.
   1. Sheet Membrane.
   2. Protection Board.
   3. Prefabricated drainage composite.

D. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

E. Manufacturer's Installation Instructions: Indicate special procedures and acceptable installation temperatures.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

C. Single Source Responsibility:
   1. Materials: For each type of material required for the work of this Section, provide primary materials which are the products of one manufacturer.

1.6 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.
   1. Do not double-stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
   2. Protect mastic and adhesive from moisture and potential sources of ignition.
   3. Store drainage composite or protection board flat and off the ground. Provide cover on top and all sides.
   4. Protect surface conditioner from freezing.

B. Sequence deliveries to avoid delays, but minimize on-site storage.

1.7 PROJECT/SITE CONDITIONS

A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.

B. Proceed with installation only when substrate construction and perparation work is complete and in condition to receive sheet membrane waterproofing.

C. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.8 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Provide five year manufacturer's warranty upon completion of the work. , except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS/PRODUCT

A. W. R. Grace & Co.-Conn. Bituthene System 4000 Membrane (for below grade walls) [Bases of Design]: www.graceconstruction.com.

B. Other Acceptable Manufacturers (Subject to meeting specifications):
   1. Carlisle Coatings & Waterproofing, Inc: www.carlisle-ccw.com.
   2. W. R. Meadows: www.wrmeadows.com .
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 SHEET WATERPROOFING MATERIALS

A. Sheet Waterproofing (for Below Grade Wall): Flexible, pre-formed waterproof composite membrane consisting of 0.056 in. (1.4mm) rubberized asphalt, and 0.004 in. (0.1mm) of cross-laminated, high density polyethylene film (HDPE) with self-adhesive surface, and with removable release sheet.
   1. Use with water-based surface conditioner formulated to prepare substrate for waterproofing membrane.

B. Termination Bars: Stainless steel; compatible with membrane and adhesives. (See Section 07 6200.)

C. Surface Conditioner: Type compatible with membrane.

2.3 ACCESSORIES

A. Protection Board: Provide type capable of preventing damage to waterproofing due to backfilling and construction traffic.
   1. Products:
      a. W.R. Meadows, Inc; HYDRODUCT 220 Drainage Composite : www.wrmeadows.com.
      b. Substitutions: See Section 01 6000 - Product Requirements.

B. Drainage Panel: 0.433 inch thick geocomposite drainage sheet system, _____comprising a hollow studded polystyrene core, covered on one side with a nonwoven, needle punched polypropylene filter fabric and on the other side with a smooth polymeric film. Drainage panel may serve as protection board if approved by manufacturer. Provide separate protection board if recommended by manufacturer.

C. Miscellaneous Materials: Surface conditioner, mastic, liquid membrane, terminations, cants, tape and accessories: acceptable to manufacturer of sheet membrane waterproofing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions are acceptable prior to starting work.

B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.

C. Verify that items penetrating surfaces to receive waterproofing are securely installed.

3.2 PREPARATION

A. Protect adjacent surfaces from damage not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Cast-In-Place Concrete Substrate:
   1. Do not proceed with installation until concrete has properly cured and dried - minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete.
   2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
   3. Repair bugholes over 0.5 inch in length and 0.25 inch deep and finish flush with surrounding surface.
   4. Remove scaling to sound, unaffected concrete and repair exposed area.
   5. Grind irregular construction joints to suitable flush surface.

E. Seal cracks and joints with sealant using depth to width ratio as recommended by sealant manufacturer.

F. Treat joints and install flashing as recommended by waterproofing manufacturer.

G. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

3.3 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.

B. Apply surface conditioner at rate recommended by manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of surface conditioner.

C. Delay application of membrane until surface conditioner is completely dry. Dry time will vary with weather conditions.

D. Roll out membrane, and minimize wrinkles and bubbles.

E. Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.

F. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

G. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.

H. Ensure plastic release liner is removed from underslab waterproofing before pouring concrete is poured.

I. Pour concrete over underslab waterproofing within time recommended by manufacturer from date membrane is placed.

J. Place and compact concrete over underslab waterproofing carefully to avoid damage to the membrane. Avoid use of sharp objects to consolidate concrete.

K. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.

L. Seal daily terminations with troweled bead of mastic.

M. Install termination bar at top of waterproofing.

N. Seal membrane and flashings to adjoining surfaces.

O. Installation shall be according to manufacturer's details to satisfy warranty requirements.

3.4 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD

A. Apply protection board and related materials in accordance with manufacturer's recommendations.

B. Adhere protection board to substrate with compatible adhesive.

3.5 CLEANING

A. Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.

3.6 PROTECTION

A. Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.

END OF SECTION

SECTION 07 1400
FLUID-APPLIED AIR BARRIER

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fluid applied vapor permeable membrane air barrier:
   1. For application on exterior side of exterior sheathing where used in vertical and other non-horizontal applications.
   2. For application on exterior side of CMU walls.

B. Sealants for substrates of fluid-applied air barrier.

C. Other Accessories.

1.2 RELATED REQUIREMENTS

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

B. Section 01 4100 - Quality Requirements: Mock-up requirements.

C. Section 04 2000 - Unit Masonry: Masonry assemblies prepared to receive air barrier and flashings.

D. Section 07 9005 - Joint Sealers: Sealant for joints other than substrates for air barrier in this Section.

E. Section 09 2116 - Gypsum Board Assemblies: Exterior sheathing receiving fluid-applied air barrier.

1.3 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use With Separate Wearing Course; 2012.

C. ASTM E96/E96M - Standard Test Methods For Water Vapor Transmission of Materials; 2014.

D. ASTM E 2178 Standard Test Method for Air Permeance of Building Materials.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for air barrier system(s) specified.

C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

D. Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer's Installation Instructions: Indicate special procedures and acceptable installation temperatures.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Membrane Manufacturer Qualifications: Company specializing in fluid-applied air barrier membranes with TEN (10) years experience.

B. Installer Qualifications: Company specializing in installation of fluid-applied air barrier with minimum FIVE (5) years documented experience.

C. Mock-Up: Include Fluid-Applied Air Barrier in Mock-Up as described in Section 01 4000 - Quality Requirements.

D. Comply with ALL special requirements and inspections of air barrier system manufacturer, as required to obtain the required 5-year labor and materials warranty.

E. Single-Source Responsibility: Obtain primary air barrier materials of each type required from a single manufacturer.

F. Sealant for Substrate Surfaces: Sealant shall be manufactured by same manufacturer as fluid-applied air barrier.

1.6 FIELD CONDITIONS

A. Maintain range of ambient and substrate temperatures recommended by air barrier manufacturer. Do not apply product to wet substrate or during snow, rain, fog, or mist.

1.7 MOCK UP

A. Integrate materials of this Section into the Exterior Assembly Mock-up per the drawing requirements, including air barrier and associated accessories.

B. Locate as directed.

C. Mock-up may not remain as a part of the work.

1.8 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five (5) year manufacturer warranty for air barrier failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Fluid-Applied Waterproofing Vapor Permeable Air Infiltration Barrier System (for CMU, Sheathing, and as indicated):
   1. Basis of Design: GE Silicones "Elemax 2600" 100% Silicone Air and Water Resistive Barrier: www.siliconeforbuilding.com.
   2. Other Acceptable Manufacturers:
      a. Dow Corning "DefendAir 200" Silicone Liquid Applied Air & Weather Barrier: www.dowcorning.com.
      b. Pecora "XL-Perm Ultra VP" Air, Vapor & Water Barrier System: www.pecora.com.
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 MEMBRANE AND FLASHING MATERIALS

A. Fluid-Applied Air Barrier - General: Cold-applied elastomeric fluid-applied membrane.
   1. General: Provide fluid-applied air barrier system that is watertight and complies with performance requirements specified, as demonstrated by testing performed by a nationally recognized independent testing laboratory of manufacturer's standard systems according to test methods indicated.
   2. Fluid-applied air barrier system shall be compatible with specified substrate.

B. Liquid Air Infiltration Barrier, Vapor Permeable, Cold-Applied Elastomeric Membrane:, complying with ASTM C 836, one component. (For CMU, Sheathing, and as indicated).

1. Cured Thickness: Comply with manufacturer's recommendation to meet performance specified.
2. Suitable for installation over concrete, CMU, and sheathing substrates.
3. UV Resistant.
4. Membrane Air Permeance ASTM E2178: Not to exceed 0.004 cfm/sq. ft. of surface area (at specified thickness) at test pressure of 0.3 in. water (75 Pa) on CMU block.
5. Membrane Vapor Transmission per ASTM E96, Method B: Not less than 10 perms.
6. Product shall withstand weather exposure up to 6 months.

C. Flexible Flashings: Type recommended by membrane manufacturer.

2.3 ACCESSORIES

A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Joint Reinforcing/Transition Strip: 2" wide glass fiber tape, self-adhesive polymeric air/vapor barrier membrane (30 mil minimum), or other material applicable for application, which is approved by air barrier manufacturer.

C. Surface Conditioner: Compatible with membrane compound, as recommended by membrane manufacturer.

D. Sealant for Substrate Surfaces: As recommended by membrane manufacturer.

E. Liquid Membrane for details and terminations: As recommended by membrane manufacturer for trowel grade applications.

F. Detail Membrane: Flexible, fully-adhered membrane for detail flashing areas: As recommended by membrane manufacturer.

G. Perimeter Detail Membrane: Preformed silicone seal strip for transitions between Fluid-Applied Air Barrier and Aluminum-Framed Storefront frames.
1. Basis-of-Design: Dow Corning Silicone Transition Sytem

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter, including efflorescence, detrimental to adhesion or application of air barrier system.

C. Verify that substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of air barrier materials.

D. Verify that items that penetrate surfaces to receive air barrier are securely installed.

3.2 PREPARATION

A. Protect adjacent surfaces not designated to receive air barrier.

B. Do not apply air barrier to surfaces unacceptable to manufacturer.

C. Caulk sheathing joints prior to application of water/air barrier coating. Caulk with manufacturer-recommended joint sealant reinforced with fiberglass mesh tape encapsulated in sealant. Encapsulate fastener heads with manufacturer-recommended sealant. Fiberglass reinforcement is not required for sheathing fastener heads.
1. Verify that Fluid-Applied air barrier is compatible with sealant used.

D. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

E. All surfaces must be sound and free from spalled areas, loose aggregate, loose nails or screws, sharp protrusions or other matter that will hinder the adhesion or regularity of the membrane installation. The surface must also be free from frost, dirt, grease, oil or other contaminants. Clean loose dust and dirt from the surface by brushing or wiping with a clean, dry cloth.

F. Concrete and other monolithic cementitious surfaces: Pretreat surface irregularities and large voids with liquid membrane, or repair with lean mortar mix or nonshrinking grout.

G. CMU surfaces: Strike joints full and flush to face of concrete block. Ensure surface is smooth and free from projections. Fill voids and holes with lean mortar mix or nonshrinking grout.

H. Sheathing panels: Fasten corners and edges with appropriate screws. Drive fasteners flush with panel surface (not countersunk). Tape panel butt joints with 2 in. wide sheathing tape recommended by manufacturer.

I. Complete detailing prior to applying air barrier.

J. Fill and seal cracks and joints between exterior sheathing panels or adjacent substrates, or in masonry, with trowel application of air barrier product and reinforce with strip of 2" (minimum) wide glass fiber tape. Follow manufacturer's instructions if other joint treatment is recommended. Allow recommended cure time before proceeding.

K. Proceed with applying air barrier only after substrate cleaning, sealing, and other preparation and sealing of joints and penetrations have been completed.

3.3 INSTALLATION

A. Apply air barrier in accordance with manufacturer's instructions .

B. Apply surface conditioner (if required) at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.

C. Apply by spray a complete and continuous unbroken film of liquid air and water barrier membrane.

D. Apply air barrier in accordance with manufacturer's instructions to uniform wet film thickness in order to dry to thickness recommended by manufacturer to achieve performance specified.
   1. Apply more than one coat, if recommended by manufacturer.

E. Roll the air barrier after spray application to fill all pin holes.

F. Install detail membrane at all openings and similar locations as recommended by manufacturer.

G. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

H. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.4 FIELD QUALITY CONTROL

A. Owner will provide testing services in accordance with Section 01 4000 - Quality Requirements. Contractor shall provide temporary construction and materials for testing.

3.5 CLEANING AND PROTECTION

A. Do not inhibit damp substrate from drying out. Do not expose the backside of the substrate to moisture or rain.

B. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

C. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed for more than 180 days.

D. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construcion.

E. Remove masking materials after installation.

END OF SECTION

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SECTION 07 1616
CRYSTALLINE WATERPROOFING

<<<< UPDATE NOTES

PART 1 - GENERAL

2.1 SECTION INCLUDES

A. Crystalline waterproofing, at elevator pit, and elsewhere as noted.

B. Liquid waterproofing admixtures.

C. Preparation of surfaces to be waterproofed, including plugging active water leaks.

2.2 RELATED REQUIREMENTS

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

B. Section 03 3000 - Cast-in-Place Concrete: Concrete work to be waterproofed.

2.3 REFERENCE STANDARDS

A. COE CRD-C 48 - Handbook for Concrete and Cement Standard Test Method for Water Permeability of Concrete; 1992.

B. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

2.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Test data showing hydraulic permeability.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.
   5. Details for waterproofing at joints, intersections, and other special conditions.

C. Specimen warranty.

2.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of products of the type specified and providing technical representatives to visit project site.

B. Installer Qualifications: Acceptable to manufacturer, with documented experience on at least five projects of similar nature within last five years.

2.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Take necessary precautions to keep cementitious materials dry.

2.7 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results; do not install products under environmental conditions outside manufacturer's absolute limits.

2.8 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide installer's warranty agreeing to correct leaking waterproofing for two years from Date of Substantial Completion, unless leakage is caused by structural failure, movement of the structure, or other causes beyond the installer's control.

PART 2 - PRODUCTS

3.1 MANUFACTURERS

A. Crystalline Waterproofing:
   1. Gemite Products Inc; ____: www.gemite.com/#sle.
   2. Tremco, Inc.; "Permaquik Super 200": www.tremcosealants.com.
   3. W. R. Meadows, Inc; CEM-KOTE CW PLUS: www.wrmeadows.com/#sle.
   4. Xypex Chemical Corporation; Xypex Concentrate: www.xypex.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Liquid Waterproofing Admixture:

3.2 APPLICATIONS

A. Crystalline Waterproofing for Building Surfaces:
   1. Negative (interior side) of elevator pits.
   2. Surfaces as indicated on drawings.

3.3 MATERIALS

A. Crystalline Waterproofing: Portland cement, quartz or silica sand, and other active chemicals that when applied to surface of concrete forms insoluble crystals in capillary pores preventing passage of liquids, while having no adverse effect on normal properties of concrete.
   1. Hydraulic Permeability of Applied Concrete: No measurable leakage or water flow at pressure ranging from 175 psi to 200 psi when tested in accordance with COE CRD-C 48, using at least 2 inch thick sample, and with applied surface preparation and installation in accordance with NRCA (WM).
   2. Toxicity: Non-toxic.
   3. Color: Gray.

B. Liquid Waterproofing Admixture: Nontoxic liquid admixture, free of Volatile Organic Compounds (VOCs), manufactured with deionized water, and formulated to react with hydroxide ion products by cement hydration process. Specifically formulated for use in normal and lightweight structural concrete mixes.
   1. Products:

PART 3 - EXECUTION

4.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

4.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions, and use sand blasting, water blasting, or acid etching as recommended.

C. Plug water leaks.

D. Patch holes, construction joints, and cracks; remove defective concrete.

E. Obtain approval of manufacturer's field representative before beginning installation.

4.3 INSTALLATION

A. Install in strict accordance with manufacturer's instructions, maintain environmental conditions required and recommended by manufacturer, and keep a copy of manufacturer's instructions on site.

B. Coordinate installation with installation of products that must penetrate waterproofed surfaces.

C. Prevent excessive drying of surface.
   1. Cure waterproofing for at least three days, or length of time required by manufacturer, with water spray and adequate air circulation.
   2. Do not use chemical curing agents unless explicitly approved by waterproofing manufacturer.

D. Do not backfill, fill water or liquid holding structures, or apply finish coatings until time period recommended by manufacturer has passed.

4.4 FIELD QUALITY CONTROL

A. See Section 01 4000 - QUALITY REQUIREMENTS, for additional requirements.

B. Flood test waterproofing application by filling water holding structures to capacity and allowing to stand for not less than 24 hours.

C. If any leaks appear, notify Architect and drain.
   1. Repair leaks at no additional cost to Owner.
   2. Repeat flood test until any leakage is eliminated.

4.5 PROTECTION

A. Protect from damage by weather; do not cover with impermeable (plastic) sheeting unless air circulation is provided.

B. Touch-up, repair or replace damaged waterproofing after Date of Substantial Completion.

END OF SECTION

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SECTION 07 2100
THERMAL INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Board insulation at cavity wall construction, continuous and as indicated.

B. Batt insulation in all exterior framed walls, and for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

C. Batt insulation in interior framed walls for acoustical and/ or thermal performance, where indicated.

D. Mineral wool fiber insulation for firestopping applications in fire-rated assemblies.

1.2 RELATED REQUIREMENTS

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

B. Section 01 4100 - Quality Requirements: Mock-up requirements.

C. Section 04 2000 - Unit Masonry Assemblies: Cavity walls for board insulation.

D. Section 05 4000 - Cold-Formed Metal Framing: Supporting structure for batt insulation, where indicated.

E. Section 07 4213.01 - Metal Wall Panels: Subgirt framing to be coordinated with cavity board insulation.

F. Section 07 4213.02 - Metal Composite Material (MCM) Wall Panels: Subgirt framing to be coordinated with cavity board insulation.

G. Section 07 5416 - Ethylene Interpolymer (KEE) Roofing: Insulation above metal roof deck.

1.3 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023, with Editorial Revision (2024).

B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.

C. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.

D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.

E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

F. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2025.

G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

I. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2026.

J. ASTM E1414/E1414M - Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum; 2021a.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.5 MOCK-UP

A. Include Thermal Insulation in mock-up as described in Section 01 4100 - Quality Requirements.

B. Locate as directed.

C. Mock-up may not remain part of the work.

1.6 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Foam Board Insulation Products:
   1. Basis of Design: Dow Chemical Company: www.dow.com
   2. Other Acceptable Manufacturers:
      a. DiversiFoam Products: www.diversifoam.com.
      b. Owens Corning Corporation: www.owenscorning.com
      c. Kingspan Insulation LLC.: www.kingspan.com.
   3. Substitutions: Reference Section 01 6000 - Product Requirements.

B. Batt Insulation Products:
   1. Basis of Design: Owens Corning Corporation: www.owenscorning.com
   2. Other Acceptable Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com.
      b. Johns Manville: www.jm.com
      c. Knauf Insulation: www.knaufinsulation.com
   3. Substitutions: Reference Section 01 6000 - Product Requirements.

C. Mineral Wood Fiberboard Insulation:
   1. Basis of Design: Owens Corning Corporation: www.owenscorning.com
   2. Other Acceptable Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com
      b. Johns Manville: www.jm.com
      c. Knauf Insulation: www.knaufinsulation.com
   3. Substitutions: Reference Section 01 6000 - Product Requirements.

2.2 APPLICATIONS

A. Continuous Insulation Inside Masonry Cavity Walls and Metal Framed Cavity Walls: Extruded polystyrene board at cavity walls composed of brick veneer, and rainscreen fiber board insulation at cavities clad with metal wall panels or MCM wall panels.

B. Insulation in Exterior Metal Framed Walls: Batt insulation with no vapor retarder.

C. Acoustical Insulation Above Ceilings: Batt insulation with no vapor retarder.

D. Acoustical Insulation in Interior Partitions: Batt insulation with no vapor barrier.

E. Firestopping Assemblies: Mineral wool insulation as a compenent of a UL rated assembly.

2.3 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene Board Insulation at masonry cavity walls and metal framed cavity walls: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, and the following characteristics:
   1. Application: Cavity Wall behind Brick Veneer.
   2. Product: "Styrofoam Brand Cavitymate Plus XPS" as manufactured by DuPont.
   3. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
   4. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   5. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   6. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
      a. Minimum R-value of continuous insulation in CMU and stud cavity walls: R-7.50.
   7. Board Size: 16 x 96 inch.
   8. Board Thickness: 1.5 inches at CMU back-up walls, and 1.5 inch at Metal Stud Back-up walls, only where veneer material is brick, unless indicated otherwise.
   9. Board Edges: Square.
   10. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.

2.4 MINERAL FIBER BOARD INSULATION MATERIALS

A. Mineral Fiberboard Insulation: Rigid mineral fiber, in accordance with ASTM C612, Type IVB.
   1. Application: Rainscreen Cavity Wall behind Metal Wall Panels and MC Wall Panels.
   2. Product: "Cavityrock" as manufactured by Rockwool.
   3. Facing: Black non-woven mat.
   4. Flame Spread Index: 0, when tested with facing, if any, in accordance with ASTM E84.
   5. Smoke Developed Index: 0s, when tested with facing, if any, in accordance with ASTM E84.
   6. Type and Thermal Resistance, R-value: Type IVB per ASTM 612, 4.3 minimum per 1 inch thickness at 75 degrees F mean temperature.
      a. Minimum R-value of continuous insulation in CMU and stud cavity walls: R-7.50.
   7. Board Size: 24 by 48 inch.
   8. Board Thickness: As required to meet continuous insulation minimum R-Value at rainscreen applications where cavity is clad with metal wall panels or MCM wall panels.
   9. Board Edges: Square.
   10. Maximum Density: 4.4 pounds per cubic foot, nominal per ASTM C303.

B. Mineral Wool Block, Board, or Blanket Thermal Insulation: Complying with ASTM C612 or ASTM C553.
   1. Product: Owens Corning "Thermafiber Safing Mineral Wool Insulation".
   2. Where indicated, provide black, mineral fiber facing on one side; with flame spread index of 25 or less, when tested in accordance with ASTM E84.
   3. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   4. Board Size and Thickness: As indicated or required for application.
   5. Maximum Density: 8 pcf, nominal.

2.5 MINERAL FIBER BLANKET INSULATION MATERIALS

A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
   1. Product: Ownes Corning Pink Next Gen Fiberglass Insulation, Unfaced.
   2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
   4. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
   5. Formaldehyde Content: Zero.
   6. Thickness: As required to meet the following requirements:
      a. Exterior walls: Full depth of stud, R=13 minimum.
      b. Interior walls: Full depth of Studs.
   7. Facing: Unfaced in interior and exterior walls.

2.6 ACCESSORIES

A. Flashing Tape: Special reinforced film with high performance adhesive.
   1. Application: Window and door opening flashing tape.
   2. Width: As required for application.

B. Tape: Polyethylene self-adhering type, 1.75 inch wide minimum.
   1. 3M "Construction Seaming Tape 8087": www:3M.com.
   2. Dow "Weathermate Construction Tape": www.dowbuildingsolutions.com.
   3. Typar "Typar Construction Tape": www.typar.com.

C. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

3.2 BOARD INSTALLATION AT CAVITY WALLS

A. Adhere a 6 inch wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
   1. Tape seal joints between sheets.
   2. Extend sheet full height of joint.

B. Apply adhesive to back of boards:
   1. Three continuous beads per board length.
   2. Apply beads of adhesive oriented vertically so as not to disrupt the drainage plane between the water/air barrier coating and cavity insulation.

C. Install boards to fit snugly between wall ties and/or Zee clips.

D. Install boards horizontally on walls.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and protrusions.
   4. Tape seal board joints.

E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

F. Place 6 inches wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.

3.3 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

D. All wet insulation shall be removed and replaced. Provide letter to Architect for record of each occurrence.

E. Visible gaps and voids for insulation on sheet vapor barrier shall be filled.

3.4 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

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SECTION 07 2400
EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Composite wall and soffit cladding of rigid insulation and reinforced finish coating ("Class PB").

B. Drainage and water-resistive barriers behind insulation board.

1.2 RELATED REQUIREMENTS

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

B. Section 05 4000 - Cold-Formed Metal Framing: Sheathing on metal studs.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Perimeter flashings.

D. Section 07 9005 - Joint Sealers: Perimeter and penetration sealants.

1.3 REFERENCE STANDARDS

A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2026.

B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

C. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2025.

D. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity; 2025.

E. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

F. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

G. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies; 2025.

H. ASTM E2486/E2486M - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS); 2022.

I. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013 (Reapproved 2021).

J. ASTM G155 - Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials; 2025.

K. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems; 2009, with Editorial Revision (2022).

L. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies; 2015, with Editorial Revision (2022).

M. NFPA 259 - Standard Test Method for Potential Heat of Building Materials; 2023, with Errata.

N. NFPA 268 - Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source; 2022.

O. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.
   1. Submit evidence of qualifications and training of GC's representative who will monitor EIFS installation, as described in Quality Assurance below.

C. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.

D. Certification: Provide certification that products provided are the same products recommended by manufacturer for EIFS system selected and used.

E. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.

F. Verification Samples: Submit actual samples of selected coating on specified substrate, minimum 12 inches square, illustrating project colors and textures.

G. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

1.5 QUALITY ASSURANCE

A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site during installation.

B. EIFS Manufacturer Qualifications: Provide EIFS products other than insulation from the same manufacturer with qualifications as follows:
   1. Member in good standing of EIMA (EIFS Industry Members Association).
   2. Manufacturer of EIFS products for not less than 5 years.

C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.

D. Installer Qualifications: Company specializing in the type of work specified and with at least five years of documented experience and approved by manufacturer.

E. The EIFS Manufacturer shall perform a project specific constructability review of the contract documents with a written report being submitted to Architect at time of product data submittal.

F. The EIFS Manufacturer shall attend a mandatory pre-construction meeting and shall provide personnel to perform a minimum of one field inspection per building during construction and a final inspection following completion of EIFS installation to confirm proper installation means and methods are being utilized and for warranty purposes. Manufacturer shall provide a written report of all field inspections to Architect. Manufacturer shall schedule and notify Contractor, Architect, and program manager significantly in advance of the date and times of scheduled inspections.

G. The General Contractor shall provide at least one member of the project team, based on site, who is designated and responsible for observing and monitoring all EIFS installation, and who has received formal training on EIFS systems. This individual shall be responsible for the ongoing and continuous inspection and photo documentation of all EIFS substrate and systems before, during and at completion of installation. This individual shall have a minimum of 3

years applicable prior-construction experience. Provide evidence of designated individual's qualifications and training to Architect for approval at time of EIFS product data submittal.

H. 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 review of special details and flashing.

I. The EIFS contractor shall cooperate fully with and provide the equipment and personnel required to assist the Owner's waterproofing consultant as may be applicable during any inspection and testing related to the EIFS installation.

1.6 MOCK-UPS

A. Include Exterior Insulation and Finish System in mock-up as described in Section 01 4000 - Quality Requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.

B. Storage: Store materials as directed by manufacturer's written instructions.
   1. Protect adhesives and finish materials from freezing, temperatures below 40 degrees F and temperatures in excess of 90 degrees F.
   2. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
   3. Protect insulation materials from exposure to sunlight.

1.8 FIELD CONDITIONS

A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.

B. Do not install coatings or sealants when ambient temperature is below 40 degrees F.

C. Do not leave installed insulation board exposed to sunlight for extended periods of time.

1.9 WARRANTY

A. The EIFS Contractor shall include in his price and be responsible for any modifications, additions or reductions to the Contract drawings and specifications to obtain the manufacturer's warranty.

B. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

C. Provide manufacturer's standard material warranty, covering a period of not less than 10 years.

D. Provide separate warranty from installer covering labor for repairs or replacement for a period of not less than 10 years.

E. The manufacturer shall perform follow-up site inspections at the following intervals following substantial completion to verify proper performance and integrity of the system: Years 1, 3, and 5. A written report of all inspections shall be provided to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Dryvit Systems, Inc.; Dryvit Outsulation Plus MD Exterior Insulation and Finish System, Class PB with Moisture Drainage: www.dryvit.com.//////fr130031//////Verify

B. Manufacturers:
   1. Sto Corp: www.stocorp.com/sle.
   2. BASF Wall Systems (Senergy, Finestone, Acrocrete, SonoWall): www.wallsystems.basf.com.

2.2 EXTERIOR INSULATION AND FINISH SYSTEM

A. Fire Characteristics:
   1. Flammability: Pass, when tested in accordance with NFPA 285.
   2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.
   3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot.

B. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.

C. Drainage Efficiency: Average minimum efficiency of 90 percent, when tested in accordance with ASTM E2273 for 75 minutes.

D. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B117, using at least three samples matching intended assembly, at least 4 by 6 inches in size.

E. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC219 or ICC-ES AC235.

F. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycles 1, 5, or 9.

G. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.

H. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.

I. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 113.5 gallons of sand.

J. Impact Resistance: Construct system to provide the following impact resistance without exposure of broken reinforcing mesh, when tested in accordance with ASTM E2486/E2486M:
   1. Medium: 50 to 89 in-lb, for areas with limited access to public.
   2. High: 90 to 150 in-lb, for areas with general access to public.
   3. Ultra-High: Over 150 in-lb, for areas subject to potential abuse.

2.3 MATERIALS

A. Materials and Components shall be those specified by Manufacturer of selected manufacturer and system.

B. Finish Coating Top Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.
   1. Textures: Medium, and Smooth (Limestone).
   2. Color: As selected by Architect from manufacturer's standard range.

C. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh, Class PB.

D. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating, weight, strength, and number of layers as required to meet required system impact rating.

E. Insulation Board: Molded expanded polystyrene (EPS) board insulation, ASTM C578, Type XI, with the following characteristics:
   1. Board Thickness: As indicated on drawings. Minimum: 2 inches.

F. Flashing Tape: Self-adhering rubberized asphalt tape with polyethylene backing or other material and surface conditioner furnished or approved by EIFS manufacturer.

2.4 ACCESSORIES

A. Metal Flashings: See Section 07 6200.

B. Trim: EIFS manufacturer's standard PVC or galvanized steel trim accessories, as required for a complete project and including starter track and drainage accessories.

C. Sealant Materials: Compatible with EIFS materials and as recommended by EIFS manufacturer.

D. Exterior Soffit Vents (If indicated): One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with plaster or EIFS edge and manufactured especially for soffit application. Provide ventilation area shown on drawings., 6" wide, unless indicated otherwise.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.

B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

3.2 INSTALLATION - INSULATION

A. Install in accordance with manufacturer's instructions.

B. Prior to installation of boards, install starter track and other trim level and plumb and securely fastened. Install only in full lengths, to minimize moisture intrusion; cut horizontal trim tight to vertical trim.

C. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.

D. On wall surfaces, install boards horizontally.

E. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch.

F. Fill gaps greater than with strips or shims cut from the same insulation material.

G. Rasp irregularities off surface of installed insulation board.

H. Adhesive Attachment: Use method required by manufacturer to achieve drainage efficiency specified; do not close up drainage channels when placing insulation board.

3.3 INSTALLATION - CLASS PB FINISH

A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at terminations of EIFS. Install reinforcing fabric as recommended by EIFS manufacturer.
   1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches.
   2. Allow base coat to dry a minimum of 24 hours before next coating application.

B. Apply finish coat after base coat has dried not less than 24 hours, embed finish aggregate, and finish to a uniform texture and color.

C. Finish Coat Thickness: As recommended by manufacturer.

D. Seal control and expansion joints within the field of exterior finish and insulation system, using procedures recommended by sealant and finish system manufacturers.

E. Apply sealant at finish perimeter and expansion joints in accordance with Section 07 9005.

3.4 CLEANING

A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

B. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

3.5 PROTECTION

A. Protect completed work from damage and soiling by subsequent work.

END OF SECTION

SECTION 07 4113
METAL ROOF PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preformed steel panels.

B. Attachment system.

C. Secondary framing.

1.2 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Roof sheathing.

1.3 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

C. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2025a.

D. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.

E. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2025.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.

C. Shop Drawings: Indicate layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
   1. Show work to be field fabricated or field assembled.

D. Samples: For each roofing system specified, submit samples of minimum size 12 inches square, representing actual roofing metal, thickness, profile, color, and texture.
   1. Include typical panel joint in sample.
   2. Include typical fastening detail.

E. Test Reports: Indicate compliance of metal roofing system with specified requirements.

F. Specimen warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section and with at least five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.7 FIELD CONDITIONS

A. Do not install metal roof panels, eave protection membrane, underlayment, or _____ when surface, ambient air, wind chill, or _____ temperatures are below 45 degrees F.

1.8 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Special Warranty: Provide 20-year warranty for weathertightness of roofing system, including agreement to repair or replace metal roof panels that fail to keep out water commencing on Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Architectural Metal Roof Panel Manufacturers:
   1. Petersen Aluminum Corporation; Snap-On Standing Seam Panel: www.pac-clad.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

A. Metal Roof Panels: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:
   1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed L/180 of span length (L) when tested in accordance with ASTM E1592.
   2. System Performance: Complete and weathertight; tested and approved in accordance with ASTM E1592.
   3. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F.

2.3 METAL ROOF PANELS

A. Description: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.

B. Metal Panels: Preformed panels with factory-applied finish.
   1. Steel Panels:
      a. Aluminum-zinc alloy-coated steel complying with ASTM A792/A792M; minimum AZ50 coating.
      b. Steel Thickness: Minimum 24 gauge, 0.024 inch.
   2. Texture: Smooth.
   3. Width: Maximum panel coverage of 18 inches.

2.4 ATTACHMENT SYSTEM

A. Exposed System: Provide manufacturer's recommended stainless steel fasteners engineered to meet performance requirements and equipped with appropriate sealant separators to provide weathertight connections that will accommodate anticipated thermal movement.

2.5 SECONDARY FRAMING

A. Material: ASTM A1011/A1011M Designation SS steel sheet.
   1. Profile: Manufacturer's standard zee.
   2. Thickness: 12 gauge, 0.1046 inch.
   3. Finish: Galvanized in accordance with ASTM A653/A653M G90.

B. Connectors: Factory-made formed steel sheet, ASTM A653/A653M SS Grade 50, with G60/Z180 hot-dipped galvanized coating and factory-punched holes.

2.6 FABRICATION

A. Panels: Provide factory- or field-fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.7 FINISHES

A. Fluoropolymer Coil Coating System: Manufacturer's standard multi-coat metal coil-coating system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of coil-coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss to match sample.

B. Solar Reflectance Index (SRI): 82, initial, less than 2:12 low-sloped roof.

C. Color: As indicated on drawings.

D. Color: As selected by Architect from manufacturer's standard range.

E. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.8 ACCESSORIES

A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
   1. Downspouts: Open face, rectangular profile.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion-resistant finish or combination steel and closed-cell foam.

C. Sealants:
   1. Exposed Applications: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
   2. Concealed Applications: Noncuring butyl or tape sealant.
   3. Seams: Factory-applied, nonskinning, nondrying type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates are properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to ensure completed roof will be free of leaks.

B. Coordinate installation of waterproof membrane over roof sheathing with Section 06 1000.

C. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by metal roof panel manufacturer.

D. At locations where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.3 INSTALLATION

A. Install roofing system in accordance with approved shop drawings and metal roof panel manufacturer's instructions and recommendations, as applicable to specific project conditions; securely anchor components of roofing system in place, allowing for thermal and structural movement.
   1. Install roofing system with exposed fasteners prefinished to match panels.
   2. Minimize field cutting of panels. Where field cutting is required, use methods that will not distort panel profiles. Use of torches for field cutting is prohibited.

B. Accessories: Install necessary components required for complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. Roof Panels: Install metal roof panels in accordance with manufacturer's installation instructions, minimizing transverse joints except at junction with penetrations.

3.4 CLEANING

A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to finish.

3.5 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION

SECTION 07 4213.02
METAL COMPOSITE MATERIAL (MCM) WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Exterior rain screen wall system consisting of formed metal composite material (MCM) sheet, framing, secondary supports, and anchors to structure.

B. Matching flashing and trim.

1.2 RELATED REQUIREMENTS

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

B. Section 05 4000 - Cold-Formed Metal Framing: Panel support framing.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashing components integrated with this wall system.

D. Section 07 9005 - Joint Sealers.

1.3 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2025b.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

D. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2025a.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

G. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2021).

H. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2023.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

J. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

K. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and

completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.

1. Require attendance by the installer and relevant sub-contractors.
2. Include MCM sheet manufacturer’s representative and wall system manufacturer’s representative to review storage and handling procedures.
3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
4. Review procedures for protection of work and other construction.
5. Review safety precautions.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

1. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
   a. Finish manufacturer's data sheet showing physical and performance characteristics.
   b. Storage and handling requirements and recommendations.
   c. Fabrication instructions and recommendations.
   d. Specimen warranty for finish, as specified herein.
2. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
   a. Physical characteristics of components shown on shop drawings.
   b. Storage and handling requirements and recommendations.
   c. Installation instructions and recommendations.
   d. Specimen warranty for wall system, as specified herein.
3. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, support clips, exposed fasteners, number of anchors, supports, reinforcement, trim, flashings, and accessories.
   a. Indicate panel numbering system.
   b. Differentiate between shop and field fabrication.
   c. Indicate substrates and adjacent work with which the wall system must be coordinated.
   d. Include large-scale details of anchorages and connecting elements.
   e. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
   f. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
4. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product in color and texture.
5. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.
6. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
7. Installer's Qualification Statement.
8. Maintenance Data: Care of finishes and warranty requirements.
9. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.

B. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

C. Manufacturer Qualifications: Company specializing in manufacturing wall panel systems specified in this section.
   1. With not less than three years of documented experience.
   2. Approved by MCM sheet manufacturer.
   3. Submit contact names and phone numbers for at least three references connected with successful past projects.

D. Installer Qualifications: Company specializing in performing work of the type specified in this section.
   1. With minimum five years of documented experience.
   2. Approved by wall panel system manufacturer.

E. Submit contact names and phone numbers for at least three references connected with successful past projects.

F. Mock-Up: Include Metal Composite Material Wall Panels in mock-up as described in Section 01 4000 - Quality Requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
   1. Protect finishes by applying heavy-duty removable plastic film during production.
   2. Package for protection against transportation damage.
   3. Provide markings to identify components consistently with drawings.
   4. Exercise care in unloading, storing, and installing panels to prevent bending, warping, twisting, and surface damage.

B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Store in well-ventilated space out of direct sunlight.
   2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
   3. Store at a slope to ensure positive drainage of accumulated water.
   4. Do not store in enclosed space where ambient temperature can exceed 120 degrees Fahrenheit.
   5. Avoid contact with other materials that might cause staining, denting, or other surface damage.
   6. Do not store on porous damp surface, such as foam or wood pallets. Permanent staining could result.

C. Handle products in such a way as to avoid fingerprinting or contact with arms, etc.
   1. Use gloves and long sleeves.

1.8 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Delamination Warranty: Provide manufacturer's written warranty against bond failure and delamination of panel for minimum of 5 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS/PRODUCTS

A. Metal Composite Material Wall Panel System Manufacturer:
   1. Alpolic; ALPOLIC/PE aluminum composite panel, 4mm: www.alpolic-americas.com.
   2. Arconic; Reynobond aluminum composite panel, 4mm: www.reynobond.com
   3. Alucobond; Alucobond Plus aluminum composite panel, 4mm: www.alucobondusa.com
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 WALL PANEL SYSTEM

A. Rain ScrWall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage, or failure.
   1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
   2. Provide panel jointing, reveal clips and other required accessories for a complete rain screen system.
   3. Anchor panels to supporting framing without exposed fasteners.

2.3 PERFORMANCE REQUIREMENTS

A. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees Fahrenheit to 180 degrees Fahrenheit without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.

2.4 MATERIALS

A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a solid core of extruded thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials; core material free of voids and spaces; no foamed insulation material content. This product hereinafter and on plans may be referred to as ACM (Aluminum Composite Material).
   1. Overall Sheet Thickness: 0.16 inch.
   2. Face Sheet Thickness: 0.020 inches, minimum.
   3. Alloy: Manufacturer's standard, selected for best appearance and finish durability.
   4. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees Fahrenheit.
   5. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
   6. Flammability: Self-ignition temperature of 650 degrees Fahrenheit or greater when tested in accordance with ASTM D1929.

B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.

1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
3. Stainless Steel Sheet Components: ASTM A480/A480M.
4. Aluminum Components: ASTM B209 (ASTM B209M); or ASTM B221 (ASTM B221M).

2.5 FINISHES

A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, with at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mils, 0.0009 inch

B. Color: As selected by Architect from manufacturer's full range of colors. .

2.6 FABRICATION

A. Use Industry Standard Fabrication techniques.

B. Fabricate panels such that panels serving as soffit can be successfully sealed and counterflashed as required for weathertight installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine dimensions, tolerances, and interfaces with other work.

B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect adjacent work areas and finish surfaces from damage during installation.

B. Provide anchorage items to be cast into concrete or built into masonry to appropriate installer(s) together with setting templates.

C. See Section 03 3000 for additional cast in place concrete requirements.

D. See Section 04 2000 for additional unit masonry requirements.

3.3 INSTALLATION

A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.

B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.

C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.

D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.

E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.

F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.

G. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
   1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
   2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
   3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
   4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.

H. Replace damaged products.

3.4 FIELD QUALITY CONTROL

A. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.

B. Site Visits: Schedule two site visits during execution of installation.

3.5 CLEANING

A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.

C. Remove temporary coverings and protection of adjacent work areas.

D. Clean installed products in accordance with manufacturer's instructions.

3.6 PROTECTION

A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION

SECTION 07 5200
MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cold Applied Modified bituminous roofing membrane, conventional application.

B. Insulation, flat and tapered.

C. Cover boards.

D. Roofing cant strips and walkway pads.

1.2 RELATED REQUIREMENTS

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

B. Section 05 3100 - Steel Decking: Placement of acoustical insulation for deck flutes.

C. Section 06 1000 - Rough Carpentry: Wood cant strips, nailers, and curbs.

D. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings and termination bars.

E. Section 07 7100 - Roof Specialties: Roof edge flashings, copings, and fascias.

F. Section 07 7123 - Manufactured Gutters and Downspouts.

G. Section 07 7200 - Roof Accessories: Roof-mounted units and prefabricated curbs.

1.3 REFERENCE STANDARDS

A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.

B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2025.

C. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 2011 (Reapproved 2023).

D. ASTM D312/D312M - Standard Specification for Asphalt Used in Roofing; 2016a (Reapproved 2023).

E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement; 2025.

F. ASTM D6164/D6164M - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements; 2026.

G. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2025.

H. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces; 2024.

I. FM DS 1-28 - Wind Design; 2015, with Editorial Revision (2026).

J. NRCA (RM) - The NRCA Roofing Manual; 2026.

K. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Pre-Roofing Conference: Convene one month before starting work of this section.

1. A pre-roofing conference is required before any roofing materials are installed. This conference shall be conducted by a representative of the Architect and attended by

representatives of the Owner, General Contractor, Roofing Contractor, Sheet Metal Contractor, Roof Deck Manufacturer (if applicable) and the Roofing Materials Manufacturer (if warranty is required of this manufacturer). If equipment of substantial size is to be placed on the roof, the Mechanical Contractor must also attend this meeting.

2. The pre-roofing conference is intended to clarify demolition (for renovation or re-roofing projects) and application requirements for work to be completed before roofing operations can begin. This would include a detailed review of the specifications, roof plans, roof deck information, flashing details and approved shop drawings, submittal data, and samples. If conflict exists between the specifications and the Manufacturer's requirements, this shall be resolved. If this pre-roofing conference cannot be satisfactorily concluded without further inspection and investigation by any of the parties present, it shall be reconvened at the earliest possible time to avoid delay of the work. In no case should the work proceed without inspection of all roof deck areas and substantial agreement on all points.
3. The following are to be accomplished during the conference:
    a. Review all Factory Mutual and Underwriters Laboratories requirements listed in the specifications and resolve any questions or conflicts that may arise.
    b. Establish trade-related job schedules, including the installation of roof-mounted mechanical equipment.
    c. Establish roofing schedule and work methods that will prevent roof damage.
    d. Require that all roof penetrations and walls be in place prior to installing the roof.
    e. Establish those areas on the job site that will be designated as work and storage areas for roofing operations.
    f. Establish weather and working temperature conditions to which all parties must agree.
    g. Establish acceptable methods of protecting the finished roof if any trades must travel across or work on or above any areas of the finished roof.
4. Copies of all roofing submittals and roof warranty information shall be submitted for review and returned Approved prior to pre-roofing conference. These submittals shall be job specific containing project name, location, etc.
5. The Architect shall prepare a written report indicating actions taken and decisions made at this pre-roofing conference. This report shall be made a part of the project record and copies furnished the General Contractor, and the Owner

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturer's catalog data for membrane and bitumen materials, base flashing materials, insulation, surfacing, and fasteners.

C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and mechanical fastener layout.

D. Samples: Submit two samples 12 by 12 inches in size illustrating granule surfaced sheet, insulation, and cover boards.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

F. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.

G. Installer's qualification statement.

H. Specimen Warranty:
   1. Provide an unexecuted copy of the warranty specified for this Project. Identify the terms and conditions required of the manufacturer along with any and all additionally required riders. Identify the terms and conditions required of the Owner to maintain the warranty.
      a. Submit a letter from the Roofing Contractor to be included in the warranty. This letter shall be signed and dated to indicate the Roofing Contractor has reviewed the roofing system and therefore warrants the system as designed and intended to be warrantied.
      b. Submit a letter from the roofing manufacturer to be included in the warranty. This letter shall be signed and dated by a manufacturer's representative to indicate the manufacturer has reviewed the roofing submittal from the Roofing Contractor and confirms compliance with specifications based on materials supplied in the submittal.

I. Warranty Documentation:
   1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
   2. Submit installer's written verification that installation complies with warranty conditions for waterproof membrane.
   3. Include wind-uplift resistance language.
   4. Roofing and insulation manufacturers shall submit a letter stating they will provide site inspections that confirm the project is being constructed as specified, by an experienced, full-time employee of the respective manufacturer. This letter shall be submitted with sample warranty submittal.
   5. Provide Manufacturer's documentation certifying that the roof design provided complies with the performance requirements for that particular system, as set forth in IBC Chapter 15 in Section 1504. The documentation shall be attached to the roof warranty provided at the close-out of the project.

1.6 QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience, and approved by manufacturer.

C. Insurance and Code Requirements: Provide materials complying with governing regulations that can be installed to comply with the following, and provide installation to comply:
   1. UL Fire Classified.
   2. Wind Uplift Resistance: As per local building code and warranty requirements.
   3. FM 1-90 wind uplift rating.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact unless otherwise indicated.

B. Store materials in weather protected environment, clear of ground and moisture; ballast materials may be stored outdoors.

C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

D. Protect foam insulation from direct exposure to sunlight.

1.8 FIELD CONDITIONS

A. Do not apply roofing membrane when environmental conditions are outside the ranges recommended by manufacturer.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is below 40 degrees F.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

F. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.9 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. General Contractor's Roofing Guarantee.

C. Special Project Guarantee: Submit three executed copies of Roofing Guarantee on the form at the "General Conditions" Section of the Project Manual, covering the work of this Section, including roofing membrane, composition flashing, roof insulation, any vapor retarders, and roofing accessories, signed by the Contractor.

D. Provide all necessary roof, and related, components to achieve specified warranty.

E. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes. Warranty shall be manufacturer's standard "No Dollar Limit" ("NDL") labor and material warranty agreement including flashing endorsement, and non-depreciating full replacement warranty, signed by an authorized representative of the manufacturer. Provide form that was published and submitted with product literature as of date of Contract Documents for the following and period of time:
   1. Warranty Term: 20 years.
   2. Include language relating to wind-uplift resistance.
   3. For repair and replacement include costs of both material and labor in warranty. Warranty shall cover in part, wind load, leakage or failure caused by improper workmanship or materials, to include insulation, insulation adhesives, fasteners, membrane adhesives, field membranes, and sheet metal work.
   4. Hail Resistance Rating: SH-Severe Hail.

F. The Guarantee and Warranty shall be governed by the laws of the State of Alabama and be in addition to and run concurrently with other warranties made by the Contractor under the requirements of the Contract Documents, and shall not limit or deprive the Owner of any other rights the Owner may have for remedy.
   1. Unless manufacturer's warranty agrees to arbitration through the American Arbitration Association or directly references State of Alabama for enforcement, manufacturer shall provide warranty rider stating that manufacturer's warranty is governed by and shall be enforced in accordance with laws of Alabama, and that in the event of a conflict between the provisions of the Warranty and the provisions of the rider, the provisions of the rider shall control.
   2. Exceptions are not Permitted:
      a. Damage due to roof traffic.

b. Damage due to wind speed greater than 56 miles per hour but less than 90 miles per hour.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cold Applied Modified Bituminous Membrane Roofing:
1. GAF: www.gaf.com/#sle.
2. Johns Manville: www.jm.com/e
3. Soprema: www.soprema.us
4. Simon Roofing: www.simonroofing.com
5. Substitutions: See Section 01 6000 - Product Requirements.

B. Insulation:
1. Atlas Roofing Corporation: www.atlasroofing.com.
2. Dow: www.dow.com/#sle.
3. Owens Corning Corporation: www.owenscorning.com/#sle.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 ROOFING - CONVENTIONAL APPLICATION

A. Cold Applied Modified Bituminous Membrane Roofing: Two-ply membrane, with insulation.

B. Roofing Assembly Requirements:
1. Solar Reflectance Index (SRI): Minimum of 64 based on three-year aged value; if three-year aged data is not available, minimum of 82 initial value.
   a. Calculate SRI in accordance with ASTM E1980.
   b. Field applied coating may not be used to achieve specified SRI.
2. External Fire Exposure Classification: ASTM E108 Class A, UL (FRD) listed.
3. Wind Resistance Classification: Factory Mutual 1-90, in accordance with FM DS 1-28.
4. Insulation Thermal Resistance (R-Value): 5 per inch, minimum; provide insulation of thickness required to achieve R-25, minimum.

2.3 MEMBRANE AND SHEET MATERIALS

A. Membrane: Polymer modified asphalt, reinforced with nonwoven fabric; granule surfaced; with the following characteristics:
1. Minimum Quality: ASTM D6164/D6164M Type I; styrene-butadiene-styrene (SBS) modified, polyester reinforced. Minimum 120mils thick.
2. Cap Sheet Color: White.
3. Sheet Width: 3.28 ft (1.0 meters)

2.4 BITUMINOUS MATERIALS

A. Bitumen: D 3019, Type III, Grade 2

B. Asphalt Primer: ASTM D41/D41M, asphalt type.

C. Asphalt Roof Cement: ASTM D4586/D4586M, Type II, asbestos-free.

2.5 COVER BOARDS

A. Cover Boards: Glass-mat faced gypsum panels; comply with ASTM C1177/C1177M.
1. Thickness: 1/4 inch, fire-resistant.
2. Products:
   a. Georgia-Pacific; DensDeck: www.densdeck.com/#sle.

b. Substitutions: See Section 01 6000 - Product Requirements.

2.6 INSULATION

A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam complying with ASTM C1289.
1. Classifications:
a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
1) Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.
2) Compressive Strength: Classes 1-2-3, Grade 1 - 16 psi (110 kPa), minimum.
3) Thermal Resistance, R-value: At 1-1/2 inches thick; Class 1, Grades 1-2-3, 8.4 (1.48) at 75 degrees F.
2. Board Size: 48 by 96 inches.
3. Board Thickness: As required to achieve R-25 minimum.
4. Tapered Board: Slope as indicated; minimum thickness 1 inch; fabricate of fewest layers possible.
5. Board Edges: Square.

2.7 SURFACING MATERIALS - CONVENTIONAL APPLICATION

A. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
1. Composition: Asphaltic with mineral granule surface.
2. Size: Manufacturers standard size.
3. Thickness: 1/2 inches.
4. Products:
a. Substitutions: See Section 01 6000 - Product Requirements.

2.8 ACCESSORIES

A. Cant and Edge Strips: Asphalt-impregnated wood fiberboard, compatible with roofing materials ; cants formed to 45 degree angle.

B. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.

C. Insulation Fasteners: Appropriate for purpose intended Factory Mutual and roofing manufacturer.

D. Roofing Nails: Galvanized, hot-dipped type, size and configuration as required to suit application.

E. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify deck is supported and secure.

C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.

D. Verify deck surfaces are dry and free of snow or ice.

E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips and nailing strips are in place.

3.2 PREPARATION - METAL DECK

A. Install preformed acoustical glass fiber insulation strips in roof deck flutes in accordance with manufacturer's instructions; see Section 05 3100.

3.3 INSTALLATION - INSULATION, CONVENTIONAL

A. Attachment of Insulation: Embed each layer of insulation adhesive in accordance with roofing and insulation manufacturers' instructions.

B. Cover Boards: Attach cover boards in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.

C. Lay subsequent layers of insulation with joints staggered minimum 6 inches from joints of preceding layer.

D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

E. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.

F. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

G. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 24 inches.

H. Do not apply more insulation than can be covered with membrane in same day.

3.4 INSTALLATION - MEMBRANE

A. Install modified bituminous membrane roofing system in accordance with manufacturer's recommendations and NRCA (RM) applicable requirements.

B. Install membrane; lap and seal edges and ends permanently waterproof.

C. Install smooth, free from air pockets, wrinkles, fish-mouths, or tears. Ensure full bond of membrane to substrate.

D. At end of day's operation, install waterproof cut-off. Remove cut-off before resuming roofing.

E. At intersections with vertical surfaces:
   1. Extend membrane over cant strips and up a minimum of 8 inches onto vertical surfaces.
   2. Apply flexible flashing over membrane.
   3. Secure flashing to nailing strips at 4 inches on center.

F. At gravel stops, extend membrane and base sheet under gravel stop and to the outside face of the wall.

G. Around roof penetrations,h seal flanges and flashings with flexible flashing.

H. Coordinate installation of roof drains and related flashings.

3.5 FIELD QUALITY CONTROL

A. See Section 01 4000 - QUALITY REQUIREMENTS for additional requirements.

B. The manufacturer shall provide onsite observations at least 2 times weekly during installation accompanied by a written report with photos for each observation. The manufacturer's representative must be an employee of the manufacturer.

3.6 CLEANING

A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

B. Remove bituminous markings from finished surfaces.

C. In areas where finished surfaces are soiled by bitumen or other source of soiling caused by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

D. Repair or replace defaced or damaged finishes caused by work of this section.

3.7 PROTECTION

A. Protect installed roofing and flashings from construction operations.

B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, exterior penetrations, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

1.2 RELATED REQUIREMENTS

A. Section 07 7123 - Manufactured Gutters and Downspouts.

1.3 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

B. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement; 2025.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Sheet Metal Flashing and Trim:
   1. ALUCOBOND by 3A Composites USA; ALUCOBOND AXCENT: www.alucobondusa.com/#sle.
   2. Petersen Aluminum Corporation; _____: www.pac-clad.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal.

B. Anodized Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 0.032 inch thick; clear anodized finish.

C. Stainless Steel: ASTM A666/A666M, Type 304 alloy, soft temper, 28 gauge, 0.0156 inch thick; smooth No. 4 - Brushed finish.

2.3 PREFINISHED ALUMINUM SHEETS

A. Aluminum Sheet Substrates: ASTM B209/B209M, alloy and temper as recommended by manufacturer for application.

2.4 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.

F. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.5 FLASHING

A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.6 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer Type: Zinc chromate.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.3 INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.

B. Apply plastic cement compound between metal flashings and felt flashings.

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

END OF SECTION

SECTION 07 7100
ROOF SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manufactured roof specialties, including copings, fascias, gravel stops, and scuppers.

B. Roof control and expansion joint covers.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2022.

C. NRCA (RM) - The NRCA Roofing Manual; 2026.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

D. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Control and Expansion Joint Covers:
   1. Construction Specialties, Inc: www.c-sgroup.com/#sle.
   2. Johns Manville: www.jm.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Counterflashings:

2.2 COMPONENTS

A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
   1. Configuration: Fascia, cant, and edge securement for roof membrane.
   2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.

B. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
   1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness, and finish as cap; concealed stainless steel fasteners.
   2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.

C. Control and Expansion Joint Covers: Composite construction of ____-inch wide flexible EPDM flashing of white color with closed cell urethane foam backing, each edge seamed to

aluminum sheet metal flanges, designed for nominal joint width of 1 inch. Include special formed corners, tees, intersections, and wall flashings, each sealed watertight.

D. Expansion Joint Covers: Roof-to-roof joint cover comprised of continuous rails fastened to continuous cleat and covered with metal cap.
   1. Fasteners: Concealed. Factory-punched fastener holes.

E. Counterflashings: Factory fabricated and finished sheet metal that overlaps top edges of base flashing by at least 4 inches, and designed to snap into through-wall flashing or reglets with lapped joints.

F. Scuppers: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
   1. Configuration:
      a. Fabricate scuppers as detailed and in accordance with SMACNA Manual.
   2. Material: Pre-Finished Aluminum-zinc alloy coated steel: ASTM A 792, 55% Aluminum, 43.5% Zinc, 1.5% Silicon Coating ("Galvalume"), with minimum 50,000 p.s.i. yield.
      a. Finish: 3-coat full strength (70-percent) Kynar 500 resin (20 year) finish.
         1) Color: As selected by Architect from Manufacturer's full range of colors.
      b. Thickness: 22 gage, 0.03 inch thick, minimum.
      c. Primer: Zinc molybdate type.

2.3 FINISHES

A. Clear Anodized Finish: AAMA 611 AA-M12C22A41 Class I clear anodic coating not less than 0.7 mil, 0.0007 inch thick.

2.4 ACCESSORIES

A. Sealant for Joints in Linear Components: As recommended by component manufacturer.

B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.2 INSTALLATION

A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Anchor components securely.

END OF SECTION

SECTION 07 7123
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Prefinished Aluminum-zinc alloy coated steel gutters and downspouts.

B. Precast concrete splash pads.

1.2 RELATED REQUIREMENTS

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

B. Section 07 5416 - Ethylene Interpolymer (KEE) Roofing: Flat roofing system.

C. Section 07 6200 - Sheet Metal Flashing and Trim.

D. Section 07 7100 - Roof Specialties.

1.3 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM A792 / A792M - 09a Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

C. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.

B. Comply with applicable code for size and method of rain water discharge.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on prefabricated components.

C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.

B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pre-Finished Aluminum-zinc alloy coated steel: ASTM A792, 55% Aluminum, 43.5% Zinc, 1.5% Silicon Coating ("Galvalume"). Thickness to comply with SMACNA guidelines, 24 gauge minimum.

B. Primer: Zinc molybdate type.

C. Protective Backing Paint: Zinc molybdate alkyd.

D. Color: Architect to select from manufacturer's full range of premium colors.

2.2 COMPONENTS

A. Gutters: Profile as indicated; size as indicated.

B. Downspouts: Plain rectangular profile; size as indicated.

C. Gutter Guards: Metal gutter guard, sized to cover the length and width of the gutter.
   1. Achoring Devices: As recommended by fabricator.

D. Splash Guards: Inside corner and straight valley guards, of same material as gutters. 3" tall and 16" each direction from corner, or center, of guard.

E. Anchors and Supports: Profiled to suit gutters and downspouts.
   1. Anchoring Devices: Type recommended by fabricator.
   2. Gutter Supports: Straps, unless indicated otherwise.
   3. Downspout Supports: Brackets, unless indicated otherwise.
      a. Provide minimum of 3 locations: top, middle and bottom, unless fabricator or SMACNA recommends more. Maximum spacing 10 feet.
   4. Material: Same material as gutters and downspouts, unless fabricator recommends otherwise.

F. Fasteners: Same material and finish as gutters and downspouts , unless fabricator recommends otherwise.

G. Gutter dropouts at each downspout location. Filter screen shall be installed at each downspout location.

2.3 DOWNSPOUT BOOTS

A. Description: Smooth interior without boxed corners or choke points; include integral lug slots and on-body cleanout and cover with neoprene gaskets.
   1. Products:
      a. Jay R. Smith Mfg. Co.; Basis of Design: www.jrsmith.com..
      b. Substitutions: Reference Section 01 6000 - Product Requirements.

2.4 ACCESSORIES

A. Splash Pads on roof: Built up roof membrane as recommended by roof manufacturer

2.5 FABRICATION

A. Form gutters and downspouts of profiles and size indicated.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

D. Provide expansion joints as recommended by SMACNA guidelines, and in locations that will not hinder drainage.

E. Hem exposed edges of metal.

F. Fabricate gutter and downspout accessories; seal watertight.

2.6 FINISHES

A. Fluoropolymer Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors (Full range of preimum colors).

B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work.

3.2 PREPARATION

A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.3 INSTALLATION

A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions, or industry standards (see Reference Standards above).

B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.

C. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

D. Install splash guards on gutters at bottom of all valleys, in accordance with manufacturer's directions.

E. Set splash pads under downspouts on roof.

END OF SECTION

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SECTION 07 7200
ROOF ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Rooftop mounted guardrails.

B. Roof hatches.

1.2 REFERENCE STANDARDS

A. 29 CFR 1910.23 - Ladders; Current Edition.

B. 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices; Current Edition.

C. 29 CFR 1926.502 - Fall protection systems criteria and practices; Current Edition.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

D. Warranty Documentation:
   1. Submit manufacturer warranty.
   2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

1.5 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 ROOFTOP MOUNTED GUARDRAILS

A. Rooftop Mounted Guardrails Manufacturers:
   1. EDGE Fall Protection: www.edgefallprotection.com/#sle.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. Non-Penetrating Rooftop Mounted Guardrails:
   1. Provide top and mid railings that comply with 29 CFR 1910.29.

2. Structural Load: 200 lb, minimum, in any direction with components in compliance with 29 CFR 1926.502.
3. Height: 42 inches, minimum.
4. Railings: 1-5/8 inches minimum outside diameter, hot-rolled, welded tubing, free of sharp edges and snag points.
5. Steel Surface Finish: Hot-dip zinc galvanized, with color of safety yellow.

2.2 ROOF HATCHES AND VENTS

A. Roof Hatches and Smoke Vents: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
1. Mounting: Provide frames and curbs suitable for mounting conditions as indicated on drawings.

2.3 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

A. Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
1. Design Loadings and Configurations: As required by applicable codes.
2. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
4. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.

B. Safety Railing System: Roof hatch safety rail system mounted directly to curb without penetration of roofing system.
1. Railing Size: As indicated on drawings.
2. Railing: Comply with 29 CFR 1910.23 for ladder safety, with safety factor of two.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.4 CLEANING

A. Clean installed work to like-new condition.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

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SECTION 07 8400
FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Work described in this Section includes:
   1. Through penetration firestopping in fire rated construction.
   2. Construction-gap firestopping at connections of the same materials and different materials in fire rated construction.
   3. Construction-gap fire stopping occurring within fire rated wall, floor, floor-ceiling, and/or roof-ceiling assemblies.
   4. Construction-gap firestopping at the top of fire rated walls.
   5. Through-penetration smoke-stopping in smoke partitions.
   6. Construction-gap smoke-stopping in smoke partitions.

B. Related work Specified elsewhere includes:
   1. For structural, finish, and fire protection materials: Refer to the appropriate Specifications Sections.
   2. Fire dampers and manufactured devices: Refer to Divisions 21-23.
   3. Raceway seals and manufactured electrical devices: Refer to Division 26.

C. Unless specifically indicated otherwise, the party, trade, or subcontractor whose work penetrates fire-rated construction and/or fire-rated assemblies, shall be responsible for firestopping around their own penetrations.

D. In the event the General Contractor employs a Specialty Subcontractor for the required firestopping work, they shall notify all prospective Bidders, so as to avoid duplication in pricing.
   1. The Specialty Subcontractor shall provide coordination of requirements and the related work of other trades in advance of and as the Work progresses.

1.3 REFERENCED STANDARDS

A. Underwriters Laboratories - U.L. Fire Resistant Directory:
   1. Through-penetration fire stop devices (XHCR); Firestop Devices (XHJI).
   2. Fire resistant ratings (BXUV) (BXRH).
   3. Through-penetration firestop systems (XHEZ).
   4. Fill, void, or cavity material (XHHW).
   5. Joint Systems (XHBN) & Perimeter Fire Containment Systems (XHDG).

B. American Society for Testing and Materials Standards:
   1. ASTM E 814: Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
   2. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E 1966: Standard Test Method for Fire Resistive Joints Systems.
   4. ASTM E 2307: (Perimeter).

C. Underwriters Laboratories, Inc.:
   1. UL 1479: Fire Tests of Through-Penetration Firestops.

2. UL 2079: Tests for Fire Resistance of Building Joint Systems.
3. UL 723: Surface Burning Characteristics of Building Materials.

D. NFPA 101 - Life Safety Code / NFPA 70 - National Electrical Code.

1.4 DEFINITIONS

A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.

B. Barriers: Time rated fire walls, smoke barrier walls, time rated floor-ceiling and roof-ceiling assemblies, and structural floors and walls.

C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses, and smoke.

D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.

E. Construction Gaps: Gaps between adjacent sections of walls, exterior walls, at wall tops between top of wall and ceiling, and structural floors or roof decks; and gaps between adjacent sections of structural floors.

F. System: Specific products and applications, classified and numbered by Underwriters Laboratories, Inc., to close specific barrier penetrations.

G. Sleeve: Metal fabrication or metal pipe section extending through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required.

1.5 SYSTEM DESCRIPTION

A. Design Requirements:
1. Fire Rated Construction: Maintain barrier and structural floor fire ratings including resistance to cold smoke at all penetrations, connections with other surfaces and/or types of construction, at separations required to permit building movement and sound and/or vibration absorption, and at other construction gaps.
2. Smoke Barrier Construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations, connections with other surfaces and types of construction and at all separations required to permit building movement and sound and/or vibration absorption, and at other construction gaps.

1.6 SUBMITTALS

A. Submit in accordance with General Conditions, Division 1, and Section 01 0150 - “Special Conditions,” unless specifically indicated otherwise.

B. Product Data: Manufacturer’s written specifications and technical data including the following:
1. Detailed specifications of construction and fabrication.
2. Manufacturer’s current written installation instructions.
3. Summary of test data for each product intended for use and limitations. Include name and address of the required independent testing laboratory and compliances obtained.

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.
1. Details of each proposed assembly identifying intended products and applicable UL System number or UL Classified devices.

2. Manufacturer or manufacturers representative shall provide qualified engineering judgments and drawings relating to non-standard applications as needed.

D. Quality Control Submittals: Statement of qualifications.

E. Applicators' Qualifications Statement: List past projects indicating required experience.

1.7 QUALITY ASSURANCE

A. Specialty Contractor's Qualifications: Firm experience in installation or application of systems similar in complexity to those required for this project, plus the following:
   1. Acceptable to or licensed by manufacturer, and to State, Local, and/or other authority having jurisdiction, where applicable.
   2. At least 2-years experience with systems intended for use.
   3. Successfully completed at least five projects of similar size, scope, and complexity using the systems intended for use.

B. Local and State Regulatory Requirements: Submit forms or acceptance for proposed assemblies not conforming to specific UL Firestop System Numbers or UL classified devices and/or systems. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

C. Materials shall have been tested to provide fire rating at least equal to that of the construction.

1.8 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping:
   1. Deliver products in original unopened packaging with legible manufacturer's identification.
   2. Coordinate delivery with scheduled installation date, so as to allow minimum storage at site.

B. Storage and Protection: Store materials in a clean, dry, ventilated interior location. Store materials off of floor, and protect from soiling, abuse, moisture, and freezing. Follow manufacturer's written instructions when more stringent.

C. Remove damaged and/or contaminated materials immediately, legally dispose of off site, and Replace, at Contractor's expense.

1.9 PROJECT CONDITIONS

A. Existing Conditions:
   1. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding with work.
   2. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

B. Environmental Requirements:
   1. Furnish adequate ventilation if using solvents.
   2. Furnish forced air ventilation during installation if required by manufacturer and/or authorities having jurisdiction.
   3. Keep Flammable materials away from sparks or flame.
   4. Provide masking or drop cloths to prevent contamination of adjacent surfaces by firestopping materials.
   5. Comply with manufacturer's written recommendations for temperature and humidity conditions before, during, and after installation of firestopping.

1.10 GUARANTEE

A. Submit copies of written guarantee agreeing to repair or replace joint sealers which fail in joint adhesion, co-adhesion, abrasive resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, and/or general durability, and/or which appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality or characteristic of the material for the exposure indicated. The guarantee period shall be for 1-year from the date of "Substantial Completion."

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND PRODUCTS

A. Use only those listed in the UL Fire Resistance Directory for the UL System involved.

B. Products shall be as manufactured by one of the following , or pre-approved equivalent:
   1. Dow Corning.
   2. HILTI.
   3. 3M Fire Protection Products.
   4. Nelson Firestop Products.
   5. Rector Seal Corp.; "Bio Fireshield", "Biostop", "Biotherm", "Metacaulk", "Track-Safe", [Basis of Design]: www.rectorseal.com.
   6. Specified Technologies, Inc.
   7. Tremco, Div. of RPM Corporation.

C. All firestopping products must be from a single manufacturer.

D. All trades shall use products from the same manufacturer.

2.2 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION

A. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR (XHJI) and XHEZ may be used, providing that they conform to the construction type, penetrant type, annular space requirements, and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems or devices must be asbestos-free.
   1. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or device, and designated to perform this function.

2.3 CONSTRUCTION-GAP FIRE STOPPING OF FIRE-RATED CONSTRUCTION

A. Firestopping at construction gaps between edges of floor slabs and exterior wall construction.

B. Firestopping at construction gaps between tops of partitions and under side of structural systems.

C. Firestopping at construction gaps between tops of partitions and underside of fire-rated ceiling or ceiling assembly.

D. Firestopping of control joints in fire rated masonry partitions.

E. Firestopping expansion joints.

F. Acceptable manufacturers and products: Use only those listed in the UL Fire Resistant Directory for the UL System involved.

2.4 SMOKE STOPPING AT SMOKE PARTITIONS

A. Through-penetration smoke-stopping: Any system complying with the requirements for through-penetration firestopping in fire-rated construction, as specified in the "Referenced Standards" is acceptable, provided that the system includes the specified smoke seal or will

provide a smoke seal. The length of time of the fire resistance may be disregarded, as applicable.

B. Construction-gap smoke-stopping: Any system complying with the requirement for construction-gap firestopping in fire-rated construction, as specified in the "Referenced Standards" is acceptable, provided that the system includes the specified smoke seal or will provide the smoke seal. The length of time of the fire resistance may be disregarded, as applicable.

2.5 ACCESSORIES

A. Fill, void, and cavity materials: As classified under category XHHW in the UL Fire Resistance Directory.

B. Forming materials: As classified under category XHKU in the UL Fire Resistance Directory.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion. Notify the General Contractor of such conditions.

1. Verify barrier penetrations are properly sized and in suitable conditions for application of materials.
2. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 PREPARATION AND CLEANING

A. Clean surfaces to be in contact with penetration seal materials, of dirt, grease, oil, loose materials, rust or other substances, that may effect proper fitting, adhesion, or the required fire resistance.

3.3 INSTALLATION

A. Install penetration seal materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's written instructions and recommendations.

B. Seal holes or voids made by penetrations to ensure an effective smoke barrier.

C. Where floor openings without penetrating items are more than 4-inches in width and subject to traffic or loading, install firestopping materials capable of supporting same loading as required for floor system.

D. Protect materials from damage on surfaces subject to traffic.

E. Place firestopping in annular space around fire dampers before installation of damper's anchoring flanges, which are to be installed in accordance with fire damper manufacturer's written recommendations, unless specifically indicated otherwise.

F. Where large openings are created in walls, or floors to permit installation of pipes, ducts, cable tray, bus duct, or other items, close unused portions of opening with firestopping material tested for the application.

G. Install smoke firestopping as specified for firestopping.

H. Where rated walls are constructed with horizontally continuous air space, double width masonry, or double stud frame construction, provide vertical, 12-inch wide fiber dams for full thickness and height of air cavity at maximum intervals of 15'-0" on center.

3.4 FIELD QUALITY CONTROL

A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by the Architect, building inspector, fire inspector, and/or other authority having jurisdiction.

C. Perform under this Section patching and repairing of firestopping caused by cutting or penetration by other trades, and/or by any other cause.

3.5 ADJUSTING AND CLEANING

A. Immediately clean-up spills of liquid components.

B. Neatly cut and trim materials as required.

C. Remove equipment, materials and debris, leaving area in undamaged and clean condition.

D. Legally dispose of excess materials, trash, debris, etc., off of site.

END OF SECTION

SECTION 07 9200
JOINT SEALERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sealants and joint backing.

B. Precompressed foam sealers.

1.2 RELATED REQUIREMENTS

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

B. Section 01 4100 - Quality Requirements: Requirements for mock-ups.

C. Section 07 1400 - Fluid-Applied Air Barrier: Sealants required in conjunction with substrates for fluid-applied waterproofing.

D. Section 07 5416 - Ethylene Interpolymer (KEE) Roofing: Roofing system.

E. Section 07 6200 - Sheet Metal Flashing and Trim: Miscellaneous sheet metal.

F. Section 07 8400 - Firestopping: Firestopping sealants.

G. Section 08 8000 - Glazing: Glazing sealants and accessories.

1.3 REFERENCE STANDARDS

A. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2024.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.

D. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber; 2020.

E. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

F. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements; 2025.

G. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with other sections referencing this section.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Samples: Submit two samples, 6 by 6 inch in size illustrating sealant colors for selection.

D. Submit results of field sealant adhesion testing to Architect prior to start of work.

E. Manufacturer's Installation Instructions: Indicate special procedures.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

C. Verify sealant system is compatible with substrate before installation.

1.7 MOCK-UP

A. Integrate materials of this Section into the Exterior Assembly Mock-up per the drawing requirements, including sealants and associated accessories. This panel will be for the purpose of approving the wall system and its components.

B. Locate where directed.

C. Coordinate with work of other Sections.

D. Mock-up may not remain as part of the Work.

1.8 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.9 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.1 SEALANT PRODUCTS/MANUFACTURERS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Use silicone sealants at all exterior joints.

C. Verify sealant system is compatible with substrate.

D. Verify sealant system is compatible with fluid-applied waterproofing system.

E. Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
   1. Color: Black.
   2. Size as required to provide weathertight seal when installed.
   3. Provide product recommended by manufacturer for traffic-bearing use.
   4. Applications: Use for:
      a. Exterior wall expansion joints.
   5. Products:
      a. Basis of Design: Tremco Global Sealants; "Illmod 600": www.tremcosealants.com.
      b. Other Acceptable Manufacturers:
      c. EMSEAL Joint Systems, Ltd: www.emseal.com.
      d. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
      e. Dayton Superior Corporation: www.daytonsuperior.com.
      f. Substitutions: See Section 01 6000 - Product Requirements.

F. Type 1 - Silicone Sealant: Ultra low-modulus, high-performance, one-part, moisture-curing silicone joint sealant. ASTM C920, Type S, Grade NS, Class 100/50, Uses NT, A, G, M, O; single component. ____fungus resistant,
   1. Color: To be selected by Architect from manufacturer's standard range.

2. Applications: Use for: Masonry-to-masonry, or masonry-to-stone joints.
3. Products:
   a. Dow Corning Corporation; Product 790: www.dowcorning.com.
   b. Pecora Corporation; 890NST Ultra Low Modulus Architectural Silicone Sealant - Class 100: www.pecora.com.
   c. Tremco Global Sealants; Product Spectrem 1: www.tremcosealants.com.
   d. Substitutions: See Section 01 6000 - Product Requirements.

G. Type 2 - Silicone Sealant: Medium modulus, one-part, high-performance, neutral-cure silicone sealant. ASTM C920, Type S, Grade NS, Class 50, Uses NT, A, G, M, O; single component.____
1. Color: To be selected by Architect from manufacturer's standard range.
2. Applications: Use for: Metal-to-metal, or Window/louvers-to-masonry joints.
3. Products:
   a. Dow Corning Corporation; Product 795: www.dowcorning.com.
   b. Pecora Corporation; 895NST Medium Modulus Structural Glazing & Weatherproofing Silicone Selant - Class 50: www.pecora.com.
   c. Tremco Global Sealants; Product Spectrem 2: www.tremcosealants.com.
   d. Substitutions: See Section 01 6000 - Product Requirements.

H. Type 3 - Polyurethane Sealant: ASTM C920, Type M, Grade NS, Class 50, Uses NT, I, (Class 2), M, A ; multi component, chemical curing, capable of continuous water immersion, non-sagging type.
1. Color: To be selected by Architect from manufacturer's standard range.
2. Applications: Use for: Concrete block-to-concrete block, or concrete block-to-poured in place concrete in cavity wall construction. Joints and penetrations in vertical and horizontal surfaces of concrete, and between metal and concrete, mortar or stone; overhead or celing joints; perimeters of metal frames; vertical expansion and control joints in masonry and concrete; and at all miscellaneous locations requiring a joint sealant.
3. Sealant used behind fluid-applied waterproofing shall be compatible with fluid-applied waterproofing system.
4. Products:
   a. Sika Corporation; Product Sika Flex 2C: usa.sika.com.
   b. Sonneborn by BASF; Product Sonolastic NP-2: www.buildingsystems.basf.com.
   c. Tremco; Dymeric 240FC: www.tremcosealants.com.
   d. Substitutions: See Section 01 6000 - Product Requirements.

I. Two-Part Pourable Urethane Sealant (Horizontal): Type M, Grade P, Class 25; Uses T, M, A and, as applicable to joint substrates indicated, O.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. “Vulkem 45SSL”; Tremco, Inc.
   b. “Pourthane”; W. R. Meadows, Inc.
   c. “NR-200 Urexpan”; Pecora Corp.
   d. “Sonolastic Paving Joint Sealant”; BASF Building Products Div.,
   e. “THC-900/901”; Tremco, Inc.
   f. Substitutions: See Section 01 6000 - Product Requirements.
2. Locations for Use: Exterior and interior expansion, control and construction joints in horizontal surfaces; and joints subject to pedestrian and light vehicular traffic.
3. Equivalent 1-part sealants will be acceptable for joints in exterior concrete paving only by one of the above named manufacturers.

J. Acoustic Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   1. Applications: Use for concealed locations only:
      a. Sealant bead between top stud runner and structure, and between bottom stud track and floor.

K. Acrylic Sealants (ASTM C920):
   1. Tremco Global Sealants: www.tremcosealants.com.
   2. Red Devil; Siliconized Acrylic Construction Grade (35 Year) Sealant: www.reddevil.com.
   3. Sherwin-Williams Company; Shermax Urethanized Elastomeric Sealant: www.sherwin-williams.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

L. Butyl Sealants:
   1. Bostik Inc: www.bostik-us.com.
   2. Pecora Corporation: www.pecora.com.
   3. Sherwin-Williams Company; Storm Blaster All Season Sealant: www.sherwin-williams.com.
   4. Tremco Global Sealants: www.tremcosealants.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

M. Acrylic-Emulsion Latex Joint Sealant: Manufacturer's standard, one part nonsag, acrylic, mildew resistant, acrylic emulsion sealant complying with ASTM C 834, formulated to be paintable and recommended for exposed applications on interior and on protected exterior exposures involving joint movement of not more than + 7.5%.
   1. Products: Subject to compliance with requirements, provide with one of the following:
      a. "Chem-Calk 600"; Bostik Construction Products Div.
      b. "AC-20"; Pecora Corp.
      c. "Sonolac"; Sonneborn Building Products Div; Rexnord Chemical Prod., Inc.
      d. "Tremflex 834"; Tremco Inc.
      e. Substitutions: See Section 01 6000 - Product Requirements.
   2. Locations for Use: Interior joints in field-painted vertical and overhead surfaces at perimeter of metal door frames, gypsum drywall, plaster and concrete or concrete masonry; and all other interior locations not indicated otherwise.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

C. Joint Backing For Exterior Silicone Sealants: Jacketed, bi-cellular polyolefin "soft-rod" backer rods, as manufactured by ITP, Nomaco, or approved equal.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

2.3 MISCELLANEOUS MATERIALS

A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated.

B. Cleaners for Nonporous Surfaces: Provide non-staining, chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrates and adjacent nonporous materials.

C. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surface adjacent to joints.

D. Expansion Joint Filler: Multi-purpose, Expansion-Contraction Joint Filler for slab joints. Thickness: 1/2 inch, unless indicated otherwise. Equal to W.R.Meadows Fibre Expansion Joint.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

E. Exposed Concrete Floor Joints: Test joint filler in inconspicuous area of floor slab. Verify specified product does not stain or discolor slab.

3.3 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave.

H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

I. Concrete Floor Joint Filler: Install concrete floor joint filler per manufacturer's written instructions. After floor joint filler is fully cured, shave joint filler flush with top of concrete slab.

3.4 FIELD QUALITY CONTROL

A. Perform field sealant testing for all exterior sealants that affect watertightness.
   1. Test each material scheduled as a substrate for silicone sealants to verify substrate priming and preparation requirements.
   2. Field sealant adhesion testing shall be performed by authorized representative of selected sealant manufacturer.
   3. Submit results of field sealant adhesion testing to Architect prior to start of work.

4. Coordinate results of testing so that substrate preparation and priming requirements are known at time when needed by sealant applicator before sealant installation.

3.5 CLEANING

A. Clean adjacent soiled surfaces.

3.6 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 07 9513
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Expansion joint cover assemblies for floor, wall, ceiling, and soffit surfaces.

1.2 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry: Placement of joint cover assembly frames in masonry.

B. Section 05 5000 - Metal Fabrications: Custom fabricated metal expansion and control joint devices.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Roof expansion and control joint covers.

D. Section 07 7100 - Roof Specialties: Roof expansion and control joint covers.

E. Section 09 2116 - Gypsum Board Assemblies: Gypsum board control joint trim.

F. Section 09 5100 - Acoustical Ceilings: Expansion joint assemblies in suspended ceiling grids.

1.3 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.

D. ASTM B455/B455M - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes; 2026.

E. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2024.

F. ITS (DIR) - Directory of Listed Products; Current Edition.

G. UL (DIR) - Online Certifications Directory; Current Edition.

H. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.

C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.

D. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Expansion Joint Cover Assemblies:
   1. Construction Specialties, Inc; _____: www.c-sgroup.com/#sle.
   2. MM Systems Corp; _____: www.mmsystemscorp.com/#sle.
   3. Nystrom, Inc; _____: www.nystrom.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 EXPANSION JOINT COVER ASSEMBLIES

A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
   1. Joint Dimensions and Configurations: As indicated on drawings.
   2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
   3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
   4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

2.3 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.

B. Resilient Filler: Neoprene, exhibiting Shore A hardness of 40 to 50 Durometer.

C. Threaded Fasteners: Stainless steel.

D. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

B. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

3.2 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor to substrate to prevent misalignment.

3.3 PROTECTION

A. Do not permit traffic over unprotected floor joint surfaces.

END OF SECTION

SECTION 08 1116
ALUMINUM DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Glazed aluminum doors.

B. Aluminum frames.

C. Flush door panels.

D. Glazing.

1.2 RELATED REQUIREMENTS

A. Section 08 7100 - Door Hardware : Hardware for aluminum doors.

B. Section 08 8000 - Glazing: Glazing materials for aluminum doors and frames.

1.3 REFERENCE STANDARDS

A. AAMA 502 - Voluntary Specification for Field Testing of Newly Installed Fenestration Products; 2021.

B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2025.

C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

D. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights; 2026.

E. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

G. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

J. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors; 2002 (Reapproved 2018).

K. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015 (Reapproved 2023).

L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's descriptive literature for each type of door; include information on fabrication methods.

C. Shop Drawings: Include elevations of each opening type.

D. Verification Samples: Two actual pieces of products in each finish specified, not less than 6 inches square or 6 inches long for linear components. For finishes subject to color variation, include not less than two samples illustrating extreme range to be anticipated.

E. Test Report: Certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.

F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum components in manufacturer's standard protective packaging, palleted, crated, or banded together.

B. Inspect delivered components for damage and replace. Repaired components will not be accepted.

C. Store components in clean, dry, indoor area, under cover in manufacturer's packaging until installation.

D. Protect materials and finish from damage during handling and installation.

1.7 FIELD CONDITIONS

A. Do not begin installation of interior aluminum components until space has been enclosed and ambient thermal conditions are being maintained at levels consistent with final project requirements.

1.8 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 DOORS AND FRAMES

A. Accessibility: Comply with ICC A117.1 and ADA Standards.

B. Dimensions and Shapes: As indicated on drawings; dimensions indicated are nominal.
   1. Provide the following clearances:
      a. Hinge and Lock Stiles: 1/8 inch.
      b. Between Meeting Stiles: 1/4 inch.
      c. At Top Rail and Bottom Rail: 1/8 inch.

2.2 COMPONENTS

A. Flush Door Panels: Without visible seams on face sheet.
   1. Framing and Hardware Backup: Extruded aluminum tubing, 1/8 inch minimum thickness.
   2. Perimeter Edges: Extruded aluminum cap.
   3. Laminating Adhesive: Manufacturer's standard low-VOC materials.

B. Frames: Extruded aluminum shapes, not less than 0.062 inch thick, reinforced at hinge and strike locations.
   1. Corner Brackets: Extruded aluminum, fastened with stainless steel screws.

2. Trim: Extruded aluminum, not less than 0.062 inch thick, removable snap-in type without exposed fasteners.

2.3 PERFORMANCE REQUIREMENTS

A. Provide door assemblies that have been designed and fabricated in compliance with specified performance requirements.

2.4 MATERIALS

A. Aluminum Sheet: ASTM B209/B209M, alloy 5005, temper H14, stretcher leveled.

B. Extruded Aluminum: ASTM B221 (ASTM B221M), alloy 6063, temper T5, or alloy 6463, temper T5.

2.5 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel, or other material warranted by manufacturer as non-corrosive and compatible with aluminum components.

B. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible, otherwise, non-magnetic stainless steel or steel hot-dip galvanized in compliance with ASTM A123/A123M.

C. Bituminous Coating: Cold-applied asphaltic mastic, compounded for 30-mil thickness per coat.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that wall surfaces and openings are ready to receive frames and are within tolerances specified in manufacturer's instructions.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Perform cutting, fitting, forming, drilling, and grinding of frames as required for project conditions.

B. Replace components with damage to exposed finishes.

C. Separate dissimilar metals to prevent electrolytic action between metals.

3.3 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and approved shop drawings.

B. Set frames plumb, square, level, and aligned to receive doors. Anchor frames to adjacent construction in strict accordance with manufacturer's recommendations and within specified tolerances.

C. Where aluminum surfaces contact metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact by painting dissimilar metal with heavy coating of bituminous paint.

D. Hang doors and adjust hardware to achieve specified clearances and proper door operation.

3.4 FIELD QUALITY CONTROL

A. See Section 01 4000 - QUALITY REQUIREMENTS for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

B. Provide field testing of installed aluminum doors by independent laboratory in accordance with AAMA 502 and AAMA/WDMA/CSA 101/I.S.2/A440 during construction process and before installation of interior finishes.
   1. Field test for water penetration in accordance with ASTM E1105 using Procedure B - cyclic static air pressure difference; test pressure shall not be less than 1.9 psf.
   2. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 6.27 psf.

C. Repair or replace fenestration components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5 CLEANING

A. Upon completion of installation, thoroughly clean door and frame surfaces in accordance with AAMA 609 & 610.

B. Do not use abrasive, caustic, or acid cleaning agents.

3.6 PROTECTION

A. Protect products of this section from damage caused by subsequent construction until Date of Substantial Completion.

B. Replace damaged or defective components that cannot be repaired to a condition indistinguishable from undamaged components.

END OF SECTION

SECTION 08 1213
HOLLOW METAL FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non-fire-rated hollow metal frames for non-hollow metal doors.

B. Fire-rated hollow metal frames for non-hollow metal doors.

1.2 RELATED REQUIREMENTS

A. Section 08 1416 - FLUSH WOOD DOORS: Non-hollow metal door for hollow metal frames.

B. Section 08 7100 - Door Hardware: Hardware, silencers, and weatherstripping.

1.3 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.

C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2025.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.

F. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.

G. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.

H. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

I. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

J. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2024.

K. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Samples: Submit one sample of frame metal, 2 by 2 inches, showing factory finishes, colors, and surface textures.

E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

F. Manufacturer's qualification statement.

G. Installer's qualification statement.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Hollow Metal Frames with Integral Casings:

B. Hollow Metal Frames with Applied Casings, Prefinished:

2.2 PERFORMANCE REQUIREMENTS

A. Door Frame Type: Provide hollow metal door frames with either integral casing or applied casings.
   1. Interior Doors: Use frames with integral casings.

B. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.

C. Accessibility: Comply with ICC A117.1 and ADA Standards.

D. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior frame that is also indicated as being sound-rated must comply with the requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.

E. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830, NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

2.3 HOLLOW METAL DOOR FRAMES WITH INTEGRAL CASINGS

2.4 HOLLOW METAL DOOR FRAMES WITH APPLIED CASINGS

A. Frame Type: Knockdown, slip-on drywall frames; separate jambs and head with separate snap-on casings both sides; factory-applied finish on exposed surfaces.
   1. Frame Material: Cold-rolled steel complying with ASTM A1008/A1008M.
   2. Casing Material: Formed steel.
   3. Casing Profile: As indicated.
   4. Finish: Factory-applied baked enamel finish, or electrostatically applied water-based paint.
      a. Color: As selected from manufacturer's full line.

2.5 FINISHES

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

2.6 ACCESSORIES

A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.3 INSTALLATION

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

B. Coordinate frame anchor placement with wall construction.

C. Install door hardware as specified in Section 08 7100.

D. Touch up damaged factory finishes.

END OF SECTION

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SECTION 08 1416
FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; fire rated and non-rated.

1.2 RELATED REQUIREMENTS

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

B. Section 04 2000 - Unit Masonry: Masonry construction to receive door frames.

C. Section 06 2000 - Finish Carpentry: Wood trim and molding associated with flush wod doors.

D. Section 08 1113 - Steel Doors and Frames: Steel door frames to receive wood doors.

E. Section 08 4313 - Aluminum Framed Storefronts: Interior aluminum framed storefronts to receive wood doors.

F. Section 08 7100 - Finish Hardware.

G. Section 08 8000 - Glazing.

H. Section 09 2116 - Gypsum Board Assemblies: Framing and wall assemblies to receive door frames.

1.3 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).

C. ANSI A208.1 - American National Standard for Particleboard; 2022.

D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

H. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

I. ASTM E336 - Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings; 2025a.

J. ASTM E413 - Classification for Rating Sound Insulation; 2022.

K. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2023.

L. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2023.

M. AWI (QCP) - Quality Certification Program; Current Edition.

N. BHMA A156.13 - Mortise Locks and Latches; 2022.

O. FM (AG) - FM Approval Guide; Current Edition.

P. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

Q. ITS (DIR) - Directory of Listed Products; Current Edition.

R. AWS (AWI/AWMAC/WI) Architectural Woodwork Standards, 2nd Edition; 2014.

S. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

T. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).

U. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

V. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

W. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

X. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata (2022).

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing and louvers.

D. Samples: Submit two samples of stain colors, 6 x 6 inches minimum - on actual veneer chosen, for Architect to use to select stain color.

E. Verification Samples: Submit two samples of door veneer, minimum 24 x 24 inches in size illustrating wood grain, stain color, and sheen.

F. Manufacturer's Installation Instructions: Indicate special installation instructions.

G. Warranty, executed in Owner's name.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than FIVE (5) years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than five (5) years of documented experience.

C. Installed Fire-Rated Door Assembly: Comply with fire-rating as indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging, and inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.7 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Eggers Industries: www.eggersindustries.com/#sle.
   2. Haley Brothers: www.haleybros.com/#sle.
   3. Marshfield-Algoma: www.marshfielddoors.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 DOORS

A. General: See drawings for locations and additional requirements.
   1. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at each location, _____.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with NFPA 252 or UL 10B - Negative (Neutral) Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
      a. Labeling of Fire Doors:
         1) Attach fire rating label to each fire rated unit.
         2) Fire rating label must be accessible, permanent (embossed on metal label), kept legible at all times, and shall contain the fire resistance rating in hours and/or minutes.
   3. Wood veneer facing with factory transparent finish.

2.3 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), 5-plies, and faces as indicated.

B. Fire Rated Doors if shown: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.4 DOOR FACINGS

A. Veneer Facing for Transparent Finish: White oak, veneer grade in accordance with quality standard indicated, quarter cut, with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Any option allowed by quality standard for grade.

2.5 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:
   1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

E. Provide edge clearances in accordance with the quality standard specified.

2.6 FINISHES - WOOD VENEER DOORS

A. Factory finish doors in accordance with specified quality standard:

1. Transparent Finish: Transparent catalyzed polyurethane, Premium quality, minimal sheen.
2. Stain color shall be custom stain color as selected by Architect.

2.7 LIGHT FRAMES

A. Factory Glazing: Refer to Section 08 8000 - Glazing for glass view panels in flush wood doors. Factory install glass in fire rated doors only. Fill glazing bead nail holes in factory finished doors.

B. Wood Glass Stops (Beads) for Light Openings in Wood Doors: Provide manufacturer's standard flush wood beads unless otherwise indicated.
   1. Wood Species: Same species as door faces.
   2. Profile: Flush rectangular beads.
   3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips as required and approved for such use.
   4. Fill glazing bead (stops) nail holes after glass has been installed - fill to match door color.

C. Wood Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered non-combustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated. Profile per Marshfield Veneer Clad Light Bead, matching non-rated W-6 profile.

2.8 ACCESSORIES

A. Hollow Metal Door Frames: See Section 08 1113.

B. Metal Louvers: See Section 08 1113.

C. Glazing: See Section 08 8000.

D. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

E. Door Hardware: See Section 08 7100.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

F. Install door louvers plumb and level.

3.3 TOLERANCES

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

B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.4 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.5 SCHEDULE

A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

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SECTION 08 3100
ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Access door and frame units, fire-rated and non-fire-rated, in wall and ceiling locations.

B. Attic Hatch.

1.2 RELATED REQUIREMENTS

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

B. Section 07 9005 - Joint Sealers.

C. Section 09 2116 - Gypsum Board Assemblies: Openings in gypsum ceilings or partitions.

D. Section 09 9100 - Painting: Field paint finish.

E. Divisions 22-26 Sections: Additional access doors provided and installed by Contractors for Plumbing, Mechanical, Electrical and related work.

1.3 SUMMARY

A. This Section includes access doors for installation in the following types of new construction:
   1. Gypsum drywall.
   2. Unit masonry.
   3. As otherwise indicated.

B. Provide fire-rated access doors where indicated or scheduled, and at access openings in all walls of stairs, elevator shafts and equipment rooms, other shafts and plumbing chase walls which are partially or fully open through floors, and at walls and ceilings indicated or required by Code to be fire-rated.

1.4 REFERENCE STANDARDS

A. UL (FRD) - Fire Resistance Directory; Current Edition.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
   1. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, finishes, latching or locking provisions, and other data pertinent to installation.

C. Shop Drawings: Indicate exact position of all access door units. Also indicate fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.

D. Manufacturer's Installation Instructions: Indicate installation requirements.

E. Project Record Documents: Record actual locations of each access unit.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated access doors.
   1. Provide access doors of fire rating equivalent to the fire rated assembly in which they are to be installed.

2. Provide products listed and labeled by UL as suitable for the purpose specified and indicated.

B. Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturer listed in Underwriters Laboratories, Inc.'s "Building Materials Directory" for rating shown.
   1. Provide UL label on each fire-rated access door.
   2. Fire rating label must be accessible, permanent (embossed on metal label), kept legible at all times, and shall contain the fire resistance rating in hours and/or minutes.

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain access doors for entire project from one source from a single manufacturer.

B. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

C. Coordination: Furnish inserts and anchoring devices that must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

1.8 PROJECT CONDITIONS

A. Coordinate the work with other work requiring access doors.

B. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.

C. Special-Size Access Doors: Use where required or requested; indicate on schedule.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Wall and Ceiling Access Doors:
   1. Acudor Products Inc: www.acudor.com.
   2. Bar-Co., Inc.
   3. Cesco Products
   4. J.L. Industries [Basis of Design]: www.activarcpg.com/jl-industries/.
   5. Karp Associates, Inc: www.karpinc.com.
   6. Larsens Manufacturing Co.
   7. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.
   8. Nystrom: www.nystrom.com.
   9. The Williams Brothers Corp.
   10. Substitutions: See Section 01 6000 - Product Requirements.

2.2 ATTIC HATCH

A. Nystrom Building Products: www.nystrom.com. Product: NT, Steel Access Door, 36 inch by 36 inch, with 1 inch flange at perimeter, constructed of 14 gauge steel at door, 16 gauge at frame. 1 year warranty. Powder coat. For ceiling mount. Latch: As selected by Architect.
   1. Substitutions: See Section 01 6000 - Product Requirements.

B. Precision Ladders: www.precisionladders.com. Product: Super Simplex Disappearing Stairway aluminum folding stairway. Individual tread test weight -1,000 lbs. No shear of rivets when tested at 2,000 lbs. 11 gauge steel frame. 5-3/16" tread depth. Meet ANSI A14.9-2004.
   1. Substitutions: See Section 01 6000 - Product Requirements.

2.3 ACCESS DOORS AND PANELS

A. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies units are to be installed in.

B. Units in Fire Rated Assemblies: Fire rating equivalent to the fire rated assembly in which they are to be installed.

2.4 MATERIALS AND FABRICATION: ACCESS DOOR UNITS - WALLS AND CEILINGS

A. Door and Frame Units: Formed steel.
   1. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts, and ready for installation.
   2. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
   3. Frames and flanges: 0.058 inch steel.
      a. Fabricate frame with exposed flange, nominal 1-inch wide around perimeter of frame for units installed in the following construction:
         1) Exposed masonry.
         2) Exposed concrete.
         3) Exposed siding.
      b. For gypsum drywall or gypsum veneer plaster, furnish perforated flange frames with drywall bead.
      c. For full-bed plaster and E.I.F.S. applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.
   4. Door panels: 0.070-inch single thickness steel sheet.
      a. Painted Flush Panel Doors (non-fire-rated and fire-rated): Fabricate from not less than 16-gage galvanized sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.
         1) Restore any damage to galvanized finish with cold-process galvanizing repair paint, prior to applying factory prime coating, or other finishes.
      b. Stainless Steel Flush Panel Doors: Fabricate from not less than 18-gage stainless steel sheet, with concealed spring hinges or concealed piano hinge set to open 175 degrees. Buff exposed surfaces to #4 satin finish, except where other finishes are indicated.
   5. Size: As indicated or as necessary to access and service equipment.
   6. Hardware:
      a. Hardware for Fire-Rated Units: As required for listing.
      b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
      c. Hinge: 175 degree steel piano hinge with removable pin.
      d. Latch/Lock: Screw driver slot for quarter turn cam latch.
   7. Galvanized, hot dipped finish, except where indicated otherwise.
   8. Finish: No. 4 finish for stainless units.

B. Non-Fire Rated Door and Frame Units in Walls:
   1. Provide manufacturer's standard flush panel/door and frame.

C. Fire Rated Door and Frame Units in Walls:

1. For fire rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.

D. Locking Devices: Furnish flush, screwdriver-operated cam locks of number required to hold door in flush, smooth plane when closed.

E. Finishes:
1. Attic hatch: Phosphate dipped with factory applied primer coat.
2. Exterior: 3-coat 70% resin “Kynar 500” finish (i.e.: 7-mil prime coat, 9-mil color coat, and 9-mil clear top coat) with minimum 2.4 mil total dry film thickness, in color to match adjacent finish where occurs, unless otherwise selected by Architect from manufacturer's standard non-metallic colors - 15 colors minimum to select from, including white.
3. Interior, Exposed to Normal View: To match finish on interior. Door "Finish Hardware" (refer to Section 08 7100), or if not indicated, to match existing hardware in room where occurs.
4. Interior, in Service Areas, Above Ceilings, etc: Factory primed baked enamel.
5. Toilet Rooms, Janitors Rooms, Kitchens, Kitchen Areas, Rooms Where Food is Stored, Prepared, Cooked and/or Served, and Break Rooms: Stainless steel, No. 4, satin finish.

2.5 FABRICATION

A. Weld, fill, and grind joints to ensure flush and square unit.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.2 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings in relation to adjacent finish surfaces. Secure rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

D. Coordinate installation with work of other trades.

E. Prepare perimeter of rough openings in concrete, CMU, and clay masonry with mortar/grout full-depth of wall and to size required; use pressure-treated wood as necessary for other concealed blocking, grounds, and supports at any stud wall construction.

3.3 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION

SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

1.2 RELATED REQUIREMENTS

A. Section 08 8000 - Glazing: Glass and glazing accessories.

1.3 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2026.

B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

E. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2026.

F. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum 3 years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified, with minimum 3 years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.9 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Aluminum-Framed Storefronts:
   1. Kawneer North America: www.kawneer.com/#sle.
   2. Oldcastle BuildingEnvelope: www.oldcastlebe.com/#sle.
   3. Trulite Glass & Aluminum Solutions, LLC; _____: www.trulite.com/#sle.
   4. YKK AP America, Inc: www.ykkap.com/commercial/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.2 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Position: Centered (front to back).
   2. Finish: Superior performing organic coatings.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
   3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.

2.3 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Glazing Stops: Flush.

B. Swing Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Top Rail: 7 inches wide.
   3. Vertical Stiles: 7 inches wide.
   4. Bottom Rail: 10 inches wide.
   5. Finish: Same as storefront.

2.4 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209/B209M.

C. Fasteners: Stainless steel.

D. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.5 HARDWARE

A. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

B. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.2 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Install hardware using templates provided.

J. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.4 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

3.5 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 4413
GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Aluminum-framed curtain wall, with vision glazing and glass and metal infill panels.

1.2 RELATED REQUIREMENTS

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

B. Section 05 1200 - Structural Steel Framing: Steel attachment members.

C. Section 05 4000 - Cold-Formed Metal Framing: Metal studs framing at exterior of building.

D. Section 05 5000 - Metal Fabrications: Steel attachment devices.

E. Section 07 8400 - Firestopping: Firestop at system junction with structure.

F. Section 07 9005 - Joint Sealers: Perimeter sealant and back-up materials.

G. Section 08 4313 - Aluminum-Framed Storefronts: Entrance framing and doors.

H. Section 08 5113 - Aluminum Windows: Fixed sash within glazing system.

I. Section 08 8000 - Glazing: Glass, and Spandrel Panels.

J. Section 09 2116 - Gypsum Board Assemblies: Metal stud and gypsum board wall at interior of curtain wall.

1.3 REFERENCE STANDARDS

A. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems; 2024.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

C. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2026.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

F. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

I. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015 (Reapproved 2023).

J. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Samples: Submit two samples 8 by 8 inches in size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.

E. Submit all curtain wall materials and accessory products to glazing manufacturer to verify materials compatibility with glazing.

F. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.

G. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.

H. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

I. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the state in which the project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than five years of documented experience.

1.7 MOCK-UP

A. Include Glazed Aluminum Curtain Walls in Mock-Up as described in Section 01 4000 - Quality Requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.9 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Warranty shall include language relating to watertightness and airtightness.

C. Manufacturer Warranty: Provide 5-year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with installer.

D. Provide five (5) year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. Oldcastle Building Envelope: www.oldcastlebe.com.
2. YKK AP America, Inc.: www.ykkap.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
2. Cross-Section:
a. 2-1/2 x 7-1/2 inch nominal dimension.
b. Provide 2-1/2" covers at perimeter conditons [head, jamb, sill] where curtin wall abutts adjacent wall material and at other location indicated.
c. Provide 4-3/4" covers at connecting bridge vertical mullions.
d. Provide standard 1" [nominal] cover at all other locations.
3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
4. Both vertical and horizontal span, where indicated.
5. Manufacturer shall provide mullion to satisfy single span dimension of 24'-0" on a horizontal spacing of 3'-4" that can accommodate a lateral load of 28 psf.

B. Glazing: See Section 08 8000.

C. Curtainwall Anchors
1. Finish: anchors exposed to view to match curtainwall finish.

2.3 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209/B209M.

C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.

D. Structural Supporting Anchors Attached to Structural Steel: Design for bolted attachment.

E. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.

F. Exposed Flashings: 0.032 inch thick aluminum sheet; finish to match framing members.

G. Concealed Flashings: 0.018 inch thick galvanized steel.

H. Firestopping: See Section 07 8400.

I. Glazing: As specified in Section 08 8000.

J. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

K. Glazing Accessories: See Section 08 8000.

L. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.4 FINISHES

A. Superior Performing Organic Coatings System: Manufacturer's standard multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (PVDF) resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch.
   1. Finish: Class I natural anodized.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.5 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce framing members for imposed loads.

G. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
   1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other related work.

B. Verify that curtain wall openings and adjoining water-resistive and air barrier seal materials are ready to receive work of this section.

C. Verify that anchorage devices have been properly installed and located.

3.2 INSTALLATION

A. Install curtain wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Coordinate attachment and seal of perimeter air and vapor barrier materials.

H. Install perimeter sealant in accordance with Section 07 9005.

I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inch per 3 feet noncumulative or 0.5 inches per 100 feet, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.

B. The following testing will be performed by the Owner's testing agency. The General Contractor and appropriate subcontractors shall be available to coordinate and support testing process.

C. See Section 01 4000 - QUALITY REQUIREMENTS for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

D. Provide field testing of installed curtain wall system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
   1. Perform a minimum of two tests in each designated area as indicated on drawings.
   2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
   3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 4.18 psf.
      a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.

E. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.5 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

3.6 PROTECTION

A. Protect installed products from damage until Substantial Completion.

END OF SECTION

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SECTION 08 71 00 - DOOR HARDWARE

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 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. Architectural Hinges
2. Continuous Hinges
3. Pivots Sets
4. Key Control System, Cylinders and Cores.
5. Locksets, Latchsets and Deadbolts
6. Panic Devices and Fire Rated Exit Devices
7. Closers and Door Control Devices
8. Automatic Door Operators
9. Overhead Door Stops and Holders
10. Floor and Wall Stops
11. Door Bolts and Coordinators
12. Door Pulls, Push/Pull Plates and Push/Pull Sets
13. Protective Plates
14. Door Seals, Gasketing and Weatherstripping
15. Thresholds
16. Miscellaneous Door Control Devices
17. Electromechanical Hardware
18. Miscellaneous Access Control Components and Security Equipment

C. Related Sections: The following Sections contain requirements that relate to the following sections.

1. Section 08 1113: Hollow Metal Doors and Frames
2. Section 08 1400: Wood Doors
3. Section 08 3323: Coiling Doors
4. Section 08 4113: Aluminum-Framed Entrances and Storefronts
5. Section 08 3490: Tornado Resistant Opening Systems
6. Section 08 4126: All-Glass Entrances
7. Section 08 1100: Custom Steel Doors and Frames
8. Division 26: Electrical
9. Division 28: Electronic Safety and Security

D. Products furnished but not installed under this Section to include:

1. Cylinders for locks on entrance doors.
2. Final replacement cores and keys to be installed by Owner.

1.3 REFERENCES:

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies

3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

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.
j. Column 1: State specified item and manufacturer.
k. 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. Provide samples if requested of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.

1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.

E. 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.

F. 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.

1. 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 Work.

B. Coordination Meetings:

1. Contractor to 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 to set up and attend the following:
3. 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.

C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction.

1. 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 to comply with State and local codes and UL 10C.

2. 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".

D. All hardware is to comply with Federal and State Handicap laws.

E. Substitutions: Request for substitutions of items of hardware other than those listed as "acceptable and approved" shall be made to the architect in writing no later than fourteen (14) days prior to bid opening. Approval of substitutions will only be given in writing or by Addenda. Requests for substitutions shall be accompanied by samples and/or detailed information for each manufacturer of each product showing design, functions, material thickness and any other pertinent information needed to compare your product with that specified. Lack of this information will result in a refusal.

F. Pre-Installation Coordination:

1. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.
2. Schedule a hardware pre-installation meeting on site to review and discuss the installation of continuous hinges, locksets, door closers, exit devices, overhead stops, and electromechanical door hardware.
3. Meeting attendees shall be notified 7 days in advance and shall include: Architect, Contractor, Door Hardware Installers (including low voltage hardware), Manufacturers representatives for above hardware items, and any other effected subcontractors or suppliers.
4. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

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. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use, or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.

B. Warranties:

1. Locksets: 10 Year Period
2. Electromechanical Locksets: 3 Year Period

3. Exit Devices: 10 Year Period
4. Electromechanical Exit devices: 3 Year Period
5. Surface Closers: 30 Year Period
6. Power Supplies: 3 Year Period
7. Weather Stripping/Gasketing: 5 Year Period
8. Overhead Stops: 10 Year Period

1.8 MAINTENANCE:

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions that are packed in hardware items for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Parts kits: Furnish manufacturers' standard parts kits for locksets, exit devices, and door closers.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the hardware schedule at the end of this Section.

2.2 MANUFACTURED UNITS: (*Denotes manufacturer referenced in the Hardware Headings)

A. Hinges:

1. Acceptable manufacturers:

a. Ives*
b. Stanley
c. McKinney

2. Characteristics:

a. Provide hinges conforming to ANSI/BHMA A156.1.
b. Provide five knuckle, ball bearing hinges.
c. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

1) Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
2) Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

d. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

1) Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
2) Interior: Heavy weight, steel, 5 inches (127 mm) high

e. 2 inches or thicker doors:

1) Exterior: Heavy weight, bronze, or stainless steel, 5 inches (127 mm) high
2) Interior: Heavy weight, steel, 5 inches (127 mm) high

f. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
g. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
h. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
i. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1) Steel Hinges: Steel pins
2) Non-Ferrous Hinges: Stainless steel pins
3) Out-Swinging Exterior Doors: Non-removable pins
4) Out-Swinging Interior Lockable Doors: Non-removable pins

5) Interior Non-lockable Doors: Non-rising pins

j. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

B. Geared Continuous Hinges:

1. Acceptable manufacturers:

a. Ives*
b. Select Products
c. Markar

2. Characteristics:

a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
e. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
g. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

C. Power Transfer:

1. Acceptable manufacturers:

a. Von Duprin EPT-10

2. Requirements:

a. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
b. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.
c. All hardwired, door mounted, electrified hardware to receive EPT-10 power transfer, unless scheduled authorized

D. Cylinders and Keying:

1. Acceptable manufacturers:

a. Match existing Corbin Russwin keying system.

2. Characteristics:

a. All lock cylinders are to be keyed to the owner’s existing Corbin Russwin master system. Provide standard 6-pin cylinders. Match existing Corbin Russwin 6N keyway. Provide temporary cylinders for exterior doors for use by the general contractor during construction. General contractor shall remove temporary cylinders and install permanent cylinders at the completion of the project.
b. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.

c. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.

1) Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."

d. Key Material: Provide keys of nickel silver only.
e. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system created 5 grandmaster keys for each grandmaster system.

E. Mortise Locksets and Latchsets: as scheduled.

1. Acceptable manufacturers:

a. Schlage L9000 Series*
b. Accurate 9000/9100
c. Sargent 8200 Series

2. Required Features:

a. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
b. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
c. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
d. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
e. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
f. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches.
g. Provide motor based electrified locksets that comply with the following requirements:

1) Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
2) Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case.
3) Low maximum current draw – maximum 0.4 amps to allow for multiple locks on a single power supply.
4) Low holding current – maximum 0.01 amps to produce minimal heat, eliminate "hot levers" in electrically locked applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
5) Connections – provide quick-connect Molex system standard.

h. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

1) Vandlgard: Provide levers with vandal resistant technology for use at heavy traffic or abusive applications.

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 to limit damage to the unit from vandalism. Lever design to match locksets.
e. All exit devices to be made of brass, bronze, stainless steel, or aluminum material, powder coated, anodized, or plated to the standard architectural finishes to match the balance of the door hardware.
f. Provide glass bead kits (GBK) to shim exit devices on doors with raised glass beads, as required.
g. All exit devices to be one manufacturer. No deviation will be considered.
h. All series exit devices to incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation. All exit devices to be non-handed. Touchpad to extend a minimum of 1/2 of the door width and to extend to the height of the cross-rail housing for a "no pinch" operation. Plastic touchpads are not acceptable. All latchbolts to be the deadlocking type. Latchbolts to have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable. Plastic linkage and "dogging" components are not acceptable.
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.
j. Non-rated panic hardware to receive standard hex-key dogging functionality.
k. Exit devices to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap to be of heavy-duty metal alloy construction and provide horizontal adjustment to provide alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.

G. Surface Closers:

1. Acceptable manufacturers:

a. LCN Closers 4010/4110Series*
b. Norton 9500 Series
c. Corbin Russwin DC8000

2. Characteristics:

a. Door closers to have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
b. All closers to utilize a stable fluid withstanding temperature range of 120oF to -30oF without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors to be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
c. Spring power to 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 to be by tamper-proof, non-critical valves. Closers to have separate adjustment for latch speed, general speed, and back check.
d. All closers to have solid forged steel main arms (and forearms for parallel arm closers) and where specified to have a cast-in solid stop on the closer shoe ("CUSH"). All parallel arm mounted closers to have "EDA" type arms or, where door travel on out-swing doors must be limited, use "CUSH" or "SCUSH" type closers. Auxiliary stops are not required when "CUSH" type closers are used. Provide drop plates where top rail of door is not sufficient

for closer mounting. Provide “cush shoe supports” and “blade stop spacers” where dictated by frame details.

e. Overhead concealed closers to have spring power adjustable for 50% increase in closing power and fully mortised door tracks.

f. All surface closers to be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) to be of one manufacturer and carry manufacturer's ten-year warranty (electric closers to have two-year warranty).

g. 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.

h. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors to provide for corridor clear width as required by code. Where possible, mount closers inside rooms.

i. 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.

j. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

k. Magnetic Door Holders to be heavy duty wall or floor mounted with metal housing and complete mounting hardware. Provide 24V holding coils unless otherwise scheduled.

l. Where specified, security closers (Series 4040XP and 146) to have heavy duty forged steel arms with special joints to prevent disassembly. All covers to be one-piece drawn metal and utilize a four-point mounting. All exposed fasteners to have hex-lobular drive with a security pin.

H. Overhead Door Stop/Holders:

1. Acceptable manufacturers:

a. Glynn Johnson*
b. Rixson Firemark

2. Characteristics:

a. Provide heavy duty concealed door holders of stainless steel.
b. Provide heavy duty surface mounted door holders of stainless steel.
c. Concealed holders to be installed with the jamb bracket mortised flush with the bottom of the jamb. The arm and channel to be mortised into the door.
d. Surface holders to be installed with the jamb bracket mounted on the stop.
e.

I. Floor Stops and Wall Bumpers:

1. Acceptable manufacturers:

a. Ives*
b. Trimco
c. Rockwood Manufacturing

2. Characteristics: Refer to Hardware Headings.

J. Door Bolts/Coordinators:

1. Acceptable manufacturers:

a. Ives*
b. Trimco
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 to be UL listed for fire door application without bottom bolts (LBB).
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 piece to close the header. Provide brackets as required for mounting of soffit applied hardware.

K. Push Plates:

1. Acceptable manufacturers:

a. Ives*
b. Trimco
c. Rockwood Manufacturing

2. Characteristics:

a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.
b. Material to be forged stainless steel, per the Hardware Headings.
c. Provide plates sized as shown in Hardware Headings.

L. Door Pulls & Pull Plates:

1. Acceptable manufacturers:

a. Ives*
b. Trimco
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 forged stainless steel.
c. Provide units sized as shown in Hardware Headings.

M. Push Pull Sets:

1. Acceptable manufacturers:

a. Ives*
b. Trimco
c. Rockwood Manufacturing

2. Characteristics:

a. Provide mounting systems as shown in hardware sets.
b. Material to be tubular stainless steel.
c. Provide Push/Pull sets sized as shown in Hardware Headings.

N. Protective Plates:

1. Acceptable manufacturers:

a. Ives*
b. Trimco
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:
c. Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
d. 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.
e. Sizes:

1) Refer to hardware headings for specific sizes.

O. Thresholds:

1. Acceptable manufacturers:

a. Zero Weatherstripping Co., Inc.*
b. Pemko
c. Reese Industries

2. Types: Indicated in Hardware Headings.

P. Door Seals/Gasketing:

1. Acceptable manufacturers:

a. Zero Weatherstripping Co., Inc.*
b. Pemko
c. Reese Industries

2. Types: Indicated in Hardware Headings.

Q. Silencers:

1. Acceptable manufacturers:

a. Ives*
b. Hager
c. Rockwood Manufacturing

2. Provide three for each single door; two for each pair of doors.

2.3 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.

2.4 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.

F. All hardware to be 626 (US26D), 652 (US26D) Satin Chrome Finish, with the following exceptions:

1. Exterior Butt Hinges: 630 (US32D) Satin Stainless Steel
2. Interior Butt Hinges: 652 (US26D) Satin Chrome Plated Steel Base Material
3. Continuous Hinges: 628 (US28) Clear Anodized Aluminum
4. Door Closers: 689 Powder Coat Aluminum
5. Push Plates: 630 (US32D) Satin Stainless Steel
6. Pull Plates: 630 (US32D) Satin Stainless Steel
7. Protective Plates: 630 (US32D) Satin Stainless Steel
8. Overhead Holders: 630 Satin Stainless Steel

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. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. 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”.

F. 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. HARDWARE SCHEDULE

HARDWARE SET: 01

DOOR NUMBER:
E132

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	OFFICE LOCK	L9050	SCH
1	CYL/CORE	AS REQUIRED	
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

HARDWARE SET: 02

DOOR NUMBER:
E111

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	STOREROOM LOCK	L9080	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	100S	GLY
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	656A-223	ZER

HARDWARE SET: 03

DOOR NUMBER:
E133

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	STOREROOM LOCK	L9080	SCH
1	CYL/CORE	AS REQUIRED	
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

HARDWARE SET: 04

DOOR NUMBER:
M108

EACH TO HAVE:

6	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	STOREROOM LOCK	L9080	SCH
1	CYL/CORE	AS REQUIRED	
2	OH STOP	100S	GLY
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	ASTRAGAL	43STST	ZER
2	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

HARDWARE SET: 05

DOOR NUMBER:
M106

EACH TO HAVE:

6	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	STOREROOM LOCK	L9080	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	100S	GLY
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	ASTRAGAL	43STST	ZER
2	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

HARDWARE SET: 06

DOOR NUMBER:
114A 140C

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 NRP	IVE
1	PANIC HARDWARE	98-NL-OP-110MD	VON
1	CYL/CORE	AS REQUIRED	
1	DOOR PULL	9266F O 18”	IVE
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

HARDWARE SET: 07

DOOR NUMBER:
V101

EACH TO HAVE:

6	HINGE	5BB1HW 4.5 X 4.5 NRP	IVE
1	REMOVABLE MULLION	KR4954 STAB	VON
1	PANIC HARDWARE	98-EO	VON
1	PANIC HARDWARE	98-NL-OP-110MD	VON
2	CYL/CORE	AS REQUIRED	
2	DOOR PULL	9266F O 18”	IVE
2	SURFACE CLOSER	4111 SCUSH MC	SCH
2	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MULLION SEAL	139N PSA	ZER

HARDWARE SET: 08

DOOR NUMBER:
E56

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	CLASSROOM LOCK	L9070	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	90S	GLY
1	SURFACE CLOSER	4011 MC TBWMS	LCN
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

HARDWARE SET: 09

DOOR NUMBER:
SR109

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	CLASSROOM LOCK	L9070	SCH
1	CYL/CORE	AS REQUIRED	
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	GASKETING	8144SBK PSA	ZER

HARDWARE SET: 10

DOOR NUMBER:

109	111	MZ102	MZ104	MZ105	MZ107
MZ108	MZ110	MZ111	MZ113	MZ115	

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	OFFICE LOCK	L9050	SCH
1	CYL/CORE	AS REQUIRED	
1	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: 11

DOOR NUMBER:
MZ106

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	OFFICE LOCK	L9050	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	100S	GLY

HARDWARE SET: 12

DOOR NUMBER:
E95

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5	IVE
1	PUSH PLATE	8200 4" X 16"	IVE
1	PULL PLATE	8303 10" 4" X 16"	IVE
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE

HARDWARE SET: 13

DOOR NUMBER:
114B

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5	IVE
1	DUMMY PUSH BAR	350	VON
1	DOOR PULL	9266F O 18”	IVE
1	SURFACE CLOSER	4111 EDA MC TBWMS	LCN
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: 14

DOOR NUMBER:

116	118	120	126	128	R122
R126	R128	R130A	R130B		

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5	IVE
1	CLASSROOM DEAD LOCK	L463	SCH
1	CYL/CORE	AS REQUIRED	
1	PUSH PLATE	8200 4" X 16"	IVE
1	PULL PLATE	8303 10" 4" X 16"	IVE
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: 15

DOOR NUMBER:

130	132

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 NRP	IVE
1	CLASSROOM DEAD LOCK	L463	SCH
1	CYL/CORE	AS REQUIRED	
1	PUSH PLATE	8200 4" X 16"	IVE
1	PULL PLATE	8303 10" 4" X 16"	IVE
1	SURFACE CLOSER	4111 EDA MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: 16

DOOR NUMBER:
R103

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	PRIVACY LOCK	L9440 OS-OCC	SCH
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: 17

DOOR NUMBER:
SR130 SR141

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	STOREROOM LOCK	L9080	SCH
1	CYL/CORE	AS REQUIRED	
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: 18

DOOR NUMBER:
M113 SR101

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5 NRP	IVE
1	STOREROOM LOCK	L9080	SCH
1	CYL/CORE	AS REQUIRED	
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

HARDWARE SET: 19

DOOR NUMBER:
M140 SR140

EACH TO HAVE:

6	HINGE	5BB1 4.5 X 4.5 NRP	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	DUST PROOF STRIKE	DP1	IVE
1	STOREROOM LOCK	L9080	SCH
2	OH STOP	100S	GLY
2	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

HARDWARE SET: 20

DOOR NUMBER:
105 106
CASED OPENING TO RECEIVE NO HARDWARE.

HARDWARE SET: 21

DOOR NUMBER:
E20 E21

EACH TO HAVE:

6	HINGE	5BB1HW 4.5 X 4.5 NRP 630 (TYPE AS REQ'D)	IVE
1	REMOVABLE MULLION	KR4954 STAB	VON
1	PANIC HARDWARE	98-NL-SNB	VON
1	PANIC HARDWARE	LD-98-EO-990-SNB	VON
2	CYL/CORE	AS REQUIRED	
2	SURFACE CLOSER	4111 SCUSH MC	SCH
2	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MULLION SEAL	139N PSA	ZER
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
2	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 22

DOOR NUMBER:
E93

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5 NRP (TYPE AS REQ'D)	IVE
1	PANIC HARDWARE	LD-98-NL-SNB	VON
1	CYL/CORE	AS REQUIRED	
1	SURFACE CLOSER	4111 SCUSH MC	SCH

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 23

DOOR NUMBER:
E01 E02 E03 E05 E06 E07

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 NRP (TYPE AS REQ'D)	IVE
1	PANIC HARDWARE	98-EO	VON
1	DOOR PULL	9266F 18" O	IVE
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 24

DOOR NUMBER:
E04 E08

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 NRP (TYPE AS REQ'D)	IVE
1	PANIC HARDWARE	98-NL-OP-110MD	VON
1	CYL/CORE	AS REQUIRED	
1	DOOR PULL	9266F 18" O	IVE
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 25

DOOR NUMBER:
M107

EACH TO HAVE:

6	HINGE	5BB1 4.5 X 4.5 NRP (TYPE AS REQ'D)	IVE
1	REMOVABLE MULLION	KR4954 STAB	VON
1	PANIC HARDWARE	98-NL-SNB	VON
1	PANIC HARDWARE	LD-98-EO-990-SNB	VON
2	CYL/CORE	AS REQUIRED	
2	SURFACE CLOSER	4111 SCUSH MC	SCH
2	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MULLION SEAL	139N PSA	ZER

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 26

DOOR NUMBER:
E91 E99

EACH TO HAVE:

6	HINGE	5BB1HW 4.5 X 4.5 NRP (TYPE AS REQ'D)	IVE
1	REMOVABLE MULLION	KR4954 STAB	VON
1	PANIC HARDWARE	98-EO	VON
1	PANIC HARDWARE	98-NL-OP-110MD	VON
2	CYL/CORE	AS REQUIRED	
2	DOOR PULL	9266F O 18"	IVE
2	SURFACE CLOSER	4111 SCUSH MC	SCH
2	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MULLION SEAL	139N PSA	ZER

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 27

DOOR NUMBER:
E100

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	CLASSROOM LOCK	L9070	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	90S	GLY
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 28

DOOR NUMBER:
E53

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	CLASSROOM LOCK	L9070	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	90S	GLY
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 29

DOOR NUMBER:
E32

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	CLASSROOM LOCK	L9070	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	90S	GLY
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 30

DOOR NUMBER:
E40

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	CLASSROOM LOCK	L9070	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	90S	GLY

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 12

DOOR NUMBER:
E95

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	PUSH PLATE	8200 4" X 16"	IVE
1	PULL PLATE	8303 10" 4" X 16"	IVE
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 31

DOOR NUMBER:
E50

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	CLASSROOM LOCK	L9070	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	90S	GLY
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 32

DOOR NUMBER:
E49

EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	CLASSROOM DEAD LOCK	L463	SCH
1	CYL/CORE	AS REQUIRED	
1	PUSH PLATE	8200 4" X 16"	IVE
1	PULL PLATE	8303 10" 4" X 16"	IVE
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 33

DOOR NUMBER:
E43

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	STOREROOM LOCK	L9080	SCH
1	CYL/CORE	AS REQUIRED	
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 34

DOOR NUMBER:
E33 E101 E102

EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5 (TYPE AS REQ'D)	IVE
1	STOREROOM LOCK	L9080	SCH
1	CYL/CORE	AS REQUIRED	
1	OH STOP	90S	GLY
1	SURFACE CLOSER	4011 MC TBWMS	SCH
1	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 35

DOOR NUMBER:
E113

EACH TO HAVE:

6	HINGE	5BB1 4.5 X 4.5 NRP (TYPE AS REQ'D)	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	DUST PROOF STRIKE	DP1	IVE
1	STOREROOM LOCK	L9080	SCH
2	OH STOP	100S	GLY
2	KICK PLATE	8400 10" X 2" LDW B-CS	IVE

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

HARDWARE SET: 36

DOOR NUMBER:
E30

EACH TO HAVE:

1	CONT. HINGE	112XY EPT (TYPE AS REQ'D)	IVE
1	POWER TRANSFER	EPT10 CON	VON
1	ELEC PANIC HARDWARE	LXRX-LC-QEL-98-NL-OP-110MD-CON 24 VDC	VON
1	CYL/CORE	AS REQUIRED	
1	DOOR PULL	9264F O 18"	IVE
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	THRESHOLD	65A	ZER
1	WIRE HARNESS (DEVICE TO EPT)	CON-6/192P (LENGTH/TYPE AS REQ'D)	SCH
1	WIRE HARNESS (EPT TO BLDG. PWR.)	CON-6W	SCH
1	CREDENTIAL READER	BY SECURITY/ACCESS CTRL SYSTEMS	
1	REMOTE LOCK/UNLOCK	BY SECURITY/ACCESS CTRL SYSTEMS	
1	DOOR CONTACT	679-05HM	SCE
1	POWER SUPPLY	PS902 900-2RS 120/240 VAC	VON

FIELD VERIFY AND COORDINATE NEW HARDWARE AND DOOR WITH EXISTING FRAME. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING STRIKE AND HINGE WITH NEW MATCH EXISTING FRAME PREP AS REQUIRED.

COORDINATE HARDWARE WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
BALANCE OF HARDWARE BY ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.

COORDINATE HARDWARE WITH ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.
BALANCE OF EAC COMPONENTS BY ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.

OPERATION: CREDENTIAL READER TO UNLOCK HARDWARE AND ALLOW PASSAGE MOMENTARILY. REMOTE SIGNAL FROM ACCESS CONTROL SYSTEMS TO LOCK/UNLOCK HARDWARE. DOOR AND LATCH CONTACT MONITORED REMOTELY VIA SECURITY AND ACCESS CONTROL SYSTEMS. FREE EGRESS AT ALL TIMES.

HARDWARE SET: AL-01

DOOR NUMBER:
104B 104C

EACH TO HAVE:

1	CONT. HINGE	112XY	IVE
1	PANIC HARDWARE	98-NL-OP-110MD	VON
2	CYL/CORE	AS REQUIRED	
1	DOOR PULL	9264F O 4" LESS DOOR HEIGHT	IVE
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	THRESHOLD	65A	ZER

COORDINATE HARDWARE WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
BALANCE OF HARDWARE BY ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.

HARDWARE SET: AL-02

DOOR NUMBER:
140A 140B

EACH TO HAVE:

2	CONT. HINGE	112XY	IVE
1	REMOVABLE MULLION	KR4954 STAB	VON
1	PANIC HARDWARE	98-EO	VON
1	PANIC HARDWARE	98-NL-OP-110MD	VON
2	CYL/CORE	AS REQUIRED	
2	DOOR PULL	9264F O 4” LESS DOOR HEIGHT	IVE
2	SURFACE CLOSER	4111 SCUSH MC	SCH
1	MULLION SEAL	139N PSA	ZER

COORDINATE HARDWARE WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
BALANCE OF HARDWARE BY ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.

HARDWARE SET: AL-03

DOOR NUMBER:
104A

EACH TO HAVE:

2	CONT. HINGE	112XY	IVE
1	REMOVABLE MULLION	KR4954 STAB	VON
1	PANIC HARDWARE	98-EO	VON
1	PANIC HARDWARE	98-NL-OP-110MD	VON
2	CYL/CORE	AS REQUIRED	
2	DOOR PULL	9264F O 4” LESS DOOR HEIGHT	IVE
1	SURFACE CLOSER	4111 EDA MC TBWMS LCN	SCH
1	SURFACE CLOSER	4111 SCUSH MC	SCH
1	MULLION SEAL	139N PSA	ZER

COORDINATE HARDWARE WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
BALANCE OF HARDWARE BY ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.

HARDWARE SET: AL-04

DOOR NUMBER:
MZ100

EACH TO HAVE:

2	CONT. HINGE	112XY	IVE
1	PANIC HARDWARE	9847-EO-LBR	VON
1	PANIC HARDWARE	9847-NL-OP-110MD-LBR	VON
2	CYL/CORE	AS REQUIRED	
2	DOOR PULL	9264F O 4” LESS DOOR HEIGHT	IVE
2	SURFACE CLOSER	4111 SCUSH MC	SCH

COORDINATE HARDWARE WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
BALANCE OF HARDWARE BY ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.

HARDWARE SET: AL-05

DOOR NUMBER:
LB101

EACH TO HAVE:

2	CONT. HINGE	112XY EPT	IVE
2	POWER TRANSFER	EPT10 CON	VON
1	ELEC PANIC HARDWARE	HD-QEL-98-EO-CON 24 VDC	VON
1	ELEC PANIC HARDWARE	HD-QEL-98-NL-OP-110MD-CON 24 VDC	VON
1	CYL/CORE	AS REQUIRED	
2	DOOR PULL	9264F O 4" LESS DOOR HEIGHT	IVE
1	SURFACE CLOSER	4111 SCUSH MC	LCN
1	SURF. AUTO OPERATOR	9542IQ NO TRACK COV2 SW	LCN
2	JAMB MOUNT ACTUATOR	8310-818T	LCN
1	WALL MOUNT ACTUATOR	8310-853T	LCN
1	THRESHOLD	65A	ZER
2	WIRE HARNESS (DEVICE TO EPT)	CON-6/192P (LENGTH/TYPE AS REQ'D)	SCH
2	WIRE HARNESS (EPT TO BLDG. PWR.)	CON-6W	SCH
1	CREDENTIAL READER	BY SECURITY/ACCESS CTRL SYSTEMS	
2	DOOR CONTACT	679-05HM	SCE
1	POWER SUPPLY	PS902 900-4RL 120/240 VAC	VON

COORDINATE HARDWARE WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
BALANCE OF HARDWARE BY ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
COORDINATE AUTO OPERATOR WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER. PROVIDE MOUNTING AND HEADER COMPONENTS AS REQUIRED.

COORDINATE HARDWARE WITH ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.
BALANCE OF EAC COMPONENTS BY ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.

OPERATION: CREDENTIAL READER TO UNLOCK HARDWARE ENABLE EXTERIOR ACTUATOR AND ALLOW PASSAGE MOMENTARILY. INTERIOR ACTUATOR ALWAYS ACTIVE. REMOTE SIGNAL FROM ACCESS CONTROL SYSTEMS TO LOCK/UNLOCK HARDWARE. DOOR AND LATCH CONTACT MONITORED REMOTELY VIA SECURITY AND ACCESS CONTROL SYSTEMS. FREE EGRESS AT ALL TIMES.

HARDWARE SET: AL-06

DOOR NUMBER:

E10	E11	E12	E13	E14	E15
E17	E18				

EXISTING HARDWARE, DOOR AND FRAME TO REMAIN. NO NEW WORK.

HARDWARE SET: AL-07

DOOR NUMBER:
E16

EACH TO HAVE:

1	POWER TRANSFER	AS REQUIRED
1	ELEC PANIC HARDWARE	FIELD CONVERSION
2	OPERATOR ACTUATORS	REUSE EXISTING, REPLACE AS REQUIRED
1	CREDENTIAL READER	BY SECURITY/ACCESS CTRL SYSTEMS
1	POWER SUPPLY	AS REQUIRED

FIELD VERIFY AND COORDINATE EXISTING OPENING TO RECEIVE ACCESS CONTROL. CONVERT OR REPLACE EXISTING PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION, MATCH EXISTING MODEL. COORDINATE WITH EXISTING AUTO OPERATOR. COORDINATE NEW HARDWARE AS REQUIRED WITH EXISTING DOOR AND FRAME. BALANCE OF EXISTING HARDWARE TO REMAIN. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING HARDWARE AS REQUIRED.

COORDINATE HARDWARE WITH ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.
BALANCE OF EAC COMPONENTS BY ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.

HARDWARE SET: AL-08

DOOR NUMBER:
E09

EACH TO HAVE:

1	POWER TRANSFER	AS REQUIRED	1
1	ELEC PANIC HARDWARE	FIELD CONVERSION	1
2	OPERATOR ACTUATORS	REUSE EXISTING, REPLACE AS REQUIRED	2
1	CREDENTIAL READER	BY SECURITY/ACCESS CTRL SYSTEMS	1
1	POWER SUPPLY	AS REQUIRED	1
1	SURF. AUTO OPERATOR	9542IQ	LCN
2	JAMB MOUNT ACTUATOR	8310-818T	LCN
1	WALL MOUNT ACTUATOR	8310-853T	LCN

FIELD VERIFY AND COORDINATE EXISTING OPENING TO RECEIVE ACCESS CONTROL. CONVERT OR REPLACE EXISTING PANIC HARDWARE WITH ELECTRIC LATCH RETRACTION, MATCH EXISTING MODEL. COORDINATE NEW HARDWARE AS REQUIRED WITH EXISTING DOOR AND FRAME. BALANCE OF EXISTING HARDWARE TO REMAIN. PATCH, FILL AND REPAIR ANY UNUSED HOLES AND HARDWARE PREPARATION. REPLACE EXISTING HARDWARE AS REQUIRED. COORDINATE NEW AUTO OPERATOR AND ACTUATORS WITH EXISTING HARDWARE, DOOR AND FRAME.

COORDINATE HARDWARE WITH ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.
BALANCE OF EAC COMPONENTS BY ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.

END OF SECTION 087100

SECTION 08 8000
GLAZING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.2 RELATED REQUIREMENTS

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

B. Section 08 1416 - Flush Wood Doors: Glazed doors. Glazing furnished by door manufacturer.

C. Section 08 4313 - Aluminum-Framed Storefronts: Glazing furnished by storefront manufacturer.

D. Section 08 4426 - Structural Glazed Canopies: Entrance canopy and associated laminated safety glass.

E. Section 08 5113 - Aluminum Windows: Glazing furnished by window manufacturer.

F. Section 08 8300 - Mirrors.

G. Section 10 2800 - Toilet, Bath, and Laundry Accessories: Framed Mirrors.

1.3 REFERENCE STANDARDS

A. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2026).

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

C. ASTM C1036 - Standard Specification for Flat Glass; 2025.

D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2024, with Editorial Revision (2025).

F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.

G. ASTM C1376 - Standard Specification for Pyrolitic and Vacuum Deposition Coatings on Flat Glass.

H. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2024.

I. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.

J. GANA (GM) - GANA Glazing Manual; 2022.

K. GANA (SM) - GANA Sealant Manual; 2008.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Provide compatibility testing of IGU edge seal with glazing compounds and setting blocks, and submit results of testing.

E. Product Data on Decorative Privacy Glazing Film for specified product.

F. Samples:
   1. Submit two samples 12x12 inch in size of glass units, showing coloration and design, for selection purposes.
   2. Submit 2 samples, minimum of 5" Wide x 60" Long of Decorative Privacy Glass Film, showing entire width of pattern, texture, and opacity level.

G. Shop Drawing showing plan & elevation of doors to receive film with installation orientation and dimensions.

H. Manufacturer's requirements for product delivery, handling, site conditions, and installation recommendations for Decorative Privacy Glazing Film.

I. Manufacturer's operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods for Decorative Privacy Glazing Film.

J. Certificates: Certify that products meet or exceed specified requirements.

K. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Glazing Film Materials: Furnish 2 percent extra material at the time of installation for future maintenance repairs. Deliver in protective packaging for storage, and label contents appropriately. Contractor shall store as recommended by manufacturer and deliver to Owner's Representative at Substantial Completion.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

B. Labeling: Furnish each pane of fire resistance-rated glazing and each pane of safety glazing with a permanent identification which meets the requirements of the latest approved edition of the International Building Code.

C. Glazing Standards: Comply with recommendations of Glass Association of North America (GANA) "Glazing Manual" and "Sealant Manual", and SIGMA TM-3000, "Vertical Glazing Guidelines", except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this secton or other referenced standards.

D. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.

E. Fire Resistance Rated Glass: Provide glass products that meet CPSC 16 CFR 1201, Category II requirements for fire-rated glass and are labeled and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

F. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certification label of the inspecting and testing organization indicated below.
   1. Insulating Glass Certification Council (IGCC).
      a. ASTM E 2190.

G. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

H. Installer of Decorative Privacy Glazing Film shall be performed by a trained and qualified installer, specialized and experienced with installation of window film. Provide documentation that installer has installed window film on at least 3 previous projects.

1.7 MOCK-UP

A. Include Glazing in Mock-Up as described in Section 01 4000 - Quality Requirements.

1.8 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.9 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

C. Replacements Under Warranties: Provide same warranty as original glass and glazing, beginning from date of replacement completion for glass units replaced under Warranty provisions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Vitro Architectural Glass (Formerly PPG); www.vitroglazings.com.

B. Other Acceptable Manufacturers:
   1. TGP America; www.tgpamerica.com.
   2. Viracon; www.viracon.com.
   3. Pilkington North America Inc: www.pilkington.com/na.
   4. Bendheim Architectural Glass; www.bendheim.com.
   5. Cardinal Glass Industries; www.cardinalcorp.com.

C. Substitutions: See Section 01 6000 - Product Requirements.

2.2 INSULATING GLASS UNITS

A. Type IG-1 - Sealed Insulating Glass Units: Tinted glazing, low-E.
   1. Application: All exterior glazing unless otherwise indicated.
   2. Basis of Design: PPG Solarban R100 Solar Control Low-E Glass.
   3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: "Solexia".
      b. Tint: Clear.
      c. Coating: Low-E (solar control type), on #2 surface.
   4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.

5. Edge Spacer: See "Sealed Insulating Glass Units" Article below.
6. Edge Spacer Color: See "Sealed Insulating Glass Units" Article below.
7. Total Thickness: 1 inch.
8. Total Visible Light Transmittance: 36 percent, nominal.
9. Total Solar Heat Gain Coefficient: 21 percent, nominal.
    a. Minimum SHGC: 25 percent, nominal.
10. Light to Solar Gain ratio (LSG): 1.71.
11. Minimum Thermal Resistance (U-Value): 0.42, nominal.
12. Glazing Method: Gasket glazing.

B. Type IG-2 - Sealed Insulating Glass Units: Safety glazing:
1. Applications: Provide this type of glazing in the following locations:
    a. Glazed lites in exterior doors.
    b. Glazed sidelights and panels next to doors.
    c. Other locations required by applicable federal, state, and local codes and regulations.
    d. Other locations indicated on the drawings.
2. Type: Same as Type IG-1 except use fully tempered float glass for both outboard and inboard lites.
3. Edge Spacer: See "Sealed Insulating Glass Units" Article below.
4. Edge Spacer Color: See "Sealed Insulating Glass Units" Article below.

C. Type IG-3 - Sealed Insulating Glass Units: Spandrel glazing.
1. Application: Exterior glazing where indicated.
2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
    a. Tint and coating, same as other sealed insulated glass units.
3. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick.
    a. Tint: Clear.
    b. Opacifier: Ceramic frit, on #4 surface.
    c. Opacifier Color: As selected by Architect.
4. Total Thickness: 1 inch.
5. Glazing Method: Gasket glazing.

D. Type IG-4 - Sealed Insulating Glass Units: Spandrel Safety glazing:
1. Applications: Provide this type of glazing in the following locations, if spandrel glazing is indicated for these locations:
    a. Glazed lites in exterior doors.
    b. Glazed sidelights and panels next to doors.
    c. Other locations required by applicable federal, state, and local codes and regulations.
    d. Other locations indicated on the drawings.
2. Type: Same as other spandrel glazing except use fully tempered float glass for both outboard and inboard lites.
3. Tint and opacifier: As scheduled for other spandrel glazing.

E. Type IG-5 - Sealed Insulating Glass Units: Interior Insulated Safety glazing.
1. Application: Provide this type of glazing in the following locations:
    a. Glazed lites at interior storefront scheduled to received insulated glazing units.
        1) Storefront Elevations S-20 and S-21. See drawings.
    b. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
        1) Tint: Clear.
        2) Coating: None.

c. Inboard Lite: Fully tempered float glass, 1/4 inch thick.
   1) Tint: Clear.
   2) Coating: None.
d. Total Thickness: 1 inch.
e. Glazing Method: Gasket glazing.

2.3 SINGLE VISION GLAZING

A. Type S-1 - Single Vision Glazing:
   1. Application: All interior glazing unless otherwise indicated.
   2. Type: Annealed float glass.
   3. Tint: Clear.
   4. Thickness: 1/4 inch.
   5. Glazing Method: Gasket glazing.

B. Type S-2 - Single Safety Glazing: Non-fire-rated.
   1. Application: Provide this type of glazing in the following locations:
      a. Glazed lites in doors, except double glazed lites in doors, and fire doors.
      b. Glazed sidelights to doors, except in double glazed sidelites, fire-rated walls and partitions.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on the drawings.
   2. Type: Fully tempered float glass as specified.
   3. Tint: Clear.
   4. Thickness: 1/4 inch.
   5. Glazing Method: Gasket glazing.

C. Mirror Glass : ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality Q1 (mirror select); silvering, protective coating and physical characteristics complying with ASTM C1503; 6 mm minimum thick.
   1. Sizes noted on Drawings.

2.4 EXTERIOR GLAZING ASSEMBLIES

A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7.
   1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
   3. Glass thicknesses listed are minimum.

2.5 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless noted otherwise.
   1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048.
   3. Thicknesses: As indicated; for exterior glazing comply with specified requirements indicated for wind load design regardless of specified thickness.

B. Fire-Protection-Rated Glazing:
   1. IBC Fire Protection Rating: D-H-T-90 or W-90, minimum.

C. High Impact-Resistant Tempered Safety Glazing: Complying with 16 CFR 1201 test requirements for Category II.

D. Ceramic-Coated Spandrel Glass: ASTM C 1048, Condition B, Type I, Quality-Q3, and complying with other requirements specified.

E. Mirror Glass : ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality Q1 (mirror select); silvering, protective coating and physical characteristics complying with ASTM C1503; 6 mm minimum thick.
   1. Sizes noted on Drawings.

2.6 SEALED INSULATING GLASS UNITS

A. Sealed Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   2. Edge Spacers: Aluminum, bent or soldered corners.
   3. Edge Spacer Color: As selected by Architect.
   4. Edge Seal: Glass to elastomer with supplementary silicone sealant.
   5. Purge interpane space with dry argon air.

2.7 GLAZING COMPOUNDS

A. Manufacturers:
   1. Bostik Inc: www.bostik-us.com.
   2. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
   3. Pecora Corporation: www.pecora.com.
   4. Substitutions: Refer to Section 01 6000 - Product Requirements.

B. Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; grey color.

C. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

D. Acrylic Sealant: Single component, solvent curing, non-bleeding; ASTM C920, Type S, Grade NS, Class 12-1/2, Uses M and A; with cured Shore A hardness range of 15 to 25; color as selected.

E. Polysulfide Sealant: Two component; chemical curing, non-sagging type; ASTM C920, Type M, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

F. Polyurethane Sealant: Single component, chemical curing, non-staining, non-bleeding; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 20 to 35; color as selected.

2.8 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I; Color as selected.

E. Glazing Clips: Manufacturer's standard type.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.

E. Install sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.

1. Place glazing tape on glazing pane of unit with tape flush with sight line.

F. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.

G. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

H. Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.4 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.5 INSTALLATION - MIRRORS

A. Install mirrors in accordance with GANA recommendations.

B. Install mirrors in correctly sized openings, using setting blocks (neoprene 80 to 90 Shore A durometer hardness), spacer shims, stainless steel clips, and adhesive compatible with mirror coating and wall substrate.

C. Set mirrors plumb and level, free of optical distortion.

D. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.

3.6 FIELD QUALITY CONTROL

A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures and unacceptable conditions.

3.7 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.8 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION

SECTION 08 9100
LOUVERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.2 RELATED REQUIREMENTS

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

B. Section 07 6200 - Sheet Metal Flashing and Trim.

C. Section .

D. Division 23 - Mechanical Sections.

1.3 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

C. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2026.

D. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021, with Editorial Revision (2022).

E. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

G. FEMA P-361 - Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms; 2024.

H. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters; 2020.

I. ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

J. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

K. ASTM D2244 - Standard Test Method for Calculation of Color Differences From Instrumentally Measured Color Coordinates.

L. FEMA 361 - Design and Construction Guidance for Community Safe Rooms.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.

D. Samples: Submit two samples 2 by 2 inches in size illustrating finish and color of exterior and interior surfaces.

E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Provide five year manufacturer warranty against distortion, metal degradation, and failure of connections.

C. Finish: Provide twenty year warranty against degradation of exterior finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Louvers:
1. Airolite Company, LLC : www.airolite.com.
2. Construction Specialties, Inc: www.c-sgroup.com.
3. Greenheck: www.greenheck.com
4. Nystrom: www.nystrom.com.
5. Ruskin Company: BASIS OF DESIGN www.ruskin.com.
6. Substitutions: See Section 01 6000 - Product Requirements.

2.2 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf without damage or permanent deformation.
2. High-Velocity Wind Load Resistance: Design to comply with applicable requirements of ICC 500 and FEMA P-361, including resistance to horizontal debris impact.
3. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
4. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
5. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.

B. Stationary Louvers : Horizontal blade, formed galvanized steel sheet construction, with concealed intermediate mullions. Storm resistant.
1. Manufacturers:
2. Free Area: 57 percent, minimum.
3. Blades: Drainable.
4. Frame: 4 inches deep nominal, channel profile; corner joints mitered and, with continuous recessed caulking channel each side, and extended subsill.
5. Steel Thickness, Galvanized: Frame 16 gauge, 0.0598 inch minimum base metal; blades 16 gauge, 0.0598 inch minimum base metal.

2.3 MATERIALS

A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

B. Bird Screen: Interwoven wire mesh of steel, 0.063 inch diameter wire, 1/2 inch open weave, diagonal design.

C. Insect Screen: 18 x 16 size aluminum mesh.

D. Primer: Zinc chromate, alkyd type.

2.4 FINISHES

A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.

2.5 ACCESSORIES

A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

B. Fasteners and Anchors: Stainless steel.

C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

B. Verify that field measurements are as indicated.

3.2 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louver frames in openings with concealed fasteners.

E. Install perimeter sealant and backing rod in accordance with .

F. Coordinate with installation of mechanical ductwork.

3.3 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

END OF SECTION

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SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Metal stud wall framing.

B. Metal channel ceiling framing.

C. Shaft wall system.

D. Fire rated area separation walls.

E. Fiber reinforced backing board.

F. Gypsum wallboard.

G. Moisture-Resistant board.

H. Glass mat faced gypsum board sheathing.

I. High-Impact gypsum board.

J. Joint treatment and accessories.

1.2 RELATED REQUIREMENTS

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

B. Section 05 4000 - Cold-Formed Metal Framing: Structural steel stud framing.

C. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

D. Section 07 1400 - Fluid-Applied Air Barrier: Water-resistive barrier and air barrier over sheathing. Sealant for sheathing on which fluid-applied waterproofing will be applied.

E. Section 07 2100 - Thermal Insulation: Acoustic insulation.

F. Section 07 2400 - Exterior Insulation and Finish Systems: Water Resistive Barrier over exterior wall sheathing.

G. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.

H. Section 07 9005 - Joint Sealers: Acoustic sealant.

1.3 REFERENCE STANDARDS

A. AISI S201 - North American Standard for Cold-Formed Steel Framing - Product Data; 2017.

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.

C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2020.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2025.

F. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).

G. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2026).

H. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.

I. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2025.

J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.

K. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.

L. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2024.

M. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2024.

N. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2025.

O. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

P. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.

Q. GA-226 - Application of Gypsum Board to Form Curved Surfaces; 2025.

R. GA-238 - Guidelines for the Preventions of Mold Growth on Gypsum Wallboard; 2003.

S. GA-253 - Recommended Specifications for the Application of Gypsum Sheathing; Gypsum Association; 1999.

T. GA-600 - Fire Resistance and Sound Control Design Manual; 2024.

U. GA-801 - Handling and Storage of Gypsum Panel Products: A Guide For Distributors, Retailers, and Contractors; 2007.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data:

C. Test Reports: For stud framing products that do not comply with AISI S220 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.5 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
   1. Maintain one copy of standards at project site.
   2. Where indicated, provide materials and construction which are identical with those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

B. Single Source Responsibility: Comply with one of the following:
   1. Obtain all steel framing and all metal trim from a single manufacturer.
   2. Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
   3. Provide a confirmation letter from both the gypsum board manufacturer and the joint compound manufacturer that their products are compatible and warrantable if used together.

C. Pre-Construction Conference: Prior to beginning work associated with roof system, the Contractor and appropriate subcontractors shall meet to discuss coordination of the work of the trades associated with the installation of the roof system, suspended acoustical and gypsum board ceiling, suspended mechanical ductwork, suspended light fixtures, etc. This work shall be planned and coordinated to provide hanger attachments needed by the various trades in a manner that will minimize conflict with installation of the roof system.

1.6 MOCK-UP

A. Include Gypsum Board Asemblies in Mock-Up as described in Section 01 4000 - Quality Requirements.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated assemblies as indicated on drawings.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. 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. Neatly stack gypsum boards flat to prevent sagging.

C. When materials are moved into the building, distribute pallets and loads evenly around work areas so as to avoid overloading structure, causing damage to any materials, interfering with work of other trades, etc.

D. Handle gypsum boards to prevent damage to edges, ends and surfaces. Do not bend or otherwise damage metal corner beads, trim, etc.

PART 2 - PRODUCTS

2.1 METAL FRAMING MATERIALS

A. Material and Product Requirements: AISI S201 and AISI S220.

B. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.

C. Manufacturers - Metal Framing, Connectors, and Accessories:
1. Aegis Metal Framing, LLC.
2. ClarkDietrich Building Systems: www.clarkdietrich.com.
3. Marino/WARE Industries, Corp.: www.marinoware.com.
4. MBA Metal Framing: www.mbastuds.com.
5. SEMCO, Southeastern Metals, Div of Gibraltar Industries.
6. Steel-Con; Div. of Steel Construction Systems.
7. Telling Industries, LLC.

D. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf. Install with flange edges bent back 90 deg. and doubled over to form 3/16-inch minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and minimum depth as follows:
1. Metal studs at interior partitions shall have web depth of 3-5/8-inches or 6-inches at locations indicated on the drawings, and a minimum base metal thickness of 0.0296-inches, spaced at 16-inches o.c., unless indicated otherwise below or otherwise shown on

drawings or required by project conditions. EQ studs allowed for spans up to 16'-0" vertically when 3rd party test data (e.g. ICC-ES report) is provided.

2. Jamb studs shall be no less than 20 gauge.
   a. Studs shall be joined together at 4'-0" intervals.
3. Use double studs or 6-inch studs, as indicated or as otherwise required, for chase walls, piping, conduits, or etc.
4. Special stud tracks for curved walls shall be equivalent to "Flex-C Trac" galvanized flexible segmented track with slidable side straps, as manufactured by Flex-Ability Concepts, Inc.; Oklahoma City, OK.
5. Runners: U shaped, sized to match studs.
6. Ceiling Channels: C-shaped.
7. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.
8. Resilient Furring Channels: 1/2 inch depth, 25 gauge minimum, for attachment to substrate through one leg only.

E. Exterior Non-Loadbearing Studs and Furring for Application of Gypsum Board: As specified in Section 05 4000.

F. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05 4000.
   1. Studs: C-shaped with knurled or embossed faces.
   2. Any interior load-bearing studs shall be at least 6-inches depth x 18 gauge, or 8-inches x 18 gauge, unless otherwise indicated on Drawings - galvanized C-studs spaced at 16-inches o.c.

G. Shaft Wall Studs and Accessories: Galvanized sheet steel.
   1. Metal shaft wall studs at interior shaft walls shall be 2-1/2 inches x 25 gauge, 4 inches x 20 gauge, or 6 inches x 20 gauge at locations indicated on the Drawings, spaced in compliance with the required UL Assembly Number, unless otherwise shown on drawings or required by project conditions. C-H and C-T shaftwall studs are acceptable.

H. Steel Framing Components for Suspended and Furred Ceilings:
   1. General: Provide components which comply with ASTM C 754 for materials and sizes, unless otherwise indicated.
   2. Wires for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.
   3. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
   4. Steel Studs for Furring Channels: ASTM C 645, with flange edges bent back 90 deg. and doubled over to form 3/16-inch minimum lip (return), minimum thickness of base (uncoated) metal and minimum depth as follows:
      a. Thickness: 20 gauge, unless otherwise indicated.
      b. Depth: As indicated.
      c. Spacing: As indicated in referenced standard and on drawings, but no less than at all edges and 24-inches o.c.
   5. Steel Rigid Furring Channels: ASTM C645, hat-shaped, depth of 7/8-inch, and minimum thickness of base (uncoated) metal as follows:
      a. Thickness: 20 gauge at interior and 18 gauge at exterior, unless otherwise indicated.
      b. Spacing: As indicated in referenced standard and on drawings, but not less than at all edges and 16-inches o.c.
         1) At ceilings and soffits indicated to receive more than a single layer of gypsum board, spacing shall be not less than at all edges and 16-inches o.c.

6. Grid Suspension System: ASTM C 645, manufacturer's standard grid suspension system composed of main beams and cross furring members which interlock to form a modular supporting network.
    a. Locations for Use: Provide grid type suspension systems for sloped and horizontal ceiling applications of interior gypsum board products which are not attached directly to primary framing system; Minimum 4-feet x 4-feet grid and cross tees at 2-feet o.c., with minimum installation requirements as required by manufacturer's current written instructions, referenced standards, and as indicated in this Section and Section 09 5100 - "Suspended Acoustical Ceilings". Provide and comply with manufacturer's published requirements for accessories, trim and hanger wire, and as otherwise required to provide flat ceilings without deflection or sag.
    b. Product/Manufacturer: Provide suspended modular grid furring system equivalent to standard drywall suspension system for flat ceilings, with 1-1/2-inch grid faces, and as follows:
        1) Equivalent to "Drywall Suspension System", as manufactured by USG Interiors, or one of the other above named manufacturers.

I. Continuous Horizontal Bridging/bracing:
1. 1-1/2-inch cold-rolled channels (galvanized); 0.0538-inch minimum bare metal G60.
2. Spacing: 4'-0" or 4'-6" o.c. vertically, through pre-punched slots in studs.
3. Splice Plates: 16 gauge at all splices.
4. Anchors (bridging channels to studs): 1-1/2-inches x 2-inches x 16 gauge clip angle, 1/4-inch less than stud width, secured with four (4) 5/8-inch S-14 screws. (Anchors required at ends of runs, where snap-in fit to stud slots is not snug or allows stud to move/slide on channels, and at studs on each side of splices in bridging channels).

J. Strap Bracing/Blocking: 16 gauge steel flat strapping/blocking, minimum 6" width. Provide with manufacturer's recommended attachment.

2.2 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
1. CertainTeed Corporation; ____: www.certainteed.com/#sle.
2. Georgia-Pacific Corp.
3. Gold Bond Building Products Div., National Gypsum Company.
4. Lafarge Gypsum.
5. United States Gypsum Company.

B. Impact Resistant Wallboard:
1. Application: High-traffic areas indicated.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Type: Fire-resistance-rated Type X, UL or WH listed.
4. Thickness: 5/8 inch.
5. Edges: Tapered.
6. Products:
    a. National Gypsum Company; Gold Bond Hi-Impact Brand XP Wallboard.
    b. Sheetrock brand Mold Tough VH1 Firecode gypsum panels.
    c. Temple-Inland Building Product by Georgia-Pacific, LLC; ComfortGuard IR Impact Resistant.

C. Gypsum Wallboard: Paper-faced as defined in ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut, and as follows:

1. Application: Use for vertical surfaces and horizontal surfaces, unless otherwise indicated.
2. Fire Resistant Type: Type X board (UL or WH listed) at all locations, unless other type is required by indicated tested assembly.
3. Thickness (unless indicated otherwise):
   a. Vertical Surfaces: 5/8 inch.
   b. Ceilings: 1/2 inch.
4. Edges: Tapered.

D. Moisture and Mold-Resistant Paper-Faced Products:
1. Core Type: Type X.
2. Thickness: 5/8 inch.
3. Edges: Tapered.
4. Application: At rooms with toilet fixtures and/or service sinks, entire wall behind sinks, and elsewhere as indicated or wherever water-resistant gypsum board is indicated.
5. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
6. Product:
   a. Georgia Pacific ToughRock Mold-Guard.
   b. USG Sheetrock brand "Mold Tough" gypsum panels.
   c. Substitutions: See Section 01 6000 - Product Requirements.

E. Backing Board For Tile:
1. Fiber-Reinforced Gypsum Panels: As defined in ASTM C1278, mold-resistant, and with water-resistant core. No paper face.
2. Thickness: 5/8 inch.
3. Product:
   a. Georgia Pacific "DensShield Tile Backer".
   b. USG Fiberock brand "Aqua-Tough" Tile backerboard.
   c. Substitutions: See Section 01 6000 - Product Requirements.
4. Application: Wall surfaces behind tile.

F. Gypsum Exterior Sheathing Board: Glass Mat gypsum sheathing board consisting of noncombustible gypsum core incorporating a water-resistant material, surfaced on face, back and long edges with glass mats; complying with ASTM C 1177 and requirements indicated below:
1. Type: Type X at all locations. (Noncombustible.)
2. Edge and End Configuration: Square.
3. Thickness: 5/8-inch, unless indicated otherwise.
4. Size: 4'-0" x 8'-0" or 9'-0" as required for coordination with framing.
5. Products:
   a. Georgia Pacific "DensGlass Sheathing".
   b. CertainTeed Gypsum "GlasRoc Sheathing".
   c. Continental Building Products: www.continental-bp.com "Weather Defense Platinum Type X".
   d. Gold Bond "eXP Extended Exposure Sheathing".
   e. USG "Securock Exterior Sheathing".
6. Joints: Sealed and facing-taped joints. Polyurethane joint sealant reinforced with fiberglass mesh tape encapsulated in the sealant. Sheathing fastener heads shall be encapsulated with polyurethane sealant. Fiberglass reinforcement is not needed at sheathing fastener heads. NO acrylic latex sealant shall be used.

7. Extent: For Exterior sheathing, where plywood or other wood sheathing is not indicated.

2.3 GYPSUM BOARD ACCESSORIES

A. Finishing Accessories:
   1. Types: As detailed or required for finished appearance.
   2. Materials: 6063-T5 extruded aluminum alloy and G40 galvanized steel sheet in accordance with ASTM A653/A653M.
   3. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.

B. Extruded Moldings and Reveal Moldings: Provide manufacturer's standard alloy 6063-T5 extruded units with 70% resin 2-coat "Kynar 500" baked enamel finish, and as follows:
   1. Design: Provide shapes and configurations as indicated on the Drawings.
      a. Form reveal moldings to cover at least two sides and rear of reveal.
      b. At drywall (or plaster) edge, provide continuous expanded metal edge, designed for mudding-in.
      c. At ceiling grid edge, provide continuous edge designed for compatibility with lay-in ceiling grid.
      d. Wall to gypsum ceiling reveal: provide continuous reveal molding equal to Fry Reglet "Z" reveal: with 1/2" wide reveal. Paint to match ceiling.
   2. Color: To match ceiling grid in same room where occurs, unless indicated otherwise, and color as selected by Architect at any exterior locations.

C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, coated glass fiber tape for joints and corners of glass-mat faced boards, and where recommended by manufacturer. Joint material shall be compatible with and approved by air barrier manufacturer, where applicable.
   2. Tape: 2 inch wide, creased paper tape for joints and corners of paper faced boards, and where recommended by manufacturer.

D. Level 5 Surface System Options:
   1. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
   2. Factory-Applied Skim-Coated Drywall with matching Joint Compound: Rapid Deco Level 5 System by Lafarge.

E. Fasteners: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum drywall manufacturers for applications indicated.

F. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

G. Adhesive for Attachment to Wood, ASTM C557.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.
   1. Environmental Requirements, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840, with gypsum

board manufacturer's recommendations, and with adhesive manufacturer's recommendations, for before, during, and after installation.

2. Minimum Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40º.
3. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

3.2 SEQUENCING AND SCHEDULING

A. Sequence installation of gypsum board and sheathing with installation of exterior cladding and roofing to comply with requirements indicated below:
   1. Do not leave gypsum sheathing board exposed to weather after its application for more than one month or, if protected as indicated below, for more than 6 months, unless otherwise warranted by manufacturer:
      a. Cover exterior surface of sheathing with a temporary air infiltration barrier equivalent to 6-mil polyethylene film. Apply covering immediately after sheathing is installed.
      b. Remove covering just prior to installation of asphalt felt, face brick, and similarly applied exterior materials.

3.3 SHAFT WALL INSTALLATION

A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
   1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
   2. Install studs at spacing required to meet performance requirements.

B. Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.
   1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
   2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.4 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.

C. Suspended Ceilings and Soffits: Space framing and furring members at 16 inches on center minimum.
   1. Level ceiling system to a tolerance of 1/1200.
   2. Laterally brace entire suspension system.
   3. Suspend ceiling hangers from building structural members and as follows:
      a. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
      b. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapeze or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

c. Secure wire hangers 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 them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
d. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
e. Secure hangers to structural support by connecting directly to structure where possible; otherwise, connect to anchorage devices or fasteners as indicated or required.
f. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
g. Do not attach hangers to steel deck tabs.
h. Do not attach hangers to steel roof deck. Attach hangers to structural members.
i. Do not connect or suspend steel framing from ducts, pipes or conduit.
j. Keep hangers and braces 2-inches clear of ducts, pipes and conduits.
k. Sway-brace suspended steel framing with hangers used for support.
l. Install suspended steel framing components in sizes and at spacing indicated but not less than that required by referenced steel framing installation standard
    1) Wire Hangers: 12 gauge, 4-feet on center. Install supplementary hangers as necessary at ceiling fixtures to provide a hanger at each corner of each fixture, diffuser, grille, and other ceiling-mounted equipment.
m. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross furring members to each other and butt-cut to fit into wall track.

4. Install bracing as required at exterior locations to resist wind uplift.

D. Studs: Space studs at 16 inches on center.
1. Extend partition framing to structure in all locations unless otherwise indicated.
2. Installation Tolerances: Install each steel framing and furring member so that fastening surface does not vary more than 1/8-inch from plane of faces of adjacent framing.
3. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
4. Extend non-bearing wall partition framing to 6 inches above adjacent ceiling heights, except where partitions are indicated to terminate at suspended ceilings.
    a. Provide studs up to tie to structure at 4'-0" o.c. minimum, from partitions terminating below ceilings
5. Install steel studs and furring in sizes and at spacings, indicated but not less than that required by referenced steel framing installation standard.
6. Install steel studs so that flanges point in the same direction and gypsum boards can be installed in the direction opposite to that of the flange.
7. Install horizontal steel bridging/bracing in all walls, and the additional strap bracing at curved walls as steel framing progresses. Install in compliance with stud manufacturer's recommendations, at spacing indicated
    a. Galvanized steel strap bracing shall be provided continuous at top and bottom runner tracks and at bridging locations at all curved stud walls.

8. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at locations indicated below to comply with details shown on Drawings:
   a. Where edges of suspended ceilings abut building structure horizontally at ceiling perimeters or penetration of structural elements.
   b. Where partition and wall framing abuts overhead structure:
      1) Unless framing is specifically indicated to terminate below ceilings, all framing and gypsum board shall extend up to bottom of structure above.
9. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
10. Install runners (tracks) at floors, ceilings and structural walls and columns, where gypsum drywall stud system abuts other construction.

E. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
   1. Frame door openings to comply with details indicated, with GA-219 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
      a. Extend vertical jamb studs (double studs-typical) through suspended ceilings and attach to underside of floor or roof structure above, unless otherwise indicated.
   2. Frame openings other than door openings to comply with details indicated, or if none indicated, in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
   3. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32-inches wide. Apply spot grout at each jamb anchor clip just before inserting board into frame.

F. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
   1. Orientation: Horizontal.
   2. Spacing: At 16 inches on center minimum.

G. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.

H. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, wood frame openings, toilet accessories, hardware, and heavy trim, shelving, furnishings and equipment services. Attach metal blocking to studs using manufacturer's recommended method. Bolt or screw steel channels to studs. Utilize 16 gauge flat strapping/blocking minimum 6" width. For all other trades, comply with Section 06 1000 for wood blocking.

3.5 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. General application and finishing of gypsum Board:
   1. Cut boards as recommended by manufacturer.
   2. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24-inches in alternate courses of board.

3. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24- inches.
4. Install wall/partitions boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At high walls, install boards horizontally with end joints staggered over studs.
5. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards. Do not force into place.
6. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
7. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
8. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
    a. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except inside double or chase walls which are required to be braced internally.
        1) Except where concealed application is required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area, and may be limited to not less than 75% of full coverage.
        2) Fit gypsum board around ducts, pipes, and conduits.
        3) Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4-to-1/2-inch-wide joints to install sealant.
    b. Fire-stop around penetrations as required by Codes and authorities having jurisdiction. Refer to Section 07 8400 for additional information and requirements
9. Where interior partitions are indicated to extend to the structure above, the drywall shall also extend to the structure with the same number of layers as required below the ceiling.
10. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4-inch to 1/2-inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.
11. Gypsum panels applied to walls shall be applied with the bottom edge spaced a minimum of 1/4-inch above the floor.
12. At all interior walls, seal construction at perimeters of partition, partition intersections, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.
    a. Offset boxes and similar openings minimum of one stud space, and insulate behind openings.
    b. Openings cut into wall for boxes shall leave maximum gap of 1/4" around box.
    c. Seal around box completely with acoustical sealant, or gasket recommended by manufacturer for acoustic isolation.

13. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations

C. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Install gypsum wallboard as follows:
      a. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
      b. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated or required for fire or smoke resistive rated assemblies. Provide maximum length panels, to minimize end joints.
      c. On partitions/walls 8'-1" or less in height apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.
   2. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:
      a. Fasten with screws

D. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
   1. Install gypsum backing board for base layer and gypsum wallboard for face layer.
   2. On ceilings apply base layer(s) prior to base layer application on walls/partitions; apply face layers in same sequence. Offset joints between layers at least 10-inches. Apply base layers at right angles to supports unless otherwise indicated.
   3. On partitions/walls apply base layer(s) and face layers vertically (parallel to framing) with joints of base layers over supports and face layer joints offset at least one stud or furring member space from base layer joints.
   4. Multi-Layer Fastening Methods:
      a. Apply base layer(s) of gypsum board and face layer to base layer(s) as follows:
      b. Fasten both base layer(s) and face layer separately to supports with screws

E. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

F. Fiber-Reinforced Gypsum Panels: Install in strict accordance with manufacturer's instructions.

G. Glass Mat Faced Gypsum Board: Install in strict accordance with manufacturer's instructions.

H. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.

I. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
   1. Single-Layer Applications: Adhesive application.
   2. Double-Layer Application: Install base layer using screws. Install face layer using adhesive.

J. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

K. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.

3.6 INSTALLATION OF TRIM AND ACCESSORIES

A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

B. Control Joints: Place control joints consistent with lines of building spaces, as indicated on drawings or as follows:
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
   2. At exterior soffits, not more than 30 feet apart in both directions.
   3. Install control joints at spacings and locations required by referenced gypsum board application and finish standard, and approved by the Architect for visual effect.

C. Corner Beads: Install at external corners, using longest practical lengths.

D. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.7 JOINT TREATMENT

A. General: Apply treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.

B. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
   1. Joint tape and joint compound shall be compatible with waterproofing subsequently applied.

C. Fiber Reinforced Gypsum and Cement Board: Use alkali-resistant glass fiber tape, recommended by manufacturer, embedded in latex-fortified mortar or latex-based Type 1 mastic over the joint. Use same material as specified for tile setting.

D. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
   2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   4. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
   5. Level 0: Temporary partitions.

E. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling, and sanding are not required at base layer of double-layer applications.

F. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

G. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

H. Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat:
   1. Embedding and First Coat: Ready-mix drying-type all-purpose or taping compound.
   2. Fill (Second) Coat: Ready-mix drying-type all-purpose or topping compound.
   3. Finish (Third) Coat: Ready-mix drying-type all-purpose or topping compound.

I. Water-Resistant Gypsum Board and Exterior Gypsum Board: Finish joints between water-resistant backing board with tape and setting-type joint compound to comply with gypsum board manufacturer's written recommendations and installation standards referenced in related sections.

J. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing, except where finishing is required to achieve fire-resistance rating, sound rating or to act as air or smoke barrier

K. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
   1. Option: Rapid Deco Level 5 System by Lafarge North America.

3.8 CLEANING AND PROTECTION OF WORK

A. Promptly remove any joint compound and adhesives and similar residue from adjacent surfaces, as it may occur.

B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction remain without damage or deterioration at time of Substantial Completion.

3.9 TOLERANCES

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

3.10 FINISH LEVEL SCHEDULE

A. Level 1: Above finished ceilings concealed from view.

B. Level 2: Utility areas and areas behind cabinetry.

C. Level 3: Walls scheduled to receive textured wall finish.

D. Level 4: Walls and ceilings scheduled to receive flat or eggshell paint finish.

E. Level 5: Walls and ceilings scheduled to receive semi-gloss or gloss paint finish.

END OF SECTION

SECTION 09 3000
TILING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Tile for shower receptors.

D. Stone thresholds.

E. Ceramic trim.

1.2 RELATED REQUIREMENTS

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

B. Section 07 9005 - Joint Sealers.

C. Section 09 2116 - Gypsum Board Assemblies: Description and installation of tile backer board.

1.3 REFERENCE STANDARDS

1. ANSI A108.19 - Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2025.

B. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile; 2026.

C. ANSI A108/A118/A136.1 - Specifications for the Installation of Ceramic Tile; 2020.
   1. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2021 (Reaffirmed 2025).

D. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.

E. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018 (Reapproved 2023).

F. TCNA (HB-GP) - Handbook for Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs Installation; 2025-2026.

G. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2026.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives. Include test results where indicated.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

D. Samples: Mount tile and apply grout on one plywood panel, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.

E. Samples: Submit two each 3 by 3 inch tile samples for color and product verification.

F. Certificate: Certify products of this section meet or exceed specified requirements.

G. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Tile: 2 percent of each size, color, and surface finish combinationbut not less than 10 square feet of each type.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

1.7 MOCK-UPS

A. Include Tiling in Mock-Up as described in Section 01 4000 - Quality Requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 7419 - CONSTRUCTION WASTE MANAGEMENT and DISPOSAL for packaging waste requirements.

B. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.9 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. All products of each type by the same manufacturer.
   1. See drawings for manufacturers.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 TILE

A. Ceramic Mosaic Tile: ANSI A137.1 standard grade.

B. Glazed Wall Tile: ANSI A137.1 standard grade.
   1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.

C. Porcelain Tile: ANSI A137.1 standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Color: As indicated on drawings.
   3. Trim Units: Matching cove base shapes in sizes coordinated with field tile.

D. Floor Tile Coefficient of Friction:
   1. Minimum Slip Resistance: Dynamic Coefficient of Friction, per ANSI A137.1-2012, shall be 0.42 (per the DCOF AcuTest) for any tile used on walking surface.

2.3 TRIM AND ACCESSORIES

A. Ceramic Accessories: same color and finish as adjacent field tile; same manufacturer as tile.

B. Non-Porcelain/Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
   1. Applications:
      a. Open edges of wall and floor tile.
      b. Inside and outside wall corners.
      c. Transition between floor finishes of different heights.
         1) Schluter Reno, or as indicated on drawings.
      d. Thresholds at door openings.
      e. Floor and wall expansion and control joints.
      f. Floor-to-wall joints.
      g. Borders and other trim as indicated on drawings.
   2. Products:
      a. Schluter-Systems; Jolly: www.schluter.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

2.4 ADHESIVE/BOND COAT MATERIALS

A. Manufacturers:
   1. Bostik Inc: www.bostik-us.com.
   2. Mapei Corporation: www.mapei.com.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Adhesive: Latex-Portland Cement Mortar Bond Coat, ANSI A118.4.

2.5 GROUTS

A. Grout: 100% solids epoxy grout as specified in ANSI A118.3 - most current standard.
   1. Colors: To be selected by Architect from manufacturer's full range.
   2. Locations: At all locations, unless noted otherwise.

2.6 SETTING-BED MATERIALS

A. Mortar Bed Materials: Portland cement, sand, latex additive, and water.

B. Waterproofing Membrane: Equivalent to "ECB Anti-Fracture Membrane", as manufactured by NAC Products, Inc.; Cuyahoga Falls, Ohio (Phone: 1-800-633-4622).
   1. Provide complete system, including substrate primer/sealer, 40-mil, two component, self-adhering membrane, and appropriate top-coat primer for the material(s) to be placed over the ECB system.
   2. Locations for Use: Below all tile flooring, turned up 1-inch at all edges and concealed by base material, and turned down at least 2-inches into floor drains.
   3. Completed membrane system is intended for waterproofing, and to bridge substrate joints within the limitations stated in manufacturer's current written product data.

C. Substitutions: See Section 01 6000 - Product Requirements.

2.7 ACCESSORY MATERIALS

A. Cleavage Membrane: No. 15 asphalt saturated felt; complies with ANSI 108.02-3.8.

B. Vapor Retarder Membrane at Walls: No. 15 (6.9kg) asphalt saturated felt. Complies with ANSI A108.02-3.8.

C. Waterproofing Membrane: Equivalent to "ECB Anti-Fracture Membrane", as manufactured by NAC Products, Inc.; Cuyahoga Falls, Ohio (Phone: 1-800-633-4622).

1. Provide complete system, including substrate primer/sealer, 40-mil, two component, self-adhering membrane, and appropriate top-coat primer for the material(s) to be placed over the ECB system.
2. Locations for Use: Below all tile flooring, turned up 1-inch at all edges and concealed by base material, and turned down at least 2-inches into floor drains.
3. Completed membrane system is intended for waterproofing, and to bridge substrate joints within the limitations stated in manufacturer's current written product data.

D. Substitutions: Section 01 6000 - Product Requirements.

E. Shower Membrane:
1. Waterproofing Membrane, and Floor Drain with Integrated Bonding Flange; Consisting of the following components (for use with thinsetting tile):
   a. Schluter KERDI: 0.008 inch (o.2mm) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides, which meets or exceeds the requirements of the "American National Standard Specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10", and is evaluated by ICC-ES (Report No. ESR-2467).
   b. Schluter KERDI-DRAIN (Plastic): Floor drain 11-3/16 inch (300mm) diameter, trapezoid-perforated, sloped integrated bonding flange with thermally laminated polypropylene fleece and grate assembly. Grate assembly includes grate, height adjustment collar, and lateral adjustment ring with trapezoid perforations. Drain listed by UPC to meet requirements of "International Association of Plumbing and Mechanical Officials Interim Guide Criteria for Floor Drain with Integrated Bonding Flange" (IGC 195), referenced in method B422 of TCNA Handbood for Ceramic Tile Installation.
   c. Schluter KERDI-SHOWER-SC: Trapezoid-imprinted, prefabricated, tiled shower curb base, made of 2.75 lb/cu ft (44 kg/cu. meter) density self-extinguishing (HF-1 rating per UL-94) expanded polystyrene. Curb dimensions: 48 inch x 6 inch x 4-1/2 inch.

F. Reinforcing Mesh: 2 x 2 inch size weave of 16/16 wire size; welded fabric, galvanized.

G. Mesh Tape: 2-inch wide self-adhesive fiberglass mesh tape, complies with ASTM C475.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive tile.

B. Verify wall surfaces are smooth and flat within tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.2 PREPARATION

A. Vacuum clean surfaces and damp clean.

B. Seal substrate surface cracks with filler.

C. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.3 INSTALLATION - GENERAL

A. Install tile, thresholds, and stair treads and grout in accordance with applicable requirements of ANSI A108/A118/A136, manufacturer's instructions, and TCNA (HB) or TCNA (HB-GP) recommendations, as applicable.

B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

C. Use manufacturer's recommended grout joint width. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

D. Form internal angles square and external angles bullnosed.

E. Install ceramic accessories rigidly in prepared openings.

F. Sound tile after setting. Replace hollow sounding units.

G. Keep control and expansion joints free of mortar, grout, and adhesive.

H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

J. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.4 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with TCA Handbook Method F131, epoxy bond coat and grout, unless otherwise indicated.
   1. Use waterproofing membrane under all tile.
   2. Where waterproofing membrane is indicated, install as recommended by manufacturer, and in accordance with applicable TCA Handbook Method____.

3.5 INSTALLATION - SHOWER PANS

A. Over backer board walls and mortar bed floor, install shower receptor in accordance with The Tile Council of North America Handbook Method TR420. Test shower pans.

3.6 CLEANING

A. Clean tile and grout surfaces.

3.7 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

3.8 SCHEDULE

A. See Finish Schedule on Drawings.

END OF SECTION

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SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

C. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

D. Perimeter Trim.

1.2 RELATED REQUIREMENTS

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

B. Section 07 2100 - Thermal Insulation: Acoustical insulation.

C. Section 07 9005 - Joint Sealers: Acoustical sealant.

1.3 REFERENCE STANDARDS

A. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low-Alloy and High Strength Low Alloy with Improved Formability.

B. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

C. ASTM A 653 (Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

D. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

E. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.

F. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

G. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.

H. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.

I. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.

J. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.

K. ASTM C 1264 Classification for Acoustical Ceiling Products.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Do not install acoustical units until after interior wet work is dry.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples: Submit two samples 6x6 inch in size illustrating material, edge detail and finish of acoustical units.

E. Samples: Submit two samples each, 8 inches long, of suspension system main runner, cross runner, and perimeter molding.

F. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Fire-Resistive Assemblies: Complete assembly listed and classified by UL (FRD) for the fire resistance indicated.
   1. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
   2. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.
   3. Fire Resistance: As follows tested per ASTM E 119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory.

C. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

E. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

B. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, 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.

1.9 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
   1. Acoustical Panels: Sagging and warping
   2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:
   1. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is Thirty (30) years from date of substantial completion.
   2. Acoustical panels and grid systems with Humidity/Sag Resistant Treatment supplied by one source manufacturer shall be warranted for number of years as indicated for each product, from date of substantial completion.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.10 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
   1. Acoustical Ceiling Units: Furnish quantity of full-size units equal to 5.0 percent of amount installed.
   2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

B. See Section 01 6000 - Product Requirements, for additional provisions.

C. Deliver extra stock to Owner’s representative.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong World Industries, Inc; [Basis of Design]: www.armstrong.com.
   2. USG Corporation; ____: www.usg.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Suspension Systems:
   1. Same as for acoustical units.
   2. Armstrong World Industries, Inc; [Basis of Design]: www.armstrong.com.
   3. USG Corporation; ____: www.usg.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 ACOUSTICAL UNITS

A. Acoustical Panels:
   1. As indicated on Ceiling Finish Legend.

2.3 SUSPENSION SYSTEMS

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold-down clips, stabilizer bars, clips, and splices as required.

B. Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
   1. Structural Classification: ASTM C 635 Intermediate Duty
   2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.

C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

D. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least three times design load, but not less than 12 gauge.

E. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
   1. Products: 15/16-inch Exposed Tee Grid, equal to Prelude XL by Armstrong.
   2. Products: 9/16" Suprafine XL, and 15/16" Prelude XL by Armstrong.

2.4 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.

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 that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
   1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
   2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

D. Perimeter Moldings: Same metal and finish as grid.

E. Acoustical Sealant For Perimeter Moldings: Specified in Section 07 9005.

F. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

C. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressy permitted by manufacturer's printed recommendations.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
   1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions, with authorities having jurisdiction, and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.

E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners.

J. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

K. Suspend main beam from overhead construction with hanger wires spaced 4-0 on center along the length of the main runner. Install hanger wires plumb and straight.

L. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

3.4 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions. Comply with ASTM C 636 and with authorities having jurisdiction.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units with pattern parallel to longest room axis, unless indicated otherwise.

D. Fit border trim neatly against abutting surfaces.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

I. Install hold-down clips on panels within 20 ft of an exterior door.

J. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

K. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.5 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.6 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with new product to eliminate evidence of damage.

END OF SECTION

SECTION 09 6466
WOOD ATHLETIC-FLOORING ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:
   1. New maple, strip flooring system on subfloor, and related work. Floating resilient wood athletic floor system
   2. New striping and graphics, as indicated on Drawings and herein.

1.2 DESCRIPTION

A. Related work specified under other sections.
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
   2. Concrete and Concrete Finishing - Section 03 3000.
      a. Concrete Slab Depression: 1-3/4” using 25/32” flooring and subfloor for SB System.
      b. Surface Finish: steel troweled and finished smooth.
      c. Concrete Tolerance: 1/8” in radius of 10’.
      d. Floor Flatness and Floor Levelness (FF and FL) numbers are not recognized.
   3. Membrane Waterproofing and Dampproofing
      a. Concrete subfloors on or below grade shall be adequately waterproofed beneath the slab and at the perimeter walls and on the earth side of below grade walls by general contractor using suitable type membrane.
      b. Sand-Poly-Sand slab construction is not an acceptable construction.
   4. Thresholds - Section 08 7100.
   5. Game Standard Inserts - Section 11 6623.

1.3 QUALITY ASSURANCE

A. Floor System Manufacturer Qualifications
   1. Manufacturer shall be an established firm experienced in field and have been in business for a minimum of ten (10) years.
   2. Manufacturer shall be a member in good standing of the Maple Flooring Manufacturers Association (MFMA).

B. Floor Contractor/Installer Qualifications and Certifications
   1. Flooring contractor shall be a firm experienced in flooring field and approved by manufacturer.
   2. Submit a list of at least three completed projects of similar magnitude and complexity completed under current corporate identity.

C. Surface Appearance
   1. Expansion spaces will not exceed 1/64" at time of installation and will be spread evenly across the floor with each row of flooring.
   2. Expansion spacing will be installed to allow for normal expected increases in Equilibrium Wood Moisture Content (EMC).

D. DIN Performance Testing
   1. Passes all criteria of DIN 18032 part 2.

1.4 SUBMITTALS

A. Manufacturer's Qualification Data

1. Submit a list of at least three completed projects of similar magnitude and complexity under current corporate identity.

B. Manufacturer's Product Data
   1. Submit three copies of manufacturer's product information, drawings, and specification sheets.
   2. Suppliers shall submit certificates attesting that materials furnished will meet specifications for grade, quality, dryness and treatment, if required.

C. Concrete Guidelines
   1. Submit three copies of MFMA Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive wood flooring.
   2. Submit manufacturer's "Concrete Guide Specification" for further information regarding conditions and requirements of concrete prior to installation.

D. Samples
   1. Submit one sample of flooring assembly. Sample to be made by the manufacturer and so indicated.

E. Maintenance Literature
   1. Submit copy of Maintenance Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery of Materials
   1. Materials shall not be delivered, stored or installed until all masonry, painting, plastering tilework, marble and terrazzo work is complete, and all overhead mechanical work, lighting, backstops, scoreboards are installed. Room temperature of 55-80 degrees Fahrenheit and relative humidity of 35-50% are to be maintained. In-Slab Relative Humidity shall be 85% or less using ASTM F2170 In-Slab Relative Humidity test. Ideal installation/storage conditions are the same as those that will prevail when building is occupied.
   2. Materials shall not be stored at the installation location if the In-Slab relative humidity level for the concrete slab is above 85% using ASTM F 2170 In-Slab Relative Humidity test.

1.6 JOB CONDITIONS-SEQUENCY

A. Do not install floor system until concrete has cured 60 days and requirements in "Delivery of Materials" paragraph above are obtained.

B. General Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.

C. Concrete slab shall be bead-blasted prior to installation of wood floor adhesive system to insure proper bond and eliminate foreign contaminants.

D. Permanent heat, light and ventilation shall be installed and operating during and after installation. Maintain a temperature range of 55 to 80 degrees Fahrenheit (13 to 27 degrees Celsius) and a relative humidity range of 35 to 50%. Consult MFMA guidelines for further information.

E. After floors are finished, area to be kept locked by general contractor to allow curing time for the finish. If after required curing time general contractor or owner requires use of area with specified flooring, he shall protect the floor by covering with non-fibered kraft paper or red rosin paper with taped joints, until acceptance by owner (or owner’s agent) of complete gymnasium floor.

1.7 GUARANTEE

A. Guarantee shall not cover damage caused in whole or in part by casualty, ordinary wear and tear, abuse, use for which material is not designed, faulty construction of the building, settlement of the building walls, failure of the other contractors to adhere to specifications, separation of the concrete slab and excessive dryness or excessive moisture from humidity, spillage, migration through the slab or wall, or any other source.

B. Manufacturer hereby warrants the Product material to be free from manufacturing defects for a period of 1 year.

C. This warranty is in lieu of all other warranties, expressed or implied including but not limited to any warranty of merchantability or fitness for a particular purpose, and of any other obligations on the part of manufacturer. In the event of breach of any warranty, the liability of the manufacturer shall be limited to repairing or replacing product and system components supplied by manufacturer and proven to be defective in manufacture, and shall not include any other damages, either direct or consequential.

PART 2 - PRODUCTS

2.1 MANUFACTURERS/PRODUCT

A. Robbins Sport Surfaces, Cincinnati, OH, 800-543-1913, [Basis of Design]: www.robbinsfloor.com.

B. Bonedry, www.bonedryproducts.com (Liquid Applied Moisture Barrier Only)

C. Substitutions: Reference Section 01 6000 - Product Requirements.

2.2 MATERIALS

A. System: Bio-Channel SB System, or approved equal.
   1. Acceptable Manufacturers provided they meet guidelines for wood dimension and adhesive composition:
      a. Conner Sports Flooring; "Focus": www.connorfloor.com.
      b. Horner Flooring; "Zenith LP": www.hornerflooring.com.

B. Vapor Barrier
   1. 6-mil polyethylene.

C. Moisture Barrier
   1. Bonedry, Liquid Applied

D. Subfloor
   1. Zero/G Lineal Strip shock pad.
   2. Bio-Channel SB Subfloor panels:
      a. 25/32" factory engineered panels, on-site lamination shall not be permitted.
      b. Pre-determined, factory routed locations to accept resilient Zero/G pad.
      c. Pre-determined, factory routed locations to accept linear anchor channel.
   3. 16-gauge coated metal anchor channels.

E. Maple Flooring
   1. 25/32” thick x 2-1/4” wide, 2nd and Btr Grade, Random length, unfinished TGEM, KD Northern Hard Maple, as manufactured by Robbins and graded in accordance with MFMA rules.

F. Fasteners
   1. Flooring - 1-3/4" cleats or staples.
   2. Subfloor Channel Anchors - Powers SPIKE® anchors.

G. MFMA Flooring - Finger-Jointed Northern Hard Maple.
   1. Grade 2 or better.

H. Finishing Materials
   1. Robbins Miracle or approved equal oil-modified polyurethane sealer and finish.

I. Gamelines
   1. Gameline paint(s) shall be recommended by the finishing materials manufacturer, and must be compatible with the finish.

J. Perimeter Base - Robbins 3” x 4” ventilating type. (Color: As selected.)

2.3 ACCESSORIES

A. Accessory items recommended by manufacturer for complete system.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect concrete slab for proper tolerance and dryness, and report any discrepancies to the general contractor and architect in writing. Slab will be level to within 1/8” in a 10’ radius. Moisture content of the concrete slab shall not exceed manufacturer recommendations using ASTM F 2170 In-Slab Relative Humidity test.

B. All work required to put the concrete subfloors in acceptable condition shall be the responsibility of the General Contractor.

C. Subfloor shall be broom cleaned by General Contractor.

D. Installer shall document all working conditions provided in General Specifications prior to commencement of installation.

E. Area of floor shall be turned over to the Contractor free of all equipment and debris, and broom clean.

3.2 INSTALLATION

A. Vapor Barrier
   1. Install polyethylene with joints lapped minimum 6” and turned up 4” at the walls.

B. Moisture Barrier
   1. Install Liquid Applied Moisture Barrier per Manufacturer's recommendations.

C. Subfloor
   1. Install manufacturer's resilient pads per manufacturer’s recommendations.
   2. Place Bio-Channel SB subfloor panels diagonally to strip flooring, in an end-to-end manner, staggering end joints in adjacent rows. Allow a 1/4" gap between panels. Provide 1-1/2" to 2" expansion void at the perimeter and all vertical obstructions.
   3. Install solid stop blocking as needed.

D. Anchoring
   1. Place anchor channel and anchor at each anchoring location. These anchor locations shall be perpendicular to the finished floor to allow for lateral movement. Anchors shall be driven tight to the concrete to insure proper placement. Anchors that need to be shimmed are not permitted.

E. Maple Flooring
   1. Machine nail maple finish flooring per manufacturer's instructions. Provide spacing for humidity conditions in specific regions. Provide 2" expansion voids at perimeter and all vertical obstructions.

3.3 FINISHING

A. Sanding
   1. Sand per manufacturer's recommendations.
   2. After sanding, buff entire floor with 100 grit screen or equivalent grit sandpaper, with a heavy-duty buffing machine.
   3. Inspect entire area of floor to insure the floor presents a smooth surface without drum stop marks, gouges, streaks or shiners.
   4. Vacuum and/or tack floor before first coat of seal.
   5. Floor should be clean and completely free of dirt and sanding dust.

B. Finishing
   1. Gymnasium:
      a. Apply specified combination of seal, gameline paint, and finish in accordance with manufacturer's instructions.
      b. Buff and vacuum and/or tack between each coat after it dries.
      c. Apply game lines accurately after the buffing and vacuuming the coated surfaces. Game lines shall be painted between seal coats and finish coats. Layout in accordance with drawings. For game lines, use current rules of association having jurisdiction. Lines shall be straight with sharp edges in colors selected by architect.
         1) Game lines shall consist of Basketball Court striping and Volleyball Court striping. (See drawings for layout of courts, and for logo.)
      d. Apply finish coats per manufacturer's recommendations.

3.4 WALL BASE INSTALLATION

A. Install manufacturer's vent cove base anchored to walls with base cement or screws and anchors. Use pre-molded outside corners and neatly mitered inside corner.

3.5 CLEANING

A. Clean up all unused materials and debris and remove it from the premises.

END OF SECTION

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SECTION 09 6500
RESILIENT FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Resilient stair accessories.

D. Installation accessories.

1.2 RELATED REQUIREMENTS

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

1.3 REFERENCE STANDARDS

A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021 (Reapproved 2025).

B. FS RR-T-650 - Treads, Metallic and Nonmetallic, Skid Resistant; Federal Specifications and Standards; Revision E, 1994.

1.4 ADMINISTRATIVE REQUIREMENTS

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

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Shop Drawings: Indicate seaming plans and floor patterns.

D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

E. Verification Samples: Submit one sample, 9 by 9 inch in size illustrating color and pattern for each resilient flooring product specified, and two 3 by 3 inch samples.

F. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.

G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Flooring Material: Provide minimum of 5% of each type and color.
   3. Extra Wall Base: Provide minimum of 5% of each type and color.
   4. Extra Stair Materials: Quantity equivalent to 5 percent of each type and color.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

B. Pre-Installation Testing: Conduct pre-installation testing as follows: Moisture tests, Bond test, and pH test.

1.7 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1 Product Requirements Sections.

B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
   1. Material should be stored in areas that are fully enclosed and weathertight. The permanent HVAC should be fully operational, controlled and set at a minimum of 68º F (20º C) for at least 48 hours prior to the installation.

1.8 WARRANTY

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

C. Warranty Period: Five (5) year limited warranty commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 SHEET FLOORING

A. Rubber Sheet Flooring:
   1. Manufacturer: See Finish Legend.
   2. Style Name: See Finish Legend.
   3. Color: See Finish Legend.
   4. Sheet Width: See Finish Legend.

B. Vinyl Welding Rod: Solid vinyl bead produced by manufacturer of vinyl flooring for heat welding seams, in color matching field color. (See Finish Legend.)

2.2 RESILIENT TILE FLOORING

A. Luxury Vinyl Tile (LVT):
   1. Minimum Requirements: Comply with ASTM F 1700 Class III, Type B - Embossed Surface.
   2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
   3. Smoke Developed: 450 or less, when in accordance with ASTM E 662.
   4. Static Load Limit: 250 psi, when tested in accordance with ASTM F 970 (modified).
   5. Size: See Finish Legend.
   6. Wear Layer Thickness: 0.020 inch (nominal).
   7. Durability: 0.125 inch - Very Good.
   8. Maintainability: 0.125 inch - Excellent.
   9. Resilience: 0.125 inch - Excellent.
   10. Manufacturer/ Style/ Color: See Finish Legend.

2.3 STAIR COVERING

A. Stair Treads: Rubber; full width and depth of stair tread in one piece; tapered thickness; nosing not less than 1-5/8 inch deep.
   1. Minimum Requirements: Comply with FS RR-T-650 requirements corresponding to type specified.
   2. Nominal Thickness: 0.210 inch.
   3. Nosing: Square, unless indicated otherwise.
   4. Style: Contrasting color abrasive grit strips full width.
   5. Color: Solid. Refer to Finish Legend.
   6. Manufacturers:
      a. Johnsonite, a Tarkett Company: www.johnsonite.com.
      b. Roppe Corp: www.roppe.com.
      c. Zandur: www.zandur.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

B. Stair Landings: Rubber Tile (Where indicated on Finish Legend and Schedules): Same dye lot as rubber stair treads. Color must match rubber stair tread and riser unit exactly in color, pattern and surface texture. Homogeneous color and pattern throughout thickness, and:
   1. Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
   2. Design: See Finish Legend.
   3. Size: See Finish Legend.
   4. Overall Thickness: 0.125 inch.
   5. Pattern: See Finish Legend.
   6. Manufacturers:
      a. Johnsonite, a Tarkett Company; {Basis of Design]: www.johnsonite.com.
      b. Roppe Corporation, U.S.A.: www.roppe.com.
      c. Zandur: www.zandur.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

2.4 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
   1. Height: See Finish Legend.
   2. Thickness: 0.125 inch.
   3. Finish: As selected by Architect.
   4. Length: Roll.
   5. Manufacturers:
      a. Johnsonite, a Tarkett Company; : www.johnsonite.com.
      b. Roppe [Basis of Design]: https://roppe.com/
      c. Substitutions: See Section 01 6000-Product Requirements.

2.5 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

C. Moldings, Transition and Edge Strips: Same material as flooring, except where indicated otherwise.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
   1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

F. Confirm tiles are square and true. Cull all non-conforming tiles.

3.2 PREPARATION

A. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

B. Prohibit traffic until filler is fully cured.

C. Clean substrate.

D. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's instructions. See finish plans for pattern and tile layout.

C. Fit joints tightly. Window panes in tiles are not acceptable.

3.4 INSTALLATION - SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.

3.5 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. General Requirement: All Tile shall be from one manufacturer.

3.6 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 72 inches between joints.

B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.7 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean, seal, and wax resilient flooring in accordance with manufacturer's instructions, and also upon coordination with manufacturer's representative and Architect.

1. Apply protective floor polish to VCT resilient flooring surfaces free from soil, excess adhesive or surface blemishes. Use commercially available, metal, cross-linked acrylic product acceptable to resilient flooring manufacturer.
   a. Coordinate selection of floor polish with Owner and/or their maintenance service.
   b. Buff floor tile and provide three (3) coats (in accordance with manufacturer's recommendations) of a protective floor polish at or near the point of substantial completion.

3.8 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

3.9 SCHEDULE

A. See Drawings.

END OF SECTION

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SECTION 09 6723
RESINOUS FLOORING

PART 1 - GENERAL

1.1 REFERENCE STANDARDS

A. ASTM C307 - Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings; 2023.

B. ASTM C580 - Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes; 2018 (Reapproved 2023).

C. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).

D. ASTM D2369 - Standard Test Method for Volatile Content of Coatings; 2024.

E. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact); 1993 (Reapproved 2024).

F. ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser; 2025.

G. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.

H. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

I. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

J. ANSI A326.3-2021 - Dynamic Coefficient of Friction (DCOF) Of Hard Surface Flooring Materials

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

A. This Section includes one resinous flooring system, one with epoxy body.
   1. Application Method: Liquid applied with broadcasted aggregates.

1.4 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 Verification: For each resinous flooring system required, 5 inches square, applied to a rigid backing.

C. Product Schedule: Use resinous flooring designations indicated in Part 2 and room designations indicated on Drawings in product schedule.

D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

E. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. No request for substitution shall be considered that would change the generic type of floor system specified (i.e. Epoxy double broadcast quartz based system). Equivalent materials of other manufactures may be substituted only on approval of Architect or Engineer. Request for substitution will only be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section.

B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in- service performance, and who is acceptable to resinous flooring manufacturer.
   1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
   2. Contractor shall have completed at least 10 projects of similar size and complexity.

C. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

D. Manufacturer Field Technical Service Representatives: Resinous flooring manufacture shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project.
   1. Field Technical Services Representatives shall be employed by the system manufacture to assist in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.

E. 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- (1200-mm-) square floor area selected by Architect.
      a. Include 48-inch (1200-mm) length of integral cove base.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Pre-installation Conference:
   1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
   2. Attendance:
      a. General Contractor
      b. Architect/Owner's Representative.
      c. Manufacturer/Installer's Representative.

1.6 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.

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects. Store material per product data sheet.

C. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

1.7 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.
   1. Maintain material and substrate temperature between 65 and 85 degrees Fahrenheit during resinous flooring application and for not less than 24 hours after 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.

D. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring

1.8 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

PART 2 - PRODUCTS

2.1 RESINOUS FLOORING

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include,
   1. Must comply with double broadcasting build. Liquid rich, slurry type systems will not be accepted, and will result in a disqualification from bid.

B. Acceptable Manufactures,
   1. Stonhard Basis of design.
   2. Substitutions: Reference Section 01 6000 - Product Requirements.

C. Products: Subject to compliance with requirements:
      a. Stonhard, Inc.; Stonshield SLT®.

D. System Characteristics:
   1. Color and Pattern: As selected by the Architect from Mfg. Standards
   2. Wearing Surface: Standard, or medium.
   3. Integral Cove Base: 4"
   4. Overall System Thickness: nominal 2mm.

E. System Components: Manufacturer's standard components that are compatible with each other and as follows:
   1. Primer:
      a. Material Basis: Standard Primer
      b. Resin: Epoxy
      c. Formulation Description: (2) two component, 100 percent solids.

d. Application Method: Squeegee and roller.
e. Number of Coats: (1) one.

2. Broadcast Media:
   a. Material Basis: Quartz aggregate.
   b. Type: pigmented.
   c. Finish: standard.
   d. Number of Coats: one.
   e. Pattern: Tweed.
3. Undercoat:
   a. Material Basis: Standard undercoat.
   b. Resin: Epoxy
   c. Formulation Description: (2) two-component, 100% solids, UV Stable.
   d. Type: Clear.
   e. Finish: Gloss.
   f. Number of Coats: one.
4. Sealer:
   a. Material Basis: Stonkote CE4.
   b. Resin: Epoxy
   c. Formulation Description: (2) two-component, 100% solids, UV Stable.
   d. Type: Clear.
   e. Finish: Gloss.
   f. Number of Coats: one.
   g. Texture level: Standard or medium.

F. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:
   1. Tensile Strength: 1,600 psi per ASTM C307
   2. Flexural Strength: 4,000 psi per ASTM C580
   3. Flexural Modulus of Elasticity: 1.0 x 1,000,000 per ASTM C580
   4. Hardness: 85 to 90 per ASTM D2240, Shore D
   5. Impact Resistance: >160 inch./lbs. per ASTM D2794
   6. Abrasion Resistance: 0.06 gm max. weight loss per ASTM D4060, CS-17
   7. Flammability: Class 1 per ASTM E648.
   8. Thermal Coefficient of Linear Expansion: 1.4 x 0.00001 in./in. F
   9. Water Absorption: 0.1% per ASTM C 413
   10. VOC Content per ASTM D2369:
      a. Undercoat – 34 g/l
      b. Sealer – 34 g/l
   11. Cure Rate @ 77 F/25 C: 12 hours foot traffic, 24 hours normal operations

2.2 ACCESSORY MATERIALS

A. Patching, Leveling and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

B. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.

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, and neutral Ph 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 or Diamond Grind with a dust free system.
   1. Mechanically prepare 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 recommendations.
   3. Verify that concrete substrates are dry.
      a. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 80 percent.
      b. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab in 24 hours.
      c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

D. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for Stonflex MP7 joint fill material.

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, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
      a. Apply joint sealant to comply with manufacturer's written recommendations.

B. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.

C. Integral Cove Base: Stonshield cove mortar, 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, of cove base. Round internal and external corners.
   1. Integral Cove Base: 4 inches high.

D. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.

E. Broadcast: Immediately broadcast quartz silica aggregate into the primer using manufacturer's specially designed spray caster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.

F. Undercoat: Remove any surface irregularities by lightly abrading and vacuuming the floor surface. Mix and apply undercoat with strict adherence to manufacturer's installation procedures and coverage rates.

G. Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 TERMINATIONS

A. Chase edges to “lock” the flooring system into the concrete substrate along lines of termination.

B. Penetration Treatment: Lap and seal resinous system onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.

C. Trenches: Continue flooring system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.

D. Treat floor drains by chasing the flooring system to lock in place at point of termination.

3.4 JOINTS AND CRACKS

A. Treat control joints to bridge potential cracks and to maintain monolithic protection.

B. Treat cold joints and construction joints cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.

C. Vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.5 FIELD QUALITY CONTROL

A. Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.
   1. Owner will 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.

3.6 CLEANING, PROTECTING, AND CURING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer. General Contractor is responsible for cleaning prior to inspection.

END OF SECTION

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SECTION 09 6813
TILE CARPETING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Carpet tile, fully adhered.

1.2 RELATED REQUIREMENTS

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

B. Section 09 3000 - Tiling: Termination edging of adjacent floor finish.

C. Section 09 6500 - Resilient Flooring: Rubber base, and transition strips.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate layout of joints.

C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Submit two, 12 inch long samples of edge strip, base cap, and stair nosing.

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.5 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. See Drawings for Manufacturer.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.2 MATERIALS

A. Tile Carpeting: Fusion bonded, unless indicated otherwise; manufactured in one color dye lot.
   1. Tile Size: As indicated on Finish Legend.

2. Pile Height: 1/2 inch maximum.
3. Color: As indicated on Finish Legend.
4. Pattern: As indicated on Finish Legend.

2.3 ACCESSORIES

A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Edge Strips: Embossed aluminum, or rubber, as selected; color as selected.

C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer, compatible with materials being adhered.

D. Carpet Tile Adhesive: Acceptable to carpet tile manufacturer, compatible with materials being adhered; maximum VOC of 50 g/L; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable.
1. Extent: Doorways, perimeter, and where recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

C. Verify that concrete sub-floor surfaces are dry enough and ready for flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by carpet tile manufacturer and adhesive materials manufacturer.

3.2 PREPARATION

A. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

C. Vacuum clean substrate.

3.3 INSTALLATION

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install carpet tile in accordance with manufacturer's instructions.

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Locate change of color or pattern between rooms under door centerline.

F. Fully adhere carpet tile to substrate at doorways and perimeter.

G. Adhere carpet tiles using adhesive squares elsewhere.

H. Trim carpet tile neatly at walls and around interruptions.

I. Complete installation of edge strips, concealing exposed edges.

J. Fasten exposed edges of carpet to floor surface with trim at entire length of exposed edge.

3.4 CLEANING

A. Clean and vacuum carpet surfaces.

END OF SECTION

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SECTION 09 7800
INTERIOR WALL PANELING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal interior wall paneling.

B. Solid surface wall paneling.

1.2 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's descriptive literature for each specified product. Include anchorage devices specific to project substrate types.

C. Shop Drawings: Submit elevations for each application and location. Indicate details of joints and attachments.

D. Samples: Submit two samples 4 by 4 inches in size, indicating finish, surface design, and color for each type of panels.

E. Manufacturer's Instructions: Provide manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least five years of documented experience.

B. Installer Qualifications: Company specializing in installing work of the type specified in this section, and with at least three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project site in manufacturer's original packaging, marked with manufacturer's product identification.

B. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Extended Correction Period: Correct defective work within a 5-year period for failure of materials or workmanship commencing on the Date of Substantial Completion.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

A. Surface Burning Classification: Provide wall paneling assemblies meeting Class A when tested in accordance with ASTM E84.

2.2 METAL INTERIOR WALL PANELING

A. Metal Wall Panel System:
   1. Applications: Wall cladding.
   2. Panel Size: As indicated on drawings.

3. Thickness: 0.035 inch.
4. Finish: As selected by Architect from manufacturers standard line..
5. Product:
    a. Basis of Design: Gage Corp; GageMetal: www.gagecorp.net.
    b. Substitutions: Reference Section 01 6000 - Product Requirements.

B. Fabrication: Shop fabricate to greatest extent possible.

2.3 SOLID SURFACE WALL PANELING

A. Solid Surface Wall System:
1. Applications: Wall Cladding.
2. Panel size: As indicated on drawings.
3. Thickness: 0.5 inch.
4. Finish: As selected by Architect from manufacturer's standard line.
5. Design: See attachment below.
6. Product:
    a. Basis of Design: DuPont; CNC-Carved Corian Solid Surface by MR Walls: https://mrwalls.io/
    b. Substitutions: Reference Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces for adhered items are clean and smooth.
1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer.

B. Start of installation constitutes acceptance of project conditions.

3.2 INSTALLATION

A. Install panels in accordance with manufacturer's instructions.

B. Apply adhesive to back side of panel using trowel recommended by adhesive manufacturer.

C. Apply panels to wall with vertical joints plumb and horizontal joints level and pattern aligned with adjoining panels.

D. Using a roller, apply pressure to panel face to ensure proper adhesion between surfaces.

E. Install panels with manufacturer's recommended gaps for panel field and corner joints.

F. Install trim with adhesive.

G. Seal joints at wall base and between panels with approved sealant to prevent moisture intrusion.

H. Remove excess sealant after paneling is installed and prior to curing.

3.3 CLEANING

A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

B. Clean panel faces using cleaning agents and methods recommended by manufacturer to remove soiling.

3.4 PROTECTION

A. Protect installed interior wall paneling from subsequent construction operations.

END OF SECTION

SECTION 09 8430
SOUND-ABSORBING WALL AND CEILING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sound-absorbing panels.

B. Mounting accessories.

1.2 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023, with Editorial Revision (2024).

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's printed data sheets for products specified.

C. Shop Drawings: Fabrication and installation details, panel layout, fabric orientation, and wood grain orientation.

D. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.

E. Verification Samples: Fabricated samples of each type of panel specified; 12 by 12 inch, showing construction, edge details, and fabric covering.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with at least three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.

B. Store units flat, in dry, well-ventilated space; do not stand on end.

C. Protect edges from damage.

PART 2 PRODUCTS

2.1 FABRIC-COVERED SOUND-ABSORBING UNITS

A. Manufacturers:
   1. Acoufelt; Wall Panels (Basis of Design): www.acoufelt.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

B. General:
   1. Prefinished, factory assembled fabric-covered panels.

C. Fabric-Covered Acoustical Panels for Walls:
   1. Sound Absorption: Noise Reduction Coefficient (NRC) or Sound Absorption Average (SAA) of 0.45 when tested in accordance with ASTM C423.
   2. Fabric: Felt.
   3. Color: As selected by Architect from manufacturer's full range.

2.2 ACCESSORIES

A. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support, designed to allow panel removal:

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.

B. Install mounting accessories and supports in accordance with shop drawings.

3.3 CLEANING

A. Clean sound-absorptive panels upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

3.4 PROTECTION

A. Provide protection of installed acoustical panels until Date of Substantial Completion.

B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

SECTION 09 9100
PAINTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and other coatings. High-performance coating at entrance canopy is to be performed under Section 09 9600 - High Performance Coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished (pre-finished) and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Exposed surfaces of steel lintels and ledge angles.
   3. Mechanical and Electrical:
      a. In all areas, paint gas piping only. See items scheduled NOT to be painted below.
      b. In all areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      d. Paint dampers exposed behind louvers, grilles, to match face panels.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished (pre-finished) unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Non-metallic roofing and flashing.
   6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
   7. Marble, granite, slate, and other natural stones.
   8. Floors, unless specifically so indicated.
   9. Ceramic and other tiles.
   10. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
   11. Brick, and cast stone.
   12. Exterior insulation and finish system (EIFS).
   13. Glass.
   14. Acoustical materials, unless specifically so indicated.
   15. Concealed pipes, ducts, and conduits.
   16. Door hinges, hardware, or fire door labels.
   17. Rusty or corroded surfaces until sandblasted or wire-brushed free of corrosion, and wiped clean.
   18. Mechanical and Electrical:
      a. In all areas, do NOT paint insulated and exposed pipes (except gas piping), conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.

1.2 RELATED REQUIREMENTS

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

B. Section 04 2000 - Unit Masonry Assemblies: Faces to be painted in this section.

C. Section 05 1200 - Structural Steel: Steel framing to be field painted.

D. Section 05 2100 - Steel Joist Framing: Steel joists to be field painted.

E. Section 05 3100 - Steel Decking: Prefinished steel decking to be protected from overspray during overhead painting operations.

F. Section 05 5000 - Metal Fabrications: Shop-primed items.

G. Section 07 0553 - Fire and Smoke Assembly Identification.

H. Section 08 1113 - Steel Doors and Frames: Shop-primed steel doors and frames.

I. Section 09 2116 - Gypsum Board Assemblies.

J. Section 09 9600 - High Performace Coatings: High performance coatings for exterior steel entrance canopy structure.

1.3 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2012.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

1.4 DEFINITIONS

A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products and special coatings, including VOC content.

1. List each material and cross reference to scheduled paint types, and including each specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.

C. Samples for initial color selection in the form of manufacturer's color charts from paint/coating manufacturer intended for use.

D. Samples: Submit two paper chip samples, 4x8 inch in size illustrating range of colors available for each surface finishing product scheduled.

E. Samples for verification purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate. Define each separate coat, including fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.

F. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

G. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

H. Applicator certifications that are required to be in writing.

I. Submit Manufacture Representative reports as outlined in Field Quality Control below.

J. Coating Maintenance Manual: Upon conclusion of the Project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as S-W "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product / color / finish was used, product data pages, Material Safety Data Sheet (MSDS), care and cleaning instructions, and Touch-up procedures.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

C. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by paint manufacturer, and use only within the recommended limits.

D. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
   1. Notify the Architect of any problems anticipated using the materials specified, prior to proceeding with work.

E. Material Quality: Provide the manufacturer's best quality grade paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.
   1. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude approved equivalent products of other manufacturers.

F. Location of Mock-Up shall be where directed. Mock-Up shall consist of complete application of coating system to full wall. Verify location with Architect before constructing.

G. Mock-Up: Provide mock-up at least 3 ft x 3 ft of general wall paint and trim for Architect's and Owner's review. Mock-Up guidelines as described in Section 01 4000 - Quality Requirements.

H. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

I. Lead content in pigments or other painting materials and components is not allowed.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, pigment and vehicle constituents by volume, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

D. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers, others present or passing through or inspecting work areas (painting or any other work), and the work areas themselves are protected from fire and health hazards resulting from handling, mixing, and application of materials.

1.9 PROJECT CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
   1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer, during application, drying and curing periods.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Minimum Application Temperature for solvent-thinned Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Application Conditions for Textured Acrylic Coating: Apply when surface temperature is between 60 and 100 degrees F, and expected to remain so for 24 hours. If dry conditions cause rapid drying of the materials before proper finishes can be completed, eliminate breezes, fans or other air movements which contribute to the problem, and if necessary, dampen the substrate with finely misted water just prior to application.

G. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 WARRANTY

A. Textured Acrylic Coating:
   1. 10-year Performance Warranty against peeling, delaminating, surface cracking, and chalking.
   2. 10-year Surface Mold/Mildew Warranty.

1.11 MAINTENANCE MATERIALS

A. See Section 01 6000 - Product Requirements, for additional provisions.

B. Supply one (1) gallon of each color and type; store where directed.

C. Label each container with color, type, and room locations in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide all paint and coating products from the same manufacturer to the greatest extent possible.

B. Paints:
   1. Basis of Design: Sherwin-Williams: www.sherwin-williams.com.
   2. Other Acceptable Manufacturers:
      a. Benjamin Moore & Co: www.benjaminmoore.com.
      b. PPG Architectural Finishes, Inc: www.ppgaf.com.

3. Substitutions: See Section 01 6000 - Product Requirements.
4. Master Coating Technologies, for Polyurethane/Acrylic Pattern system: www.scuffmaster.com.

C. Block Fillers: Same manufacturer as top coats.

2.2 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
4. Supply each coating material in quantity required to complete entire project's work from a single production run.
5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
b. Architectural coatings VOC limits of State in which the project is located.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: As indicated on drawings
1. In all areas, finish pipes, ducts, conduit, and equipment the colors as indicated on drawings. Refer to Finish Legend.

2.3 PAINT SYSTEMS - EXTERIOR

A. Paint WE-TR-St - Wood, Stained.
1. Two Coats: S-W: Woodscapes Exterior Waterborne Semi-Transparent Polyurethane Stain, A15T5 (for vertical use).
2. Two Coats: S-W: SuperDeck S/T Waterborne Stain, 2650 Series.

B. Paint CppE-OP-3A - Concrete, Poured and Precast:
1. One Coat: S-W: Loxon Concrete & Masonry Primer, A24W8300, (<100 g/l voc).
2. Two Coats: S-W: SuperPaint Acrylic Exterior House Paint (Flat, A80-100 series) (Satin, A89-100 Series) (Gloss, A84-100 Series) - Architect to select finish required (<50 g/l voc).

C. Paint CE-OP-3A - Masonry, Opaque, (One filler coat and two acrylic finish coats):
1. One Coat: S-W: PrepRite Interior / Exterior Acrylic Block Filler, B25W25 (<50 g/l voc) (as required to be pinhole-free).

2. Two Coats: S-W: SuperPaint Exterior Acrylic House Paint, Gloss, A84-100 Series (<50 g/l voc).

D. Paint GEfibcem-OP-3A - Fiber Cement Board, Acrylic Primer and Paint, 3 Coat:
1. One Coat: S-W: Loxon Latex Primer, A24 (if unprimed).
2. Two Coats: S-W: A100 Exterior Acrylic House Paint, A82. More coats if needed to cover all fibering. Sheen: As selected from gloss or satin.

E. Paint GEsof-OP-3A - Gypsum Board Soffit (Glass-mat faced), Acrylic Primer and Paint, 3 Coat:
1. One Coat: S-W: Multi-Surface Interior/Exterior Acrylic Primer Sealer, B51W450.
2. Two Coats: S-W: SuperPaint Acrylic Exterior House Paint (Flat, A80-100series) (Satin, A89-100 Series) (Gloss, A84-100 Series) - Architect to select finish required (<50g/l voc).

F. Paint ME-OP-3A - Ferrous Metals, Unprimed, 100% Acrylic, 3 Coat:
1. One Coat: S-W: Pro Industrial Pro-Cryl Universal Metal Primer, B66-310 (<100 g/l voc).
2. Two Coats: S-W: Sher-Cryl High Performance Acrylic, Gloss, B66-300 (<200 g/l voc).

G. Paint ME-OP-2A - Ferrous Metals, Primed, Acrylic Latex, 2 Coat:
1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
2. Two Coats: S-W: Sher-Cryl High Performance Acrylic, Gloss, B66-100 (<200 g/l voc).

H. Paint MgE-OP-3A - Galvanized Metals, Acrylic, Opaque, 3 Coat:
1. One Coat: S-W: Pro Industrial Pro-Cryl Universal Metal Primer, B66-300 (<100 g/l voc).
2. Two Coats: S-W: Sher-Cryl High Performance Semi-Gloss, B66-350 (<200 g/l voc).

2.4 PAINT SYSTEMS - INTERIOR

A. Paint WI-OP-3A - Wood, Opaque, Acrylic Latex, 3 Coat:
1. One Coat: S-W: Multi-Purpose Interior / Exterior Latex Primer /Sealer, B51-450 Series (<50 g/l voc).
2. Two Coats: S-W: ProMar 200 Zero VOC Interior Latex EgShel Enamel, B20-2600 (0 g/l voc).

B. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:
1. Filler coat: S-W: As required.
2. One coat of stain; S-W: WoodClassics “250” Interior Wood Stain, A49-800 Series (<250 g/l voc). Option: S-W: MinWax “250” VOC Stain (<250 g/l voc).
3. One coat sealer; S-W: none required.
4. Two coats; S-W: WoodClassics Waterbased Polyurethane, A68 Series (<350 g/l voc). Option: MinWax Waterbased Polyurethane Varnish: Satin (710337), Semi-Gloss (710320), Gloss (710313) (<350 g/l voc).

C. Paint CppI-OP-3A - Concrete, Poured and Precast, Opaque, Acrylic, 3 coats.
1. One Coat: S-W: Loxon Concrete & Masonry Primer, A24W8300 (<100 g/l voc).
2. Two Coats: S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel, B31-2600 (0 g/l voc).

D. Paint CI-OP-3L - Masonry, Opaque, Latex, 3 Coat:
1. One Coat: S-W: Pro Industrial Heavy Duty Block Filler, B42W150. (Required to be pin-hole free).
2. Two Coats: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel, B31-2600 (0 g/l voc).

E. Paint CI-OP-3PAP - Masonry, Polyurethane Acrylic Pattern, 3-Coat:

1. One Coat: Suitable heavy-bodied latex vinyl acrylic block-filler (pinhole-free), or primer recommended by manufacturer. Provide manufacturer's recommended product if uniform base color with pores exposed is desired.
2. One Coat: Water-based polyurethane/acrylic base coat: "Scuffmaster MC100" by Master Coating Technologies: www.scuffmaster.com.
3. One Coat: Water-based polyurethane/acrylic metallic pattern coat. "Scuffmaster AC1200M" by Master Coating Technologies: www.scuffmaster.com.
4. Miscellaneous Materials: Surface patching compounds and other materials necessary for application of finish system shall be of high quality and compatible with coating system.

F. Paint MI-OP-3A - Ferrous Metals, Unprimed, Acrylic, 3 Coat:
1. One Coat: S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer, B66-310 (<100 g/l voc).
2. Two Coats: S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel, B31-2600 (0 g/l voc).

G. Paint MI-OP-2A - Ferrous Metals, Acrylic Primed, Acrylic-Alkyd Finish, 2 Coat:
1. One Coat: Touch up with primer: S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer, B66-310 (<100 g/l voc).
2. Two Coats: S-W ProMar 200 Interior Waterbased Acrylic-Alkyd Semi-Gloss B34-8200 Series.

H. Paint MgI-OP-3A - Galvanized Metals, Acrylic, 3 Coat:
1. One Coat: S-W: Pro Industrial Pro-Cryl Universal Primer, B66-310 (<100 g/l voc).
2. Two Coats: S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel, B31-2600 (0 g/l voc).

I. Paint CI-OP-3E - Concrete/Masonry [Inside Face of Single-Wythe Exterior Concrete Block Walls, and in Rest Rooms and other Wet Areas], Epoxy Enamel, 3 Coat:
1. One Coat: S-W: Kem Cati-Coat HS Epoxy Filler Sealer, B42W400. (Required to be pin-hole free) (Trowel to smooth finish may be required).
2. Two coats of waterborne epoxy polyamide (two-component, chemically-cured waterborne epoxy coating for use as a high performance architectural coating). S-W: Pro Industrial Water Based Catalyzed Epoxy (B73-300, Gloss) or (B73-360 EgShel). Architect to select finish required.

J. Paint GI-OP-3E - Gypsum Board, Epoxy, 3 Coat:
1. One coat of best commercial grade acrylic drywall primer, or as recommended by paint manufacturer. S-W: ProMar 200 Zero VOC Interior Latex Primer, B28-2600 (0 g/l voc).
2. Semi-gloss: Two coats of S-W K46 Pro Industrial Precatalyzed Waterbased Epoxy. Scrub Resistance: 500-600 cycles per ASTM D 2486. MPI # 141, & 153, (145 g/L).

K. Paint GI-OP-3LA - Gypsum Board/Plaster, Latex-Acrylic, 3 Coat:
1. One Coat: S-W: ProMar 200 Zero VOC Interior Latex Primer, B28-2600 (0 g/l voc).
2. Two Coats: S-W: ProMar 200 Zero VOC Interior Latex EgShel, B20-2600 (0 g/l voc). (Where Sheen is indicated "Gloss", provide Pro Industrial™ High Performance Acrylic, B66-600 Series, <50 g/l voc).

2.5 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

E. All surfaces to be pinhole free.

3.2 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

H. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

I. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

J. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

K. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

L. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

M. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

N. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

O. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's instructions.

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. All surfaces shall be pinhole-free.

G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

H. Sand wood and metal surfaces lightly between coats to achieve required finish.

I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

J. Polyurethane/Acrylic Pattern Coating: Apply according to manufacturer's instructions.
   1. Apply as many prime coats as necessary to produce uniform substrate appearance. Do not exceed manufacturer's recommended coverage rate. Allow to dry.
   2. Over wood and gypsum board, sand primer with 100 grit or finer sand paper. Thoroughly remove dust after sanding with clean, wet rag.
   3. Apply textured finish system in two steps.
      a. Spray or roll base coats to completely cover primer. Apply in continuous even film at manufacturer's specified coverage rate.
      b. Spray pattern coat using manufacturer's proprietary spray equipment. Adjust spray tip size and air pressure for specified finish according to manufacturer's written instructions. Apply pattern coat uniformly to match approved finish standard and at manufacturer-specified coverage rates.

K. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

L. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Refer to Division 23 and 26 Sections for scheduling of color coding of equipment, duct work, piping, and conduit.

B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

C. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

B. Architect shall approve surface prior to finish coats being applied.

C. Manufacturers Representative shall visit the site a minimum of 3 times. These visits shall be at the beginning , middle and completion of work.

1. The beginning visit shall review the substrate for compliance prior to installation and for appropriate use of products.
2. The middle visit shall review the progress and performance of the installer.
3. The final visit shall review the quality of the final product.
4. The manufacturer shall submit reports to the Contractor and the Architect within 72 hours of each visit. The letter shall document observations, instructions to Contractor, and any remediations required and/or completed.

3.6 CLEANING

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

B. Clean paint from all electrical devices, mechanical devices, door hardware, architectural items, and other permanent materials.

3.7 PROTECTION

A. Protect finished coatings until completion of project.

B. Protect textured acrylic coatings from casual impact and rain for 48 hours after installation. Protect from heavy traffic for at least 3 days.

C. Touch-up damaged coatings after Substantial Completion.

3.8 SCHEDULE - SURFACES TO BE FINISHED

A. See drawings for surfaces to be painted.

END OF SECTION

SECTION 09 9600
HIGH PERFORMANCE COATINGS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes applying special coating systems to exposed steel structure at the main entrance canopy and identified steel components in the main lobby, as scheduled and/ or indicated.

B. Scope of this Section including surface preparation, prime coats (including shop applied primer), and topcoats for interior and exterior coatings.

C. Types of Special Coatings for interior and exterior use as indicated on the drawings and schedules include the following:
   1. Organic Zinc Rich Urethane: High Performance, Immersion grade, moisture cured urethane zinc rich primer.
   2. Epoxy: Two-component, high performance, polyamide epoxy or polyamine epoxy coating.
   3. Fluoropolymer Urethane: Two-component, high performance, thermoset solution fluoropolymer coating.

1.2 RELATED DOCUMENTS

A. Documents affecting work of this Section include, but are not limited to, General Conditions, Supplementary Conditions, Sections in Division 1 of these Specifications.

B. Section 05 1200 - Structural Steel Framing: Steel framing to receive high performance coating.

C. Section 09 9100 - Painting: General painting.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM B 117 Standard Test Method for Corrosion Resistance.
   2. ASTM D 2240 Standard Test Method for Measuring Shore Hardness.
   3. ASTM D 2794 Standard Test Method for Measuring Direct Impact.
   4. ASTM D 3359 Standard Test Methods for Measuring Adhesion by Tape Test.
   5. ASTM D 3363 Standard Test Method for Film Hardness by Pencil Test.
   6. ASTM D 4060 Standard Test Method for Abrasion Resistance.
   7. ASTM D 4213 Standard Test Method for Measuring Scrub-ability of Coatings.
   8. ASTM D 4258 Standard Practice for Surface Cleaning Concrete for Coating.
   9. ASTM D 4259 Standard Practice for Abrading Concrete.
   10. ASTM D 4261 Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating.
   11. ASTM D 4263 Standard Test Method for Indicating Moisture by the Plastic Sheet Method.
   12. ASTM D 4541 Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.
   13. And various other ASTM test standards.

B. Steel Structures Painting Council (SSPC):
   1. Steel Structures Painting Council Surface Preparation Specifications (SSPC-SP)
   2. Steel Structures Painting Council Paint Application Specifications (SSPC-PA)

1.4 DEFINITIONS

A. Definitions as used in Finish Schedule shown on Drawings and Coating Schedule included herein.
   1. Coatings: Paint or heavy duty finishes for use on surfaces subject to interior and exterior exposure, submergence, high moisture, splash, or chemical environment, including primers, sealers, fillers, and intermediate and finish coats.
   2. Normal: Surfaces subject to normal temperature and humidity.
   3. First Coat: Field primer, factory primer, or shop primer. When only one coat is required, first coat is the finish coat.
   4. Second, Third, Intermediate, or Finish coats: Successive finish coats applied over first coat.
   5. DFT: Dry Film Thickness (Mils/coat).
   6. Sfpg: Square feet per gallon (per coat).

1.5 SUBMITTALS

A. Product Data:
   1. Manufacturer's product data sheets, product performance criteria, generic chemistry of each coating, and application recommendations for each coating scheduled.
   2. List each material and cross-reference the specific coating, finish system, and application.

B. Submit one copy of manufacturer's Material Safety Data Sheets (MSDS) for each type of coating to Architect for information. Contractor shall post a copy of MSDS on the Site at all times when coating is in progress.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. All coatings shall conform to OSHA requirements for allowable exposure to lead and other hazardous substances.

B. Product Manufacturer:
   1. Manufacturer shall be a company that specializes in producing high quality industrial coating materials. This company shall have 10 years or more experience demonstrated by case histories in the designated field of application.

C. Applicator Qualifications:
   1. Engage an experienced applicator with 5 years or more experience who has successfully completed coating system applications similar in material and extent to those indicated.

D. Single-Source Responsibility:
   1. Provide coating material produced by the same manufacturer for each system.

E. Performance Testing:
   1. The Owner/ Architect will require that any request for substitution will be accompanied by the performance requirements listed in Section 3.07.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered to the site in original containers with labels intact and seals unbroken.

B. Protect and heat or cool material storage location to maintain temperature ranges recommended by coating manufacturers, but not less than 50 degrees F.

C. Oily rags and waste must be removed from buildings each night or kept in appropriate metal containers. Provide fire extinguishers of the type recommended by coating manufacturers in

areas of storage and where finishing is occurring. Allow no smoking or open containers of solvent.

D. Empty containers shall have labels canceled and clearly marked as to use.

1.8 PROJECT / SITE CONDITIONS

A. Environmental Requirements:
   1. Use indirect-fired dry heat and ventilate areas to obtain conditions recommended by coating manufacturer.
   2. Relative humidity conditions as specified by coating manufacturer shall be adhered to.
   3. No unprotected, unheated exterior coating shall be undertaken when cold damp, foggy, or rainy weather appears probable, nor when the temperature of the substrate is below 50 degrees F, unless listed in this specification or approved in writing by the coating manufacturer.
   4. Maintain the manufacturer's environmental requirements until the coating is fully cured.
   5. Apply no coating in areas where dust is being generated.
   6. Testing and disposal of any waste and coating shall be the responsibility of the CONTRACTOR.

B. Protection:
   1. Drop cloths shall be provided in all areas where coating is performed to fully protect other surfaces.
   2. Remove hardware, accessories, plates, lighting fixtures, and similar items or provide protection by masking. Upon completion, replace items or remove protection and clean.

C. Upon Substantial Completion, remaining unused material will become property of the OWNER. Seal material as required for storage, mark contents with color, type, location, and shelf life, and store on Site where required by the OWNER. Provide a minimum of two gallons of each system component and color used.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Tnemec Company, Inc.

B. Other Acceptable Manufacturers:
   1. PPG Paints: www.ppgpaints.com.
   2. Sherwin-Williams Company: www.protective.sherwin-williams/industries.

C. Substitutions: Section 01 6000 - Product Requirements.

2.2 SPECIAL COATING MATERIALS

A. Basis of Design: Special Coating products of Tnemec Company, Inc. are listed in the Coating Schedule as a standard of quality and performance. Technical information may be obtained from the following:
   1. SteelCon Coating Systems, Inc.
   2. 2100 3rd Ave South
   3. Irondale, Alabama 35210
   4. Phone: 205-951-2086
   5. E Mail: rcrumbaugh@tnemec.com

B. Substitutions: See Section 01 6000 - Product Requirements.
   1. Only coatings that meet or exceed the performance of these specified coatings may be submitted for use. Substitution requests shall include the name of the specified material

for which a substitute is being requested; name of the proposed substitute material; and a complete description of the proposed substitute including performance & test data, cure times, recoat windows, and generic composition. No request for substitution will be considered that would decrease film thickness or offer a change in the generic type of coating specified or would be considered a change to the generic chemistry of the coatings specified.

2.3 COLORS, MIXING, AND THINNING

A. Color shall be formed of pigments free of lead, lead compounds, or other materials that might be affected by the presence of hydrogen sulfide or other gases likely to be present at the Site.

B. Where thinning is necessary, only the products of the manufacturer furnishing the coating will be allowed. All such thinning shall be done in strict accordance with the coating manufacturer's recommendations.

C. Mix in accordance with the manufacturer's recommendations.

2.4 SOURCE QUALITY

A. Source Quality: Obtain painting, coating, and thinning materials from a single manufacturer.

PART 3 – EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical information, catalogue instructions, and product instructions listed on material containers.

3.2 EXAMINATION

A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to the timely and proper completion of the work. Materials removed and replaced to correct defects due to errant application such as overspray or drips on unsuitable surfaces shall be at the Contractor's expense.

3.3 SURFACE PREPARATION

A. General:
   1. All surfaces to be coated shall be prepared as specified herein and in accordance with the coating manufacturer's recommendations. The object shall be to obtain a uniform, clean, and dry surface.
   2. Quality of surface preparation described herein is considered a minimum. If the coating manufacturer requires a higher degree of preparation, comply with the coating manufacturer's recommendations.
   3. Where surface dryness is questioned, test with a dampness-indicating instrument. Do not apply coatings over surfaces where moisture content exceeds that permitted by the coating manufacturer.
   4. Workmanship for surface preparation shall conform to the following Steel Structures Painting Council (SSPC) specification:
      a. SSPC-SP1
      b. SSPC-SP2
      c. SSPC-SP3
      d. SSPC-SP5
      e. SSPC-SP6
      f. SSPC-SP7
      g. SSPC-SP10
      h. SSPC-SP11

i. SSPC-SP12

B. Ferrous Metal:
1. New Steel: Prior to surface preparation all ferrous metals shall be cleaned of oil, grease and other contaminants in accordance with SSPC-SP 1 Solvent Cleaning. All surfaces shall be abrasive blast cleaned in accordance with SSPC-SP 10 Near White Blast Cleaning. Surface profile shall be 1.5 – 2.5 mils.

3.4 APPLICATION

A. Surfaces shall be dry at the time of application.

B. The minimum surface temperature shall be 50 degrees F and rising unless noted otherwise.

C. Apply in strict accordance with the manufacturer's recommendations by brush, roller, spray, or other application method. The number of coats and thickness required is the same regardless of application method.

D. Each coat shall be allowed to dry in accordance to the manufacturer's requirements. Drying time shall be construed to mean "under normal conditions." Where conditions other than normal exist, because of weather or because of confined space, longer times will be necessary.

E. Coatings shall be applied to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, or other surface imperfections will not be acceptable. Areas cut-in by brush prior to rolling shall have uniform appearance in comparison to adjoining surfaces.

F. Edges of coatings adjoining other materials or other colors shall be sharp and clean without overlapping.

G. Crevices and other hard to apply areas shall be back-rolled/back-brushed in conjunction with the field-applied prime coat.

H. Where multiple coats of the same material are applied, each undercoat shall be slightly different in shade to facilitate identifying each coat.

3.5 FINAL TOUCH-UP AND CLEANING

A. Prior to substantial completion, examine the coated surfaces and retouch or refinish surfaces to leave in condition acceptable to the ARCHITECT/OWNER.

B. Remove masking, coatings, and other material from floors, glass, and other surfaces not scheduled to be coated.

3.6 COATING SYSTEMS

A. Scheduled thickness or coverage rate is the minimum that will be accepted. Where thickness recommended my the manufacturer exceeds the minimum stated herein, comply with the thicker requirement.

B. Coatings shall conform to the following schedule and coating manufacturer's recommendations.

C. Ferrous structural steel shall be shop-primed. Field touch-up, where necessary, shall consist of surface preparation equivalent to what is specified and application of each coat that is in need of repair.

3.7 SCHEDULE OF COATING SYSTEMS FOR EXTERIOR SERVICE

A. *All coating thicknesses are expressed in dry film thickness (DFT.)

B. Exposed Structural and Architecturally Exposed Ferrous Metals:
1. Provide the following finish systems over exposed structural steel at main entrance canopy and in main entrance lobby where identified:

a. Shop Surface Preparation: SSPC-SP10 Near White Metal Blast Cleaning
b. Shop Primer: Tnemec Series 90-97 Tneme-Zinc applied at a rate to achieve 2.5 – 3.5 mils dry film thickness. Prime coat shall meet the following performance criteria:
    1) Generic Type: Organic Zinc Rich Urethane Primer
    2) Solids By Volume: 63%
    3) Zinc Content: 83% by weight. ASTM D520 Type III Zinc Dust
    4) Salt Spray (Fog): ASTM B 117, Scribed Panels, 50,000 hours exposure.
    5) Adhesion: ASTM 4541 Elcometer Adhesion.
    6) Humidity: ASTM D 4585. 4,000 hours exposure.
    7) Cathodic Disbondment: ASTM G8, Method A. Days Exposure
    8) Immersion: ASTM D 870 Potable Water Immersion. 7 years immersion.
    9) Prohesion: ASTM G 85 Prohesion Cabinet. 15,000 hours exposure.
c. Field Touch-Up/Repair Surface Preparation: Shop applied primer damaged during shipping and erection shall be cleaned in accordance with SSPC-SP11 Power Tool Cleaning to Bare Metal. All edges shall be feathered. All surfaces shall be clean, dry and in a suitable condition to be coated.
d. Touch-Up/Repair Primer: Tnemec Series 90-97 Tneme-Zinc applied at a rate to achieve 2.5 – 3.5 mils dry film thickness. Prime coat shall meet the following performance criteria:
    1) Generic Type: Organic Zinc Rich Urethane Primer
    2) Solids By Volume: 63%
    3) Zinc Content: 83% by weight. ASTM D520 Type III Zinc Dust
    4) Salt Spray (Fog): ASTM B 117, Scribed Panels, 50,000 hours exposure.
    5) Adhesion: ASTM 4541 Elcometer Adhesion.
    6) Humidity: ASTM D 4585. 4,000 hours exposure.
    7) Cathodic Disbondment: ASTM G8, Method A. Days Exposure
    8) Immersion: ASTM D 870 Potable Water Immersion. 7 years immersion.
    9) Prohesion: ASTM G 85 Prohesion Cabinet. 15,000 hours exposure.
e. Intermediate Coat: Tnemec Series 66 Hi Build Epoxoline applied at a rate to achieve 4.0 – 6.0 mils dry film thickness. Intermediate coat shall meet the following performance criteria:
    1) Generic Type: Polyamide Epoxy
    2) Solids By Volume: 56%.
    3) Salt Spray (Fog): ASTM B 117. Result after 10,000 hours exposure (plane rust, rust at scribe and blistering).
    4) Immersion: ASTM D 870. 7 Years.
    5) Abrasion: ASTM 4060 (CS-17 Wheel, 1,000 gram load, 1,000 cycles)
    6) Adhesion: ASTM 4541 Elcometer Adhesion.
    7) Humidity: ASTM D 4585. 4,500 hours.
f. Finish: Tnemec 1070 Fluoronar applied at a rate to achieve 2.0 – 3.0 mils dry film thickness (Available in high gloss (1070), semi-gloss (1071) and eggshell (1072). Finish coat shall the following performance criteria:
    1) Generic Type: Thermoset Fluoropolymer Polyurethane
    2) Solids By Volume: 60%.
    3) Salt Spray (Fog): ASTM B 117, 10,000 hours exposure
    4) Adhesion: ASTM 4541 Elcometer Adhesion.
    5) Abrasion: ASTM 4060 (CS-17 Wheel, 1,000 gram load, 1,000 cycles)
    6) Flexibility: ASTM D 522 (Method A)

7) Hardness: ASTM 3363.
8) Humidity: ASTM 4585, 3,000 hours exposure
9) Impact: ASTM B2794
10) QUV: ASTM D 4587, 16,000 hours exposure.
11) QUV: ASTM D 4587, 25,000 hours exposure.
12) Exterior Exposure: ASTM D 4141, Method C (EMMAQUA), 1,500 MJ/m² Exposure. Report gloss retention and color retention.
13) Exterior Exposure: ASTM D 4141, Method C (EMMAQUA), 2,000 MJ/m² Exposure. Report gloss retention and color retention.
14) Exterior Exposure: ASTM D 4141, Method C (EMMAQUA), 5,000 MJ/m² Exposure. Report gloss retention and color retention.
15) AAMA 2605 (10 Years South Florida Exposure):

3.8 COATING SYSTEM WARRANTY

A. The coating manufacturer shall provide to the Owner a 15 year warranty for the exterior coating system. The manufacturer shall warrant against (a) checking (b) cracking (c) blistering (d) delamination (e) color change as defined in the pre-approved warranty document (f) gloss change as defined in the pre-approved warranty document, and (g) chalking as defined in the pre-approved warranty document. To facilitate execution of the warranty, the Contractor shall provide the following:
   1. The painting contractor shall apply the intermediate and finish coat of the specified coating system to a minimum of 6 panels (to be supplied by Tnemec) of each finish color identified in the warranty.
   2. The panels shall be air dried for a minimum of 7 days and shipped to Tnemec Company prior to final acceptance of the work for verification color and gloss accuracy and for storage as the Original Project Color Standards for the duration of the warranty coverage.
   3. Tnemec shall forward the signed warranty document along with (2) two panels of each finish color to the Owner for retention by the Owner and (2) panels of each finish color to the painting contractor. These procedures are required to validate the warranty.
   4. All conditions of the product warranty shall be fulfilled by the contractor.

END OF SECTION

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SECTION 10 1100
VISUAL DISPLAY UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Glass markerboards.

1.2 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Blocking and supports.

B. Section 06 2000 - Finish Carpentry: Wood frame and marker rails.

C. Section 09 2116 - Gypsum Board Assemblies: Concealed supports in metal stud walls.

D. Section 09 2216 - Non-Structural Metal Framing: Concealed supports in metal stud walls.

1.3 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2026.

C. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2024, with Editorial Revision (2025).

D. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2024.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data on glass markerboard, trim, and accessories.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.

D. Samples: Color charts for selection of color and texture of glass markerboard and trim.

E. Samples: Two, 2 by 2 inches in size illustrating materials and finish, color and texture of glass markerboard, tackboard surfacing, and trim.

F. Manufacturer's printed installation instructions.

G. Manufacturer's Qualification Statement.

H. Maintenance Data: Include data on regular cleaning, stain removal .

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.1 VISUAL DISPLAY UNITS

A. Magnetic Glass Markerboards:

1. Manufacturers:
   a. Claridge Products; Glass Markerboards: www.claridgeproducts.com/#sle.
   b. Substitutions: See Section 01 6000 - Product Requirements.
2. Glass: Laminated, low iron, 1/4 inch thick, with bevel edges and radiused corners, laminated to steel backing sheet for use with magnets. Coated or treated for use as dry erase board or projection surface.
3. Glass Finish: White back-coating.
4. Steel Backing Sheet Thickness: 24 gauge, 0.0239 inch .
5. Size: As indicated on drawings.
6. Frame: No frame, with concealed fasteners.
7. Mounting: Concealed Z clips.
8. Accessories: Provide magnetic marker tray and magnetic marker holder.

2.2 ACCESSORIES

A. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

B. Cleaning Instruction Plate: Provide instructions for chalkboard cleaning on a metal plate fastened to perimeter frame near chalkrail.

C. Marker Tray: Aluminum, manufacturer's standard profile, one piece full length of markerboard, molded ends, concealed fasteners, same finish as frame.

D. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

C. Verify flat wall surface for frameless adhesive-applied boards.

3.2 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install boards in accordance with manufacturer's instructions.

B. Install with bottom of perimeter frame at 36 inches above finished floor.

C. Secure units level and plumb.

3.4 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at Architect Punch.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Room and door signs.

B. Interior directional and informational signs.

C. Roof Identification Signage.

D. Emergency evacuation maps.

E. Building identification signs.

F. Dimensional Letters.

1.2 RELATED REQUIREMENTS

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

B. Detail of Project Plaque in General Conditions section of Project Manual.

C. Section 04 2000 - Unit Masonry.

D. Section 09 2116 - Gypsum Board Assemblies.

E. Division 22 - Mechanical Identification.

F. Division 26 - Electrical Identification.

1.3 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

D. NFPA 170 - Standard for Fire Safety and Emergency Symbols; 2024, with Errata (2023).

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
3. Submit for approval by Owner through Architect prior to fabrication.

D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

E. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

F. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

G. Manufacturer's Qualification Statement.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room and door signs in sequential order of installation, labeled by floor or building.

C. Store tape adhesive at normal room temperature.

1.7 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain this minimum temperature during and after installation of signs.

1.8 WARRANTY

A. Provide manufacturer's standard warranty against defects in materials and workmanship for minimum 5 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Flat Signs:
   1. Basis of Design: APCO Signs: Elevate Series; www.apcosigns.com.
   2. Other Acceptable Manufacturers:
      a. TakeForm, Inc.; www.takeform.net.
      b. Best Sign Systems, Inc: www.bestsigns.com/#sle.
      c. Inpro: www.inprocorp.com/#sle.
   3. Substitutions: See Section 01 6000 - Product Requirements.

B. Dimensional Letter Signs:
   1. Andco Industries Corporation.
   2. Gemini, Inc.
   3. Leeds Architectural Letters, Inc.
   4. Substitutions: See Section 01 6000 - Product Requirements.

C. Exterior Building Identification Signs:
   1. Andco Industries Corporation.
   2. Cosco Industries: www.coscoarchitecturalsigns.com/#sle.
   3. FASTSIGNS: www.fastsigns.com/#sle.
   4. Inpro: www.inprocorp.com/#sle.
   5. Leeds Architectural Letters, Inc..
   6. Substitutions: See Section 01 6000 - Product Requirements.

D. Plaques:

1. Cosco Industries; Cast Aluminum: www.coscoarchitecturalsigns.com/#sle.
2. FASTSIGNS; _____: www.fastsigns.com/#sle.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room, Directional, Informational, and Door Signs: Provide interior signage as indicated on the drawings.
   1. Sign Type: Flat signs with engraved panel media as specified.
   2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
   3. Character Height: 1 inch unless indicated otherwise.

C. Interior and Exterior Door Signs: Provide at every door and cased opening on Architect's drawings.

D. Interior Flat Signs:
   1. Sign Type: Flat sign with acrylic or PETG panels
   2. Life Safety Signage: See Drawings
   3. Roof Identification: As described below.

E. Exterior Flat Panel, exterior grade plastic laminate (in silver or aluminum color), or satin aluminum metal background, with raised black lettering. Sign size: 6" x 8", unless otherwise indicated on drawings.
   1. Mount with mechanical fasteners.

F. Emergency Evacuation Maps:
   1. Map content to be provided by Owner. Map graphics are to be provided by Signag Manufacturer.
   2. Allow for minimum of six (6) Emergency Evacuation Maps, unless otherwise indicated on the drawings.
   3. Mounting: Flush mounted.

G. Building Identification Signs:
   1. Provide building identification sign as indicated on the drawings. Use metal components to match the exterior signage illustrated on the drawings.
   2. Shop prime and field finish the sign as indicated, in color to be selected by Archtect.
   3. Mount on exterior as indicated on drawings.

H. Building Dimensional Letters:
   1. Provide building identification sign as indicated on the drawings. Use metal components to match the exterior signage illustrated on the drawings.
   2. Shop prime and field finish the sign as inciated, in color to be selected by Architect.
   3. Mount on exterior as indicated on drawings.

2.3 SIGN TYPES

A. Flat Signs: As indicated on the drawings.
   1. Edges: Square.
   2. Corners: Square.
   3. Wall Mounting of One-Sided Signs: Tape adhesive.

4. Wall "Flag" Mounting of Two-Sided Signs: Aluminum wall bracket, powder coated, color selected from manufacturer's standard colors, attached with screws in predrilled mounting holes, set in clear silicone sealant.

B. Color and Font: Unless otherwise indicated:
1. Character Font: As indicated on drawings.
2. Character Case: Upper and lower case (title case).
3. Background Color: As scheduled.
4. Character Color: Contrasting color.

2.4 TACTILE SIGNAGE MEDIA

A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
1. Total Thickness: 1/16 inch.

2.5 DIMENSIONAL LETTERS

A. Metal Letters: Height and size as indicated on drawings. Letters shall be cast from 319 aluminum alloy with anodized finish.
1. Metal: Aluminum casting.
2. Finish: As selected by Architect from manufacturer's aluminum anodized colors.
3. Font: As selected by Architect, with approval of Owner.
4. Size: 1" thick by height as indicated on drawings.
5. Mounting: Concealed screws; flush mounting. With 3-inch stainless steel stand-offs, unless indicated otherwise.

2.6 PLAQUES

A. Metal Plaques:
1. Metal: Aluminum casting.
2. Metal Thickness: 1/8 inch, minimum.
3. Size: 24 inches by 36 inches.
4. Text and Typeface:
a. Character Font: Helvetica, Arial, or other sans serif font.
b. Character Case: Upper case only.
c. Character Color: Contrast with background color.
5. Border Style: As indicated on drawings.
6. Background Texture: Ripple.
7. Surface Finish: Brushed, satin.
8. Painted Background Color: Light oxide stain.
9. Protective Coating: Manufacturer's standard clear coating.

2.7 EXTERIOR BUILDING IDENTIFICATION SIGNS

A. Metal Letters and Forms:
1. Metal: Steel or Aluminum plate.
2. Metal Thickness: 3/8 inch minimum.
3. Text and Typeface:
a. Character Font: To be selected.
b. Character Case: To be selected.
4. Finish: Finish shall be per Section 09 9600 - High Performance Coatings.
5. Mounting: As indicated on drawings.

2.8 ACCESSORIES

A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

B. Tape Adhesive: Double sided tape, permanent adhesive.

C. Use clear silicone sealant.

D. For glass application provide backer on sign and clear silicone or tape for mounting.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

END OF SECTION

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SECTION 10 2113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Solid plastic (HDPE) toilet compartments.

1.2 RELATED REQUIREMENTS

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

B. Section 05 1200 - Structural Steel Framing: Concealed steel support members.

C. Section 05 5000 - Metal Fabrications: Concealed steel support members.

D. Section 06 1000 - Rough Carpentry: Blocking and supports.

E. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.3 REFERENCE STANDARDS

A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

C. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate work with placement of support framing and anchors in walls and ceilings.

1.5 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on panel construction, hardware, and accessories.

C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall, floor, and ceiling supports, and door swings.

D. Samples: Submit two samples of partition panels, 4 by 4 inch in size illustrating panel finish, color, and sheen.

E. Manufacturer's Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in strict accordance with the manufactuers printed instructions.

1.7 WARRANTY

A. Provide manufacturer's standard written warranty on panels, pilasters, and doors against breakage, corrosion, and delamination; to be replaced without charge, including labor.

B. Warranty Term: Twenty-five (25) years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Solid Plastic Toilet Compartments:
   1. ASI Global Partitions; Basis of Design: www.asi-globalpartitions.com/#sle.
   2. Scranton Products; Hiny Hiders Partitions: www.scrantonproducts.com/#sle.
   3. Substitutions: Section 01 6000 - Product Requirements.

2.2 PLASTIC TOILET COMPARTMENTS

A. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286; floor-mounted headrail-braced.
   1. Color: Single color as selected.
   2. Doors:
      a. Thickness: 1 inch.
      b. Width: 24 inch.
      c. Width for Handicapped Use: 36 inch, out-swinging.
      d. Height: 58 inch.
   3. Panels:
      a. Thickness: 1 inch.
      b. Height: 58 inch.
      c. Depth: As indicated on drawings.
   4. Pilasters:
      a. Thickness: 1 inch.
      b. Width: As required to fit space; minimum 3 inch.
   5. Screens: Without doors; to match compartments; mounted to wall with two panel brackets.

2.3 ACCESSORIES

A. Headrails: Extruded aluminum, anti-grip profile.
   1. Size: Manufacturer's standard size.

B. Wall and Pilaster Brackets: Stainless steel; manufacturer's standard type for conditions indicated on drawings.

C. Attachments, Screws, and Bolts: Stainless steel, tamper-proof type.
   1. Bracket Attachment to Panels and Pilasters: Through-bolts and nuts; tamper proof.

D. Hinges: Stainless steel, manufacturer's standard finish.
   1. Continuous-type hinge, self-closing.

E. Door Hardware: Stainless steel, manufacturer's standard finish.
   1. Door Latch: Slide type with exterior emergency access feature.
   2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch.
   3. Provide door pull for outswinging doors.

F. Coat Hook: One per compartment, mounted on door.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and interfaces with other work.

B. Verify spacing of and between plumbing fixtures.

C. Verify location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's written instructions.

B. Maintain 3/8-to-1/2-inch space between wall and panels and between wall and end pilasters.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to brackets. Locate headrail joints at pilaster center lines.

E. Replace damaged or scratched materials with new materials. Do not touch up scratches or damaged finish in field.

3.3 TOLERANCES

A. Maximum Variation from True Position: 1/4 inch.

B. Maximum Variation from Plumb: 1/8 inch.

3.4 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.

B. Adjust hinges to position doors in partially open position when unlatched. Return outswinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

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SECTION 10 2600
WALL PROTECTION AND CORNER GUARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Corner guards.

B. Protective wall covering.

1.2 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications: Corner guards fabricated from rolled metal sections or bent plate.

B. Section 05 5000 - Metal Fabrications: Anchors for attachment of work of this section, concealed in wall.

C. Section 06 1000 - Rough Carpentry: Blocking for wall and corner guard anchors.

D. Section 09 2116 - Gypsum Board Assemblies: Placement of supports in stud wall construction.

1.3 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2026.

C. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

E. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2026.

F. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2023.

G. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

H. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.

C. Shop Drawings: Include plans, elevation, sections, and attachment details. Show design and spacing of supports for protective corridor handrails, required to withstand structural loads.

D. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
   1. Submit two sections of corner guards, 24 inches long.
   2. Submit two samples of protective wall covering, 6 by 6 inches square.

E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
   1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Stock Materials: One package(s) of minimum 96 inches long unit of each kind of covers for corner guards.
3. Extra Stock Materials: 5% of each kind of protective wall covering.

G. Maintenance Data: Manufacturer's instructions for care and cleaning of each type of product. Include information about both recommended and potentially detrimental cleaning materials and methods.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.

B. Protect work from moisture damage.

C. Protect work from UV light damage.

D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.

E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Corner Guards:
1. Construction Specialties, Inc; Acrovyn Solid Color and Chameleon Crash Rails: www.c-sgroup.com/#sle. [Basis of Design]
2. Inpro; _____: www.inprocorp.com/#sle.
3. Koroseal Interior Products; _____: www.koroseal.com/#sle.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Protective Wall Covering:
1. Construction Specialties, Inc; Acrovyn High-Impact Wall Covering: www.c-sgroup.com/#sle. [Basis of Design]
2. Inpro; _____: www.inprocorp.com/#sle.
3. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PERFORMANCE CRITERIA

A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.

B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.

C. Fungal Resistance: Unless otherwise noted, provide protection products and assemblies which pass ASTM G21 testing.

2.3 PRODUCT TYPES

A. Corner Guards - Surface Mounted:

B. Basis of Design: Construction Specialties SM-20AN Corner Guard

1. Corner guards fabricated from rolled section or bent plate are specified in Section 05 5000.
2. Material: Aluminum - Extruded aluminum retainers should be 6063-T6 alloy, nominal .062" (1.57mm) thickness. Minimum strength and durability properties as specified per ASTMM B221.
3. Width of Wings: 3 inches.
4. Corner: Square.
5. Color: As indicated.
6. Length: One piece.
7. Preformed end caps.

C. Protective Wall Covering:
1. Material: PETG-based, PVC-free, High-Impact Sheet
   a. Basis of Design - Acrovyn by Construction Specialties.
2. Thickness: 0.040 inch.
3. Color: As indicated on drawings.
4. Accessories: Provide manufacturer's standard color-matched trim and moldings.
   a. Provide Color Matched Caulk when applicable.
5. Mounting: Adhesive.

2.4 FABRICATION

A. Fabricate components with tight joints, corners and seams.

B. Pre-drill holes for attachment.

C. Form end trim closure by capping and finishing smooth.

2.5 SOURCE QUALITY CONTROL

A. See Section 01 4000 - QUALITY REQUIREMENTS, for additional requirements.

B. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

B. Verify that field measurements are as indicated on drawings.

C. Verify that substrate surfaces for adhered items are clean and smooth.
1. Complete all finishing operations, including painting, before beginning installation of rigid vinyl sheet materials. Paint substrate with a paint or primer that does not contain polyvinyl acetate (PVA).
2. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer. Follow adhesive manufacturer's recommendations for remedial measures at locations and/or application conditions where adhesion test's results are unsatisfactory.

D. Start of installation constitutes acceptance of project conditions.

3.2 INSTALLATION

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.

B. Position corner guard above wall base._____.

C. Position protective wall covering above wall base.

1. Full-Height Installation: Establish a plumb line located at edge of starting point of first sheet to ensure following sheets will be installed plumb.
2. Wainscot Installation: Establish a level line at the specified height for entire length of run. Install by aligning top of edge of covering with this line.
3. Apply adhesive with 1/8 inch V-notch trowel to an area of wall surface that can be completed within cure time of the adhesive.
4. Install trim pieces as required for a complete installation. Allow tolerance for thermal movement.
5. At joints indicated to be caulked, allow for a minimum 1/16 inch wide gap between edges of sheets. Gaps are required to be of consistent width throughout the project.
6. Use a roller to ensure maximum contact with adhesive.
7. At inside and outside corners cut covering sheets to facilitate installation of trim pieces or corner guards.

3.3 TOLERANCES

A. Maximum Variation From Required Height: 1/4 inch.

B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

3.4 CLEANING

A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

SECTION 10 2800
TOILET, BATH, AND LAUNDRY 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.

B. Section 06 1000 - Rough Carpentry.

C. Section 10 213.19 - Plastic Toilet Compartments.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.
   1. Public-use washroom accessories.
   2. Underlavatory guards.
   3. Custodial accessories.

1.3 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.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
   2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Include electrical characteristics.

B. Samples: Full size, for each exposed product and for each finish specified.
   1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify products using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from a single source from a single manufacturer.

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

1.8 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, visible silver spoilage defects.
   2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials: The Owner will furnish the following items to be installed by the General Contractor:
   1. Toilet Tissue Dispensers.

2.2 PERFORMANCE REQUIREMENTS

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

2.3 MANUFACTURER

A. Basis-of-Design Products: Subject to compliance with requirements, provide the listed Basis-of-Design Products.
   1. Bobrick Washroom Equipment, Inc. (Basis-of-Design Product Manufacturer)
      a. Or comparable products by the following:
         1) Bradley Corporation (wash room accessories)
   2. Koala (Childcare Accessories Only)
   3. Plumberex (Underlavatory Guards Only)
      a. Or comparable products by one of the following:
         1) American Specialties, Inc.
         2) Bradley Corporation.
   4. Alternate products submitted for consideration (from one of the manufacturers listed above) must show an itemized comparison with each product named below.

2.4 PUBLIC-USE WASHROOM ACCESSORIES

A. Toilet Tissue Dispenser (Standard Roll): **TA01**
   1. OFCI - Install Per Owner Direction

B. Paper Towel Dispenser (Folded, High-Capacity): TA03
   1. Basis-of-Design Product: Bobrick B-26212
   2. Mounting: Surface Mounted.
   3. Minimum Capacity: Capacity: 400 C-fold or 525 multifold towels.
   4. Material and Finish: Stainless steel, No. 4 satin finish.
   5. Lockset: Tumbler-type.
   6. Refill Indicators: Pierced slots at sides or front.
   7. Optional Accessories: “Towel Mate”. Device that allows single towel dispensing without bulging, sagging, or falling through towel tray opening.

C. Waste Receptacle, Surface Mount, Large: TA11
   1. Basis-of-Design Product: Bobrick B-277
   2. Mounting: Surface Mounted.
   3. Minimum Capacity: 12.75 gallon.
   4. Material and Finish: Stainless steel, No. 4 satin finish.
   5. Waste Receptacle Profile: Arc-front.

6. Trash Liner Holder: Removable holding device designed to facilitate installation and removal of disposable trash liners and to retain liner inside waste receptacle. Device shall have a molded plastic sleeve with a stainless steel U-shaped support strap.

D. Soap Dispenser, Liquid Type, Manual: TA19
   1. Basis-of-Design Product: Bobrick B-26617
   2. Description: Manually Operated Liquid Soap Dispenser.
   3. Mounting: Wall mount, surface.
   4. Capacity: 34 oz.
   5. Materials: Stainless steel, No. 4 satin finish.
   6. Accessories: Provide 2 container cartridges for each unit.
   7. Refill Indicator: Window type.

E. Grab Bar (short): **TA23**
   1. Basis-of-Design Product: Bobrick B-6806 x 18
   2. Mounting: Flanges with concealed fasteners.
   3. Material and Finish:
      a. Material: Stainless steel, 0.05 inch thick.
      b. Finish: Smooth, No. 4 satin finish on ends and slip-resistant texture in grip area.
      c. Outside Diameter: 1-1/2 inches.
      d. Configuration and Length: Straight, 18 inches long.

F. Grab Bar (medium): **TA24**
   1. Basis-of-Design Product: Bobrick B-6806 x 36
   2. Mounting: Flanges with concealed fasteners.
   3. Material and Finish:
      a. Material: Stainless steel, 0.05 inch thick.
      b. Finish: Smooth, No. 4 satin finish on ends and slip-resistant texture in grip area.
      c. Outside Diameter: 1-1/2 inches.
      d. Configuration and Length: Straight, 36 inches long.

G. Grab Bar (long): **TA25**
   1. Basis-of-Design Product: Bobrick B-6806 x 42
   2. Mounting: Flanges with concealed fasteners.
   3. Material and Finish:
      a. Material: Stainless steel, 0.05 inch thick.
      b. Finish: Smooth, No. 4 satin finish on ends and slip-resistant texture in grip area.
      c. Outside Diameter: 1-1/2 inches.
      d. Configuration and Length: Straight, 42 inches long.

H. Mirror, Framed, without Shelf: **TA31**
   1. Basis-of-Design Product: Bobrick B-165-1824
   2. Frame: Stainless steel channel.
   3. Corners: Mitered, welded, and ground smooth.
   4. Hangers: Produce rigid, tamper and theft-resistant installation, using one-piece, galvanized steel, wall hanger device with spring action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
   5. Size: 24 inches wide x 36 inches high.

I. Mirror, Framed, without Shelf (Full-Length): **TA32**
   1. Basis-of-Design Product: Bobrick B-165-2460
   2. Frame: Stainless steel channel.

3. Corners: Mitered, welded, and ground smooth.
4. Hangers: Produce rigid, tamper and theft-resistant installation, using one-piece, galvanized steel, wall hanger device with spring action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
5. Size: 24 inches wide x 60 inches high.

J. Robe Hook: **TA26**
1. Basis-of-Design Product: Bobrick B-7672
2. Mounting: Surface mounted.
3. Material and Finish: Stainless steel, No. 4 satin finish.

K. Sanitary Napkin Disposal Unit, Surface-mount: **TA29**
1. Basis-of-Design Product: Bobrick B-9254
2. Mounting: Surface mounted.
3. Door or Cover: Self-closing disposal opening cover and hinged face panel with tumbler lockset.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 satin finish.

2.5 PUBLIC USE SHOWER ROOM ACCESSORIES

A. Shower Curtain Rod, Extra-Heavy-Duty (straight): TA33
1. Basis-of-Design Product: Bobrick B-6047
2. Description: 1-1/4 inch OD; fabricated from nominal 0.0375-inch-thick stainless steel.
3. Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
4. Finish: Stainless steel, No. 4 satin finish.

B. Shower Seat, Folding-Type: **TA36**
1. Basis-of-Design Product: Bobrick B-5181
2. Description: Fold-up, reversible shower seat complete with mounting kits, anchor, and accessories, as required to support 360 lbs. in compliance with accessible design guidelines.
3. Configuration: L-shaped seat, designed for wheelchair access.
4. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
5. Mounting Mechanism: Stainless steel, No. 4 satin finish.
6. Width: 33 inches.

2.6 PRIVATE USE BATHROOM ACCESSORIES

A. Shower Curtain: **TA35**
1. Basis-of-Design Product: Bobrick B-204-2
2. Description: Vinyl Shower Curtain.
3. Curtain Size: Minimum 6 inches wider than opening by 72 inches.
4. Curtain Material: Vinyl, minimum 0.008 inch thick, opaque, matte.
5. Color: White
6. Curtain Grommets: HDPE at minimum 6 inches o.c. through top hem.

2.7 CHILDCARE ACCESSORIES

A. Diaper-Changing Station: **TA55**
1. Basis-of-Design Product: Koala KB110-SSWM
2. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.

a. Engineered to support a minimum of 250-lb static load when opened.
b. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
c. Operation: By pneumatic shock-absorbing mechanism.
d. Material and Finish: Stainless steel, No. 4 satin finish.
e. Liner Dispenser: Built in.

2.8 UNDERLAVATORY GUARDS

A. Underlavatory Guard: **TA58**
1. Basis-of-Design Product: Plumberex Soft Guard Plus
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.9 CUSTODIAL ACCESSORIES

A. Mop and Broom Holder: **TA95**
1. Basis-of-Design Product: Bobrick B-224 x 36
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
3. Length: 36 inches.
4. Hooks: Three.
5. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless steel, No. 4 satin finish.
a. Shelf: Not less than nominal 0.05 inch thick stainless steel.
b. Rod: Approximately 1/4-inch-diameter stainless steel.

2.10 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.11 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 10 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 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 manufacturer’s written recommendations.

END OF SECTION

SECTION 10 5100
LOCKERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal lockers.

B. Locker units with hinged doors.

C. Metal tops and filler panels.

1.2 RELATED REQUIREMENTS

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

B. Section 03 3100 - Concrete: Concrete base construction.

1.3 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's published data on locker construction, sizes and accessories.

C. Shop Drawings: Indicate locker plan layout, including locker types, sizes and quantities. Include all necessary details related to anchoring, installation, fillers, trim, base, accessories, and dimensioned relation to adjacent surfaces.

1. Numbering: The locker numbering sequence shall be provided by the approving authority and noted on approved drawings returned to the locker contractor.

D. Color Samples: Submit samples of all manufacturer's available paint colors on specified base metal (chain set) for Architect's color selection.

E. Verification Samples: If requested, submit two samples 3 x 6 inches in size, of each color selected; applied to specified base metal.

F. Manufacturer's Installation Instructions: Indicate component installation assembly.

1.5 QUALITY ASSURANCE

A. Manufacturer shall be a firm with not less than 5 years of successful experience in manufacturing products specified in this Section.

B. Installer shall be a firm with not less than 5 years of successful experience in installation of products specified in this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until building is enclosed and ready for locker installation.

B. Protect locker finish and adjacent surfaces from damage.

1.7 WARRANTY

A. Provide manufacturer's warranty against all defects in materials and workmanship excluding finish, and damage resulting from deliberate destruction and vandalism under this section for the lifetime of the facility.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Metal Lockers:
   1. Art Metal Products: www.artmetalproducts.com.
   2. List Industries Inc.: www.listindustries.com.
   3. Penco Products, Inc: www.pencoproducts.com.
   4. Republic Storage: [Basis of Design] www.republicstorage.com
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. The approval of manufacturers does not relieve the contractor from furnishing products which comply with all detailed requirements of specification.

C. Manufacturers' products shall be standard cataloged items and shall be a consistently offered line of equipment. Manufacturers published literature must clearly show that the products being furnished are in compliance with these specifications. Otherwise a detailed listing of differences is required prior to bid.

2.2 LOCKER APPLICATIONS

A. Lockers S37: MVP storage metal lockers, wall mounted for base indicated on drawings.
   1. Width: 36 inches.
   2. Depth: 22 inches.
   3. Overall Height: 84 inches.
   4. Locking: Built-in combination locks.

B. Lockers S36: Single tier, wall and base mounted as indicated on drawings.
   1. Width: 24 inches.
   2. Depth: 22 inches.
   3. Overall Height: 72 inches.
   4. Locking: Built-in combination locks.

C. Lockers S34: Four tier, wall and base mounted as indicated on drawings.
   1. Width: 18 inches.
   2. Depth: 18 inches.
   3. Overall Height: 72 inches.
   4. Locking: Built-in combination locks.

D. Lockers S33: Three tier, wall and base mounted as indicated on drawings.
   1. Width: 12 inches.
   2. Depth: 15 inches.
   3. Overall Height: 72 inches.
   4. Locking: Built-in combination locks.

E. Lockers S31: Double tier, wall and base mounted as indicated on drawings.
   1. Width: 18 inches.
   2. Depth: 18 inches.
   3. Overall Height: 72 inches.
   4. Locking: Built-in combination locks.

F. Lockers Type S30: Single tier, wall and base mounted as indicated on drawings.
   1. Width: 18 inches.
   2. Depth: 18 inches.
   3. Height: See drawings.

4. Locking: Lock on corridor side.

G. Lockers S38: Six tier wall mounted pass-thru lockers.
1. Width: 18 inches.
2. Depth: 18 inches.
3. Overall Height: 72 inches.
4. Locking: Built-in combination locks.

2.3 METAL LOCKERS

A. Lockers: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.
1. Where ends or sides are exposed, provide flush panel closures.
2. Heavy Duty.
3. Construction: Welded.
4. Color: To be selected by Architect.

B. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.

C. Sloped Top: 16 gage, 0.0598 inch. To be installed in addition to the locker flat top, with end closures for support. Finish to match lockers.

D. Coat Hooks: Stainless steel or zinc-plated steel.

2.4 MATERIALS

A. Fasteners: Cadmium, zinc or nickel-plated steel; bolt heads, slotless type; self-locking nuts or lock washers.

2.5 LOCKER UNITS

A. Athletic Lockers: Doors shall be 13 gauge steel, and perforated for ventilation. Handle shall be 3-point handle latching system. Tops, bottoms, shelves and dividers shall be 16 gauge, flanged on all sides for added stiffness. Sides shall be 16 gauge with diamond perforations. Exposed backs shall be 16 gauge and factory painted to match locker fronts. Unexposed backs shall be 18 gauge.

B. Locker Equipment: Furnish each locker with the following items, unless otherwise shown:
1. Double Tier Lockers: One double prong ceiling hook, and a minimum of two single prong wall hooks.
2. Ceiling and Wall hooks shall be cadmium plated or zinc plated steel or cast aluminum, with ball tips.

C. Base: Fabricate for concrete base. See drawings for height.

D. Class: Conventional.

E. Locker Body: Formed and flanged; with steel stiffener ribs.

F. Frames: Formed channel shape, ground flush.

G. Door frames shall be 16 gauge steel channel formation securely welded together making a rigid one piece structure. Vertical members shall have an additional flange forming a continuous door strike, integral with frame on both sides of door opening. Cross frame members of 16 gauge channel shapes, including intermediate cross frame on multi-tier lockers, securely welded to vertical framing members to ensure a square and rigid assembly. Intermediate cross frame members not required on box lockers.

H. Continuous Hinges: Manufacturers heavy duty, steel, full height, 16 gauge. All doors shall be right hand side hinge.

I. All lockers shall be provided with built-in combination lock, master keyed. Equal to Master Lock #1630.

J. Pre-Locking Device: All "tiered" lockers, except lockers with a turn handle, shall be equipped with a positive automatic pre-locking device, whereby the locker may be locked while door is open and then closed without unlocking and without damaging locking mechanism.

K. Rubber bumpers shall be fastened to the vertical continuous door frame at each latch hook location to provide a cushion for door closing.

L. Number Plates: Provide oval shaped brass or aluminum plates. Form numbers 1/2 inch high of block font style with ADA designation, in contrasting color.
   1. Attach to door with two aluminum rivets.

M. Form recess for operating handle and locking device.

N. Finish edges smooth without burrs.

O. Fabricate sloped metal tops, ends and closure pieces.

P. Provide end panels and filler strips.

2.6 LOCKER BENCHES

A. Benchtops:
   1. To be 9-1/2" wide x 1-1/4" thick and made from laminated hardwood. Benchtops are to be finished with one coat deep penetrating sealer and two coats of heavy body high impact hot hydraulically applied lacquer. Benches up to 8'-0" in length have two pedestals. Benchtops longer than 8'-0" up to 12'-0" are supplied with three pedestals.

B. No. 4085 Heavy-Duty Steel Pedestal:
   1. Fabricated from 1-1/2" diameter 14 gauge steel tube welded to top and bottom 11 gauge formed flanges. Each flange to have three anchoring holes.
      a. Color: #729 Parchment.

2.7 FABRICATION

A. Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Make exposed metal edges free of sharp edges and burrs, safe to touch.

2.8 FINISHING

A. Clean, degrease, and neutralize metal; prime, and finish with two coats of baked enamel.
   1. Color: As selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases and embedded anchors are properly sized.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and referenced standards.

B. Install lockers plumb and square.
   1. Units shall be set in place, plumb, level, rigid, flush and securely attached to the wall and anchored to the floor or base according to manufacturer's specifications.

C. Place and secure on specified base.

D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.
   1. Anchor about 48" o.c., unless otherwise recommended by manufacturer. Also where necessary to avoid metal distortion, using concealed fasteners. Friction cups are not acceptable.

E. Bolt adjoining locker units together to provide rigid installation.

F. Install end panels, filler panels, and sloped tops.
   1. Attach using concealed fasteners. Provide flush, hairline joints against adjacent surfaces.

G. Install accessories.

H. Replace components that do not operate smoothly.

3.3 ADJUSTMENT

A. Upon completion of installation, inspect lockers and adjust as necessary for proper door operation. Touch-up scratches and abrasions to match original finish.

3.4 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION

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SECTION 10 5613
METAL STORAGE SHELVING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Four post shelving.

B. Industrial metal storage shelving.

C. Shelving accessories.

1.2 RELATED REQUIREMENTS

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

B. Section 06 1000 - Rough Carpentry: Blocking and reinforcement in walls for anchoring shelving units.

C. Section 09 2116 - Gypsum Board Assemblies: Blocking and reinforcement in walls for anchoring shelving units.

1.3 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Rated uniform shelf loads.
   2. Details of shelving assemblies, including reinforcement.
   3. Accessories.
   4. Substrate preparation instructions and recommendations.
   5. Storage and handling requirements and recommendations.
   6. Installation methods.
   7. Specimen warranty.

C. Test Reports: Provide independent agency test reports documenting compliance with specified structural requirements.
   1. In lieu of test reports, detailed drawings stamped and sealed by a Professional Engineer licensed in the State in which the Project is located will be acceptable.

D. Shop Drawings: Indicate location, type, and layout of shelving, including lengths, heights, and aisle layout, and relationship to adjacent construction.
   1. Indicate methods of achieving specified anchoring requirements.

E. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and finishes.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Shelves: Two of each size with shelf brackets.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of documented experience and approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inspect for dents, scratches, or other damage. Replace damaged units.

B. Store in manufacturer's unopened packaging until ready for installation.

C. Store under cover and elevated above grade.

1.6 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide one year manufacturer warranty covering defects of manufacturing and workmanship and rust and corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Four Post Shelving:
1. Hallowell, Div. of List Industries, Inc: www.hallowell-list.com.
2. Penco Products, Inc: www.pencoproducts.com.
3. SpaceSaver Corporation: www.spacesaver.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 SHELVING - GENERAL

A. See drawings for layout and sizes.

B. Anchors: Provide anchoring hardware to secure each shelving unit to floor and wall.
1. Provide hardware of type recommended by manufacturer for substrate.

C. Location: Janitor's closet, and elsewhere as noted.

2.3 FOUR POST SHELVING

A. Four Post Shelving: Steel post-and-beam type with sway bracing, shelving brackets, shelving surfaces, and accessories as specified.
1. Unit Width: 36 inches, center to center of posts, unless indicated otherwise.
2. Shelf Capacity: Uniform distributed load of 50 psf, minimum.
3. Shelf Deflection: L/140, maximum, under specified uniform load.
4. Adjustability of Shelving: At intervals of 6 inches on center, minimum.
5. Shelf Depth: 24 inches, unless indicated otherwise.
6. Shelves per Unit: As indicated on drawings.
7. Unit Height: 87 inches, overall , unless indicated otherwise.
8. Finish: Baked enamel, medium gloss.
9. Color: As selected by Architect from manufacturer’s standard range.
10. Number of Units: As indicated on drawings.
11. Product: Penco "Clipper - Open Configuration".

B. Posts and Beams: Formed sheet members; perforations exposed on face of members are not acceptable.
1. Metal Thickness: 16 gage, minimum.
2. Post Shape: Tee intermediate posts, angle end posts forming corners.
3. Post Face Width: 2 inches, maximum.
4. Connecting Hardware: Manufacturer's standard.

C. Bracing: Formed sheet members.

1. Back Sway Bracing: Either strap or panel; at back of each unit.
2. Side Sway Bracing: Either strap or panel; at each side of each unit.
3. Strap Sway Bracing: One strap installed diagonally, 16 gauge, 0.0598 inch; welded, riveted, or bolted to uprights.
4. Panel Sway Bracing: Formed sheet metal panels, 20 gauge, 0.0359 inch; welded, riveted, or bolted to uprights.
5. See drawings for additional details of bracing.

D. Shelves: Formed sheet, finished on all surfaces .
1. Metal Thickness: 16 gage, minimum.
2. Shelf Edge Profile: Extending 3/4 inch, maximum, below top surface of shelf.
3. Shelf Connection to Posts: Manufacturer's standard.

2.4 ACCESSORIES

A. Label Holders: Steel, attached to front face of shelf.
1. Size: 2-1/4 by 3/4 inches.
2. Finish: Manufacturer’s standard.
3. Mounting: Slide-on.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate is level and that clearances are as specified.

B. Verify that walls are suitable for shelving attachment.

C. Do not begin installation until substrates have been properly prepared.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Coordinate location with Owner prior to installation.

B. Install in accordance with manufacturer's instructions.

C. Anchor and reinforce as specified, as indicated on drawings, and as recommended by manufacturer.

D. Install shelving with shelf surfaces level and vertical supports plumb; adjust feet and bases as required.

E. Out-Of-Square Tolerance - Four Post Shelving: Maximum of 1/8 inch difference in distance between bottom shelf and canopy top, measured along any post in any direction.

3.3 CLEANING

A. Clean shelving and surrounding area after installation.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

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SECTION 10 7316.13
METAL CANOPIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Attached metal canopies.

1.2 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete footings.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

D. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2025.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit product data sheets, including material descriptions and finishes, and preparation instructions and recommendations.

C. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing profiles, sections of components, finishes, and fastening details.

D. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site ready for erection.

B. Package using methods that prevent damage during shipping and storage on site.

C. Store materials under cover and elevated above grade.

1.7 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Metal Canopies: Correct defective work within a two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 METAL CANOPIES

A. Configuration: Layout and dimensions, column layout, canopy clearance, fascia profile, and roof covering design as indicated on drawings.

B. Performance Requirements:

1. Thermal Movement: Design canopy system to accommodate thermal movement caused by ambient temperature range of 120 degrees F and surface temperature range of 180 degrees F without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects on assembly components.

2.2 COMPONENTS

A. Structural Steel Framing:
   1. Columns: ASTM A500/A500M, Grade B, round or rectangular tubing, sized to suit project design load requirements.
   2. Base and Top Plates: ASTM A36/A36M, with pre-drilled bolt holes.
   3. Beams: Wide flange, ASTM A572/A572M Grade 50.
   4. Other Structural Steel Members: ASTM A36/A36M.

B. Covering:

C. Anchor Bolts: ASTM A307 or ASTM A572/A572M, formed with bent shank, assembled with template for casting into concrete.
   1. Minimum exposed thread of 7 inches above footing and 23 inch minimum embedment.
   2. Provide nuts and washers as required for column leveling and plumbing.

D. Concrete Footings: Refer to Section 03 3000 for additional requirements.

2.3 FINISHES

A. Structural Steel Framing:
   1. Shop Primer: Rust-inhibitive red oxide.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and site area for conditions that might prevent satisfactory installation.

B. Verify that foundation, electrical utilities, and placed anchors are in correct position.

C. Do not proceed with installation until all conditions are satisfactory.

3.2 INSTALLATION - FRAMING

A. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation.

B. Set column base plates with non-shrink grout to achieve full plate bearing.

C. Fasten columns to anchor bolts.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.3 INSTALLATION - CANOPY COVERING

A. Install in accordance with manufacturer's instructions.

B. Fasten metal decking to metal support members, aligned level and plumb.

C. Install fascia panels, trim, and flashing.

D. Separate dissimilar metals using concealed bituminous paint.

E. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

END OF SECTION

SECTION 11 3013
RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Kitchen appliances.

1.2 RELATED REQUIREMENTS

A. Section 22 1005 - Plumbing Piping: Plumbing connections for appliances.

B. Section 26 0583 - Wiring Connections: Electrical connections for appliances.

1.3 REFERENCE STANDARDS

A. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

2.1 KITCHEN APPLIANCES

A. Ice Machine: Undercounter.
   1. Finish: Stainless Steel
   2. Width: 14-3/4"
   3. Height: 31-1/2"
   4. Depth:
   5. Warranty: Minimum 3 years parts and labor on all components. 5 year parts on compressor.
   6. Manufacturers:
      a.

END OF SECTION

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SECTION 11 6623
GYMNASIUM EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section includes the following gymnasium equipment:
   1. Basketball equipment, electrically and manually operated.
   2. Volleyball equipment, manually operated.
   3. Wall-mounted and post column safety pads.
   4. Judge's stand.
   5. Scoring table.
   6. Shot Clock.

B. Related Sections include the following:
   1. Division 3 Section "Concrete" for installation of floor insert sleeves, for oversized recessed voids to be cast in concrete floors, and for thickened slabs at these locations.
   2. Division 5 Sections “Metal Fabrications” and "Structural Steel" for structural supports not provided by gymnasium equipment manufacturer for supporting gymnasium equipment to building structure.
   3. Section 11 6643 - Interior Scoreboards.
   4. Section 11 6653 - Gymnasium Divider Curtain.
   5. Division 26 - Electrical.
      a. Manufacturer of electrical items in this Section shall coordinate junction box with switch plate in field.

C. Products furnished, but not installed under this Section, include floor insert sleeves for inserts to be cast in concrete subfloors and footings.

1.3 DEFINITIONS:

A. FIBA: International Basketball Federation (Federation Internationale de Basketball Amateur).

B. FIVB: International Volleyball Federation (Federation Internationale de Volleyball).

C. NAGWS: National Association for Girls and Women in Sport.

D. NCAA: National Collegiate Athletic Association.

E. NFHS: National Federation of State High School Associations.

F. USAV: United States of America Volleyball (formerly, USVBA: U.S. Volleyball Association).

1.4 PERFORMANCE REQUIREMENTS:

A. Seismic Performance: Provide basketball backstops capable of withstanding the effects of earthquake motions determined according to the building code in effect for this Project or ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads," whichever is more stringent.

1.5 SUBMITTALS:

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, features, and finishes. Include

details of anchors, hardware, and fastenings. If applicable, include assembly, disassembly, and storage instructions.

B. Shop Drawings: Show location and extent of fully assembled gymnasium equipment. Show location and extent of disassembled equipment and components and transport and storage accessories. Include elevations, sections, and details not shown in Product Data. Show method of field assembly, connections, installation details, mountings, floor inserts, attachments to other Work, operational clearances, and relationship to adjoining work.
   1. Blocking and Reinforcement: Show locations of blocking and reinforcement required for support of gymnasium equipment.
   2. Setting Drawings: For cast-in floor insert sleeves for post standards.
   3. Design Calculations: Upon request, submit signed and sealed design calculations by a qualified professional engineer. Calculate requirements for supporting gymnasium equipment and for seismic restraint. Verify capacity of members and connections to support loads and verify loads, point reactions, and locations for attachment of gymnasium equipment to structure with those indicated on Drawings.

C. Coordination Drawings: Court layout plans and elevations drawn to scale and coordinating oversized recesses for deferred installation of floor insert sleeves, and/or floor-insert penetrations, and game lines and markers applied to finished flooring.

D. Samples for Initial Selection: For each type of gymnasium equipment indicated.

E. Samples for Verification: For the following products:
   1. Pad Fabric: Not less than 3 inches (80 mm) square, with specified treatments applied. Mark face of material.
   2. Volleyball Floor Insert: Full size unit, which after review and acceptance, upon request, may be picked up by the Contractor for use in the project.

F. Product Certificates: For each type of gymnasium equipment, signed by product manufacturer.

G. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements. Include evidence of manufacturing experience.

H. Qualification Data: For installer and for professional engineer.

I. Maintenance Data: For gymnasium equipment and gymnasium equipment operator to include in maintenance manuals.

1.6 QUALITY ASSURANCE:

A. Installer Qualifications: A qualified installer employing workers trained and approved by manufacturer.
   1. Refer to Section 01 0150 - “Special Conditions”, for additional information regarding minimum experience requirements.

B. Source Limitations: Obtain each type of gymnasium equipment through one source from a single manufacturer.

C. Standards: Provide gymnasium equipment complying with or exceeding requirements of the Alabama High School Athletic Association, and the above referenced standards.

D. 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.

1.7 PROJECT CONDITIONS:

A. Environmental Limitations: Do not install gymnasium equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Verify position and elevation of floor inserts and layout for gymnasium equipment. Verify dimensions by field measurements.

1.8 COORDINATION:

A. Coordinate installation of floor inserts with structural floors and finish flooring installation and with court layout and game lines and markers on finish flooring.

B. Coordinate layout and installation of overhead-supported gymnasium equipment and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

1.9 WARRANTY:

A. Special Warranty: Manufacturer agrees to repair or replace components of gymnasium equipment that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Basketball backboard failures including glass breakage.
      b. Faulty operation of basketball backstops.
      c. Volleyball post standards and net tensioning system.
   2. Warranty Period:
      a. Basketball equipment: 25 years from date of substantial completion.
      b. Volleyball equipment: 10 years from date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Basketball Equipment:
      a. AALCO.
      b. AL, Inc.; ADP Lemco, Inc.
      c. Arizona Courtlines.
      d. Basketball Products International; American Athletic, Inc.
      e. Bison Inc.
      f. Draper.
      g. Garner.
      h. Institutional Products, Inc.
      i. Jaypro Sports, Inc.
      j. Performance Sports Systems, Inc.
      k. Porter Athletic Equipment Co.
      l. Spalding.
   2. Volleyball Equipment:
      a. AALCO.
      b. American Athletic, Inc.
      c. Arizona Courtlines
      d. Bison Inc.

e. Draper.
f. Garner.
g. Jaypro Sports, Inc.
h. Performance Sports Systems, Inc.
i. Porter Athletic Equipment Co.
j. Schelde North America.
k. Spalding.
l. Sports Imports, Inc.

3. Wall-Mounted and Post Column Safety Pads:
a. AALCO.
b. AL, Inc.; ADP Lemco, Inc.
c. Alabama Contract Sales
d. American Athletic, Inc.
e. Arizona Courtlines
f. Draper
g. Garner
h. Institutional Products, Inc.
i. Jaypro Sports, Inc.
j. Performance Sports Systems, Inc.
k. Porter Athletic Equipment Co.
l. Spalding

2.2 MATERIALS, GENERAL:

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; mill finish or decorative, baked-enamel, powder-coat finish.
1. Extruded Bars, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
2. Cast Aluminum: ASTM B 179.

B. Steel: Comply with the following:
1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M, hot-dip galvanized.
2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53.
3. Cold-Formed Steel Tubing: ASTM A 500, Grade A, unless another grade is required by structural loads.
4. Steel Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513 or steel tubing fabricated from steel complying with ASTM A 569/A 569M and complying with the dimensional tolerances in ASTM A 500.
5. Malleable-Iron Castings: ASTM A 47 (ASTM A 47M 0, grade required by structural loads.
6. Support Cable: 1/4-inch- (6-mm-) diameter, 7x19 galvanized steel aircraft cable with a breaking strength of 7000 lb (3175 kg). Provide fittings complying with cable manufacturer's written recommendations for size, number, and method of installation.
7. Support Chain: Proof coil chain, complying with ASTM A 413/A 413M, Grade 30, size and diameter as required by structural loads; plated or painted. Provide fittings complying with chain manufacturer's written recommendations for size, number, and method of installation.

C. Particleboard: ANSI A208.1.

D. Wood-Based, Structural-Use Panels: Comply with DOC PS 2; for plywood, comply with DOC PS 1.

E. Equipment Mounting Pads: Wood, transparent painted finish, size, and quantity as required to mount gymnasium equipment according to manufacturer's current written recommendations.

F. Anchors, Fasteners, Fittings and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed tamperproof, vandal and theft resistant. Provide as required for gymnasium equipment assembly, mounting, and secure attachment.

G. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107 with minimum strength recommended in writing by gymnasium equipment manufacturer.

2.3 BASKETBALL EQUIPMENT:

A. General: Provide equipment complying with requirements in the NCAA's Basketball Rule Books. Protruding fasteners or exposed bolt heads on front face of backboards are not permitted.

B. Overhead-Supported Backstops: Complete assembly spanning height indicated on Drawings, including primary and secondary superstructure support framing to building structure, pipe and cable bracing, adjustable hangers, clamps, cables, chains, pulleys, fittings, hardware, and fasteners. Overhead backstop support shall be compatible with Folding Type listed below.
   1. Framing: Steel pipe, tubing, and shapes. Design framing to minimize vibration during play.
      a. Center Mast: All welded construction with side sway bracing of pipe.
      b. Finish: Manufacturer's standard factory-applied, baked powder-coating finish complying with finish manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness; black.
   2. Folding Type: Provide manufacturer's standard assembly for side-folding backstop where indicated, with hardware and fittings to permit folding.
   3. Goal Height Adjuster: Adjustable from 8 to 10 feet (2.4 to 3 m) with crank mechanism, locking in any position within adjustment range, with visible height scale and finish matching framing.
   4. Operation: Electrically operated.

C. Backstop/Backboard Safety Device: Designed to limit free fall if support cable, support chain, pulleys, fittings, winch, or related components fail; with mechanical automatic reset; 6000-lb (2722-kg) load capacity, unless higher capacity is recommended in writing by backstop manufacturer; Provide one per folding backstop.
   1. Retractor Device: Manufacturer's standard device designed to retract both support and safety cables, chains, and straps away from play of the basketball when backstop is in playing position; Provide one per folding backstop.

D. Basketball Backboards: Provide predrilled holes or preset inserts for mounting goals.
   1. Description: Rectangular, 72 by 42 inches (1800 by 1050 mm) width by height, fabricated from the following:
      a. Glass: Not less than 1/2-inch- (12-mm-) thick, transparent tempered glass. Provide glass with impact-absorbing, resilient rubber or PVC gasket around perimeter in a fully welded brushed-natural-finish, heavy extruded-aluminum frame, with steel subframe, reinforcement, and bracing, including center-strut frame reinforcement, and with mounting slots for mounting backboard frame to backstop support framing.
      b. Direct Mount: Designed for mounting backboard frame to center mast of backstop framing to maximize relief of stresses on backboard frame and glass.
   2. Target Area and Border Markings: Permanently etched in white color, marked in pattern and stripe width according to referenced rules.

3. Rim-Restraining Device: Complying with NCAA and NFHS rules and designed to ensure that basket remains attached if glass backboard breaks.

E. Goal Mounting Assembly: Compatible with goal, backboard, and support framing.
1. Glass Backboard Goal Mounting Assembly: Goal support framing and reinforcement designed to transmit load from goal to backboard frame and to minimize stresses on glass backboard.
2. Direct Mount: Designed for mounting goal directly and independently to center mast of backstop support framing so no force, transmitted by ring, is directly applied to backboard and rigidity and stability of goal are maximized.

F. Basketball Goals: Complete with flanges, braces, attachment plate, and evenly spaced loops welded around underside of ring.
1. Single-Rim Basket Ring Competition Goal: Materials, dimensions, and fabrication complying with referenced rules.
2. Type: Movable, breakaway design with manufacturer's standard breakaway mechanism and rebound characteristics identical to those of fixed, nonmovable ring.
3. Mount: Rear mount.
4. Net Attachment: No-tie loops for attaching net to rim without tying.
5. Finish: Manufacturer's standard factory-applied, electrostatic baked powder-coating finish complying with finish manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness; orange.

G. Basketball Nets: 12-loop-mesh net, between 15 and 18 inches (400 to 450 mm long), official sized to fit rim diameter, and as follows:
1. Competition Cord: Antiwhip, made from white nylon cord not less than 120 gm nor more than 144 gm thread.

H. Safety Pads: Provide safety pads, complying with referenced standards, designed for backboard thickness indicated and extending continuously along bottom and up sides of backboard and over goal mounting and backboard supports as required by referenced rules.
1. Safety Pad Attachment: Bolt-on.
2. Color: As selected by Architect from manufacturer's full range of fifteen (15) standard colors, minimum.

I. For motorized goals and other electrical equipment in this Section, Manufacturer shall coordinate junction box with switch plate in field.

2.4 VOLLEYBALL EQUIPMENT:

A. General: Provide equipment complying with requirements in referenced standards.

B. Floor Inserts: Chrome-finished steel floor plate; and steel pipe sleeve, concealed by floor plate, with capped bottom end, sized with ID to fit post standards, not less than length required to securely anchor pipe sleeve below finished floor in concrete with anchors designed for securing floor insert to floor substrate indicated; one per post standard.
1. Floor Plate: Lockable, manufacturer's standard hinged access cover, designed to be flush with adjacent flooring. Provide two tools for unlocking access covers.

C. Post Standards: Removable, paired volleyball post standards as indicated on Drawings. Adjustable height. Designed for easy removal from permanently placed floor insert supports. Fabricated from steel and extruded-aluminum or manufacturer's standard metal pipe or tubing, with nonmarking plastic or rubber end cap or floor bumper to protect permanent flooring. Finished with manufacturer's standard factory-applied, baked powder-coating finish complying

with finish manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness or plated metal finish.

1. Nominal Pipe or Tubing Diameter: 3-1/2-inch (89 mm) OD at base.
2. Net Height Adjuster: Manufacturer's standard mechanism for height adjustment, complete with fittings; designed for positioning net at heights indicated.
    a. Net Heights: Between sitting volleyball net height and boys'/men's volleyball net height, 36 and 95-5/8 inches (910 and 2430 mm) or more.
3. Height Markers: Clearly marked at regulation play heights for elementary school, girls/women, boys/men, sitting volleyball, and tennis.
    a. Include as minimum the following height markers for adult through youth: 7'-11-5/8", 7'-9-5/8", 7'-6", 7'-4-1/8", 7'-2-1/8", 7'-0", 6'-6", 6'-4", 6'-0", and 5'-0".

D. Net: 32 feet (9.75 m) long, 39 inches tall, and as follows; 1 per pair of paired post standards:
    1. Width and Mesh: 39 inches with 4-1/2-inch- (110-mm-) square mesh made of black polyester string.
        a. Hem Band Edges: White, 2-inch- (50-mm-) wide top binding, black, 1-inch-
            1) (25-mm-) wide bottom and side bindings, tie offs at top and bottom of each side end of net, and 1/4-inch- (6-mm-) diameter rope, at least 42 feet (12.8 m) long, threaded through top hem of binding.
        b. Top Line: Not less than 1/8-inch- (3-mm-) diameter, galvanized or coated steel cable.
        c. Bottom Line: Not less than 1/8-inch- (3-mm-) diameter, galvanized or coated steel cable.
    2. Dowels: Not less than 1/2-inch- (12-mm-) diameter fiberglass or 1-inch- (25-mm-) diameter wood. Provide two dowels per net threaded through each side hem sleeve for straightening net side edges.

E. Net Tensioning System: Designed to adjust and hold tension of net. Fully enclosed, nonslip worm-gear, rack-and-pinion type, or ratchet-type winch with cable length and fittings for connecting to net lines, positive-release mechanism, and removable handle. Mount net tensioner on post standard at side away from court play. Provide end post with post top pulley. Provide opposing post with welded steel loops, hooks, pins, or other devices for net attachment and post top grooved line guide.

F. Safety Pads: Comply with NCAA and NFHS requirements. Provide pads consisting of not less than 1-1/4-inch- (32-mm-) thick, multiple-impact-resistant manufacturer’s standard polyurethane, or cross-linked or closed-cell polyethylene foam filler covered by puncture- and tear-resistant, not less than 14-oz. (397-g) PVC-coated polyester, or not less than 14-oz. (397-g) nylon-reinforced PVC fabric cover, treated with fungicide for mildew resistance, with fire-test-response characteristics indicated. Provide pads with hook-and-loop closure or attachments for the following components:
    1. Post Standards: Wraparound style, designed to totally enclose each standard to a height of not less than 72 inches (1830 mm); 1 per post.
    2. Net Lines: Four per net.
    3. Fabric Cover Flame-Resistance Ratings: Passes NFPA 701.
    4. Fabric Color: As selected by Architect and Owner from manufacturer's full range of standard color selections (15 minimum color options).

G. Post Standard Transporter: Manufacturer's standard wheeled unit designed for transporting a single post.

H. Storage Cart: Manufacturer's standard wheeled unit designed for transporting and storing volleyball equipment and passing through 36-inch- (910-mm-) wide or wider door openings.

Fabricate units of welded steel tubing with heavy-duty casters, including not less than two swivel casters. Fabricate wheels from materials that will not damage or mark floors; number of units as required to provide transport and storage for specified equipment.

I. Judge's Stand: Provide judge's stand which connects to volleyball net post standard. Provide with platform-support side frames, platform, ladder, handrail (extending 38" nominal above platform). Provide with lower end of ladder equipped with heavy-duty diameter, non-marking rubber pads. Side frames shall also be equipped with 3" diameter, non-marking caster wheels positioned for ease of tipping and transporting to storage area. Metal frames and ladder rungs shall be finished in durable powder-coated finish. Platform shall be coated with non-slip top surface. Top of platform shall be 3'-10" above playing surface while in use. Product shall be Porter No. 00999-000 Judge's Stand with Protective Padding Set, or approved equal, and shall be compatible with net post standard used.

2.5 SCORING TABLE

A. Provide scoring table.

B. Color: To be selected by Architect

C. Size: 96-inches long x 31-inches high x 31-inches deep, nominal.

D. Capable of folding to 16-inch width.

E. Provide back-lit panels on front for school name and mascot, or advertising; illumination by recessed fluorescent tubes with polycarbonate covers to reduce glare onto court, covered with shatterproof lexan.

F. Provide with non-marking wheels to protect gym floor.

G. Provide with electronic possession/ bonus indicator panel.

H. Manufacturer:
1. Allied Scoring Tables: www.alliedscoringtables.com.
2. GV Pro.: www.gvprotables.com.
3. Varsity Image: www.varsityimage.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

2.6 SHOT CLOCK

A. Provide 2 shot clocks per court. Location to be approved by Owner prior to installation.

B. Color: To be selected by Architect from full range of manufacturer colors.

C. Size: 26-inches long x 25-inches high x 6-inches deep, nominal.

D. Provide with wireless play/shot clock remote controller.

E. Provide with 15" LED digits.

F. Manufacturer:
1. Allied Scoring Tables: www.alliedscoringtables.com.
2. GV Pro.: www.gvprotables.com.
3. Varsity Image: www.varsityimage.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for play court layout, alignment of mounting substrates, installation tolerances, operational clearances, and other conditions affecting performance.

1. Verify critical dimensions.
2. Examine supporting structure and below finished floor for subfloors and footings.
3. Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements have been clearly marked for installers. Locate reinforcements and mark locations if not already done.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL:

A. General: Comply with manufacturer's current written installation instructions and competition rules indicated for each type of gymnasium equipment. Complete equipment field assembly, where required.

B. Unless otherwise indicated, install gymnasium equipment after other finishing operations, including painting, have been completed.

C. Permanently Placed Gymnasium Equipment and Components: Rigid, level, plumb, square, and true; anchored securely to supporting structure; positioned at locations and elevations indicated on Shop Drawings; in proper relation to adjacent construction; and aligned with court layout.
1. Floor Insert Locations: Coordinate location with application of game lines and markers.
2. Floor Insert Elevations: Coordinate installed heights of floor insert with installation and field finishing of finish flooring and type of floor plate.
3. Operating Gymnasium Equipment: Verify clearances for movable components of gymnasium equipment throughout entire range of operation and for access to operating components.

D. Floor Insert Setting: Grout sleeve for post standards in oversized, recessed voids in concrete slabs and footings. Clean holes of debris. Position sleeve and fill void around sleeves with grout, mixed and placed to comply with grout manufacturer's written instructions. Protect portion of sleeve above subfloor and footing from splatter. Verify that sleeves are set plumb, aligned, and at correct height and spacing; hold in position during placement and finishing operations until grout is sufficiently cured. Set insert so top surface of completed unit is flush with finished flooring surface.

E. Anchoring to In-Place Construction: Use anchors and fasteners where necessary for securing built-in and permanently placed gymnasium equipment to structural support and for properly transferring load to in-place construction.

3.3 ADJUSTING:

A. Adjust movable components of gymnasium equipment to operate safely, smoothly, easily, and quietly, free from binding, warp, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and moving parts.

3.4 CLEANING AND PROTECTION:

A. After completing gymnasium equipment installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.

B. Provide final protection and maintain conditions acceptable to manufacturer and Installer that ensure gymnasium equipment is without damage or deterioration at time of Substantial Completion.

C. Replace gymnasium equipment and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION:

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain gymnasium equipment. Refer to Division 1 Section "Project Closeout".

END OF SECTION

SECTION 12 2414
ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Manually operated double-roller sunscreen and room-darkening shades.

1.2 RELATED SECTIONS

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

B. Section 06 1000 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.

C. Section 09 2116 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.

D. Section 09 5100 - Suspended Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.

E. Division 26 - Electrical: Electric service for motor controls.

1.3 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 70 - National Electrical Code.

C. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 3000.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
   3. Storage and handling requirements and recommendations.
   4. Mounting details and installation methods.
   5. Typical wiring diagrams including integration of motor controllers with building management system, audiovisual and lighting control systems as applicable.

C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.

D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

E. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

G. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.

E. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

F. Mock-Up: Provide a mock-up (for both manual and electrical shades) of one roller shade assembly for evaluation of mounting, appearance and accessories.
   1. Locate mock-up in window designated by Architect.
   2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

A. Shade Fabric: Manufacturer's 10-year warranty.

B. Roller Shade Hardware, and Chain: 5 years warranty against defects in materials and workmanship.

C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Caco, Inc.

B. Draper, Inc.; "Access FlexShades" [Basis of Design]: www.draperinc.com.

C. MechoShade Systems, Inc. www.mechoshade.com.

D. Substitutions: Section 01 6000 - Product Requirements.

2.2 SHADE CLOTH

A. Light-Filtering Fabrics:
   1. SheerWeave Series SW2700 Series by Phifer: VOC Emissions: GREENGUARD and GREENGUARD Gold - certified as a low-emitting fabric. Composition: 38% Fiberglass, 62% Vinyl on Fiberglass. Fire rating: NFPA 101 (Class A Rating). Bacteria and Fungal

Resistance: ASTM E 2180; ASTM G 21AATCC30 Part 3; ASTM D 3273; GREENGUARD Mold and Bacteria Standard ASTM 6329. Include Microban antimicrobial additives. Mesh Weight: 14.1 oz/sq yd. Openness Factor - Approx. 3 percent. UV Blockage - Approx. 95 Percent. Fabric thickness: 0.022 inches.

B. Room Darkening Fabrics:
   1. SheerWeave Series SW7100 by Phifer: PVC-coated Fiberglass laminated with a 2-ply PVC film. Fire rating: NFPA 701. Openness Factor: Opaque. Fabric and color: As selected by Architect. Location: Where dual roller shades are scheduled in the drawings.

C. Color and Pattern: As selected by Architect from manufacturer's standard range.

2.3 MANUAL WINDOW SHADES

A. Roller Shades -
   1. Description: Double roller. Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation. Includes aluminum housing with installation to be coordinated with ceiling system installation. Provide brackets, fasteners, and other components necessary for complete installation.
      a. Provide universal drive capability to offset drive chain.
      b. Drop Position: Regular roll.
      c. Mounting: As indicated on drawings.
   2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated. Provide shade hardware constructed as required to support 150 percent of the full weight of each shade.
      a. Material: Steel, 1/8 inch thick. Do not use styrene-based plastics, polyester, or reinforced polyester.
      b. Double Roller Brackets: Configured for light-filtering and room-darkening shades in one opening.
         1) Light-Filtering Fabric: Room-side of opening.
         2) Room-Darkening Fabric: Glass-side of opening.
         3) Operating Chain: Pulls for both fabrics, configured for same side of window.
      c. Single Shade Operation Width: 180 inches, maximum.
      d. Multiple Shade Operation: Provide hardware to operate multiple shade bands with one clutch operator.
   3. Roller Tubes:
      a. Provide with roller idler assembly of molded nylon and zinc-plated steel pin. Sliding pin to allow easy installation and removal of roller.
      b. Material: Extruded aluminum or steel.
      c. Size: As recommended by manufacturer for installation conditions, span, and weight of shades.
      d. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Fabric connected to the roller tube with LSE (low surface energy) double sided adhesive specifically developed to attach coated textiles to metal. Adhesive attachment to eliminate horizontal impressions in fabric.
      e. Capable of removal and reinstallation without affecting roller shade limit adjustments.
   4. Hembars: Designed to maintain bottom of shade straight and flat.
      a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.

5. Clutch Operator: Manufacturer's standard material and design integrated with bracket and brake assembly. Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Provide limit stops to prevent shade from being raised or lowered too far.
    a. Provide permanently lubricated brake assembly mounted on oil-impregnated hub with wrapped spring clutch.
    b. Provide brake capable of withstanding minimum pull force of 50 pounds in stopped position.
    c. Mount clutch and brake assembly on support brackets, fully independent of roller tube components.
6. Drive Chain: Continuous loop, stainless steel beaded ball chain, 100 pounds minimum breaking strength. Provide upper and lower limit stops.
    a. Chain Retainer: Chain tensioning device complying with WCMA A100.1.
7. Accessories:
    a. Fascia: Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; anodized aluminum finish to match adjacent window framing.
        1) Provide fascia capable of installation across two or more shade bands in one piece.
        2) Profile: Square.
        3) Endcaps: Stamped steel with universal design suitable for mounting to ceiling, wall, and jamb. Provide size compatible with roller size.
        4) Endcap covers to match fascia/headbox finish.
        5) Shade slat: Slat encased in heat seamed hem.
        6) Headbox Ceiling/Wall Style: Aluminum fabrication with removable closure, endcaps, and back and top cover piece:
            (a) Finish: Powder coat color as selected by Architect.

2.4 ACCESSORIES

A. Fascia, where required for non-recessed mounting:
    1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
    2. Fascia shall be able to be installed across two or more shade bands in one piece.
    3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
    4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
    5. Notching of Fascia for manual chain shall not be acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.

B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

D. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 TESTING AND DEMONSTRATION

A. Test window shades to verify that operating mechanism, fabric retainer, and other operating components are functional. Correct deficiencies.

B. Test motorized window shades to verify that controls, limit switches, interface to other building systems, and other operating components are functional. Correct deficiencies.

C. Demonstrate operation of shades to Owner’s designated representatives.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 12 3219
LAMINATE CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. The General Contractor, at its option, may furnish and install Custom Architectural Woodwork (Millwork) in lieu of the Casework specified in this Section. See Section 06 4000 - Custom Architectural Woodwork for requirements.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 - Specification sections, apply to work of this section.

B. Section 06 1000 - Rough Carpentry.

1.3 WORK INCLUDED

A. The extent of manufactured casework systems as shown on drawings, schedules, and specified herein. Where specific materials, finishes, construction details, and hardware are specified herein, the casework contractor shall be held in strict accordance. All items shall be as provided, and publicly cataloged, by the manufacturers to assure physical and dimensional integrity of the system and ready access to additional systems components for a minimum of ten (10) years after completion of this contract. Product from companies not meeting this requirement will not be accepted. It is the intent of the owner and architect and construction manager to have this specification section furnished by one contractor.

B. Furnish and install all fixed, modular, and mobile laminate clad casework, tops and accessories and components, fillers and related items shown on drawings and herein specified. All built-in and modular plastic laminate counter tops and splashes are specified herein and detailed on architectural.

C. Furnish and install all locks for cabinet doors and drawers as indicated on elevations of the architectural drawings.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain entrance mats, grates, and frames from a single manufacturer.

B. Manufacturer Qualifications: Company specializing in manufacturing specified mats and grates with minimum three years documented experience.

C. Installer Qualifications: Company specializing in installing mats and grates with minimum three years documented experience and approved by carpet tile manufacturer.

D. Flammability in accordance with ASTM E648, Class I, Critical Radiant Flux minimum 0.45 watts/ SM.

E. Slip Resistance: Per ASTM D 2047-96, Coefficient of Friction 0.60 when wet, or better.

1.5 RELATED WORK SPECIFIED ELSEWHERE

A. Division 6 - Coordination of all in-wall blocking.

B. Sinks and service fixtures, service and waste lines and all connections, vents, electrical service fixtures, hoods and ducting within or adjacent to casework, or otherwise required in all areas: Furnished and installed under Mechanical and Electrical Divisions 21 through 26.

C. Base molding: Furnished and installed under Finishes Division 9, to be consistent with base molding in room, unless base is not specified, in which case laminate base shall be applied.

D. Appliances, unless specifically noted on plans as included in this section.

E. Furnishing, installing and connecting of service supply lines and conduits within equipment and reagent racks, connecting of exposed service lines, connecting of services in tunnels or service turrets through, under, or along backs of working surfaces as required for utility service fixtures.

F. Installing all utility service outlet accessory fittings and fixtures furnished by casework contractor, pulling of wire and connecting of electrical fixtures in service lines, provision of ground fault protection for circuits requiring such.

G. Receiving, installing and connecting all separate sinks, cup sinks or drains, draining troughs, overflows and sink outlets, as furnished by the casework contractor for the Work Room and Storage Room areas.

H. Furnishing, installing and connecting all traps, tailpieces, backflow prevention devices and special plumbing fittings and piping of unusual nature to meet local codes even though not specifically called for in specifications or shown on drawings.

I. Furnishing and installing of all framing, bucks, metal grounds or reinforcements in walls, floors, ceilings to adequately support and anchor casework and related equipment.

J. Furnishing fluorescent tubes, light bulbs and any miscellaneous materials generally classified as maintenance or supply items.

K. Furnishing and installation of all rigid or flexible conduit, wire, pulling of wire, fittings, special electrical equipment, data, and accessories including boxes, receptacles, and flush plates required at reception desk.

L. Coordination with millwork items as specified in Section 06 4000 - "Architectural Woodwork".

1.6 SYSTEM DESCRIPTION

A. All manufactured casework shall be pre-engineered, and cataloged in a nationally published catalog. Manufacturers submitting for approval must provide printed catalog information documenting this performance feature; no exceptions will be allowed.

1.7 QUALITY ASSURANCE

A. All manufactured casework systems, countertops and related items herein specified shall be furnished by one contractor to insure single source responsibility, and integration with other building trades

B. All manufacturers herein listed, shall show evidence of a minimum of five (5) years experience in providing manufactured casework systems for similar types of projects.

C. Manufacturer shall produce evidence of adequate facilities and personnel required to perform on this project. Financial stability of manufacturer shall be evidenced by readily providing a material performance bond if required.

D. Manufactured casework systems must conform to design, quality of materials, workmanship and function as shown on drawings and specified herein. In the absence of a printed specification, minimum quality standards shall be in accordance with AWS Section 10 & Section 11, 1st Edition, Oct. 2009, no exceptions will be permitted; additional requirements shall be as specified herein.

E. Provide independent laboratory testing documenting that the support rail and interfacing components when tested in strict accordance with the requirements of seismic construction codes, all components met or exceeded the requirements as set forth by the codes. All casework bidders must provide a copy of test to architect ten days prior to bid date.

F. All casework bidders must provide the following test results as tested by an independent testing firm:
   1. Racking Test (must exceed 975 lbs.)
   2. Front Joint Load Test (must exceed 635lbs.)
   3. Uniform Load Shelf Test (must exceed 1140 lbs.)
   4. Isolated Shelf Clip Load Test (must exceed 640 lbs.)
   5. Static Load Test (must exceed 1800 lbs with no cabinet failure)
   6. Draw Side Joint Test (must exceed 425 lbs.)
   7. Draw Front Joint Test (must exceed 925lbs.)
   8. Draw Static Load Test (must exceed 900 lbs.)

G. The architect and owner reserves the right to randomly select one 36” wide base cabinet and one 36” wide wall cabinet and one 36” wide tall cabinet from each manufacturer during installation and cut apart to determine if the product installed meets the written specification. The casework manufacturer shall include the price to replace these units in his bid. If the product fails to meet the specification then the casework supplier shall be responsible to make any and all necessary corrections.

1.8 SUBMITTALS

A. Product Data:
   1. In addition to the general conditions as relates to prior approvals, submittals of manufacturer's data, installation instructions, and samples are required upon architect's request.

B. Samples:
   1. Submit samples of specified decorative laminate colors, patterns, and textures for exposed and semi-exposed materials for architect's selection. See drawings.
   2. Submit samples of hardware.
   3. Architect may request representative full-size samples for evaluation prior to approval. Samples may be impounded by architect/owner until completion of project to ensure compliance with specifications.
   4. Submit copy of Seismic testing report.

C. Production Drawings:
   1. Submit production drawings for all casework systems and countertops and required equipment showing plans, elevations, ends, cross-sections, service run spaces and location of services.
   2. Include layout of units with relation to surrounding walls, doors, windows, and other building components. Include finish and hardware schedule.
   3. Coordinate production drawings with other work involved.

1.9 PRODUCT HANDLING

A. Deliver casework and countertops only after wet operations in building are completed.

B. Store completed casework and countertops in a ventilated place, protected from the weather, with relative humidity range of 20% to 50%.

C. Protect finished surfaces from soiling and damage during handling and installation.

D. General Contractor shall be responsible for protection of all casework and tops after installation is completed.

1.10 JOB CONDITIONS

A. Humidity and Temperature Controls:

1. Before the delivery and installation of casework and equipment, building conditions shall be as follows:
    a. The building shall be secure and weather tight, with windows and doors installed, heat and air conditioning systems functional.
    b. Walls and openings shall be plumb, straight and square. Concrete floors shall be level within acceptable trade tolerances. Specifically the floor must be within 1/8" of level per 10 foot run, non-accumulative, when tested with a straight edge in any one direction.
    c. Flooring required to be placed under casework and equipment must be installed.
    d. Wood or metal blocking (wall grounds) shall be installed within partitions prior to delivery of casework and furnishings to allow for immediate installation on delivery.
    e. General Contractor shall have heat and air conditioning systems providing consistent temperature and humidity conditions as required Related humidity must be maintained at not less than 25%, nor more than 55%. Temperatures must not range lower than 65 degrees F, not to exceed 80 degrees F in areas of material installation.
    f. All overhead mechanical, electrical or plumbing rough-in work shall be complete
    g. Any “wet” operation performed by other trades must be complete prior to delivery.
    h. Ceiling grids (with or without ceiling tiles), overhead soffits, duct work and lighting shall be installed.
    i. Painting shall be complete.
    j. General Contractor shall provide a secure storage area within the building that is clean, dry well ventilated, protected from direct sunlight and broom clean.

1.11 WARRANTY

A. The manufacturer shall guarantee all materials and workmanship of equipment provided in this contract for a period of five years from date of final acceptance. This is a warranty of replacement and repair only, whereby the manufacturer will correct defects in materials and/or workmanship without charge. Any defective materials of faulty workmanship occurring within that time shall be replaced or corrected promptly without charge upon notification by the owner or his designated representative. All bidders are to provide to the Architect a copy of the manufacturers warranty for the casework ten (10) days before the bid date.

PART 2 – PRODUCTS

2.1 PLASTIC LAMINATE CASEWORK

A. Manufacturers: Subject to compliance with specifications, provide products by one of the following:
    1. Casework Systems:
        a. TMI Systems Design Corporation.
        b. Case Systems, Inc.
        c. LSI Corporation of America, Inc.
        d. Stevens Industries, Inc.
    2. Plastic Laminate: Provide products from manufacturers listed on Finish Legend.

B. Substitutions:
    1. It is the intent of this specification to establish performance and quality criteria consistent with pre-established standards of design and function herein described. Casework systems not meeting these minimum standards will not be accepted.
    2. Where specific materials, finish options, construction details, modularity, hardware and test data are specified herein, the casework storage system will be held in strict compliance. Substitutions will be considered prior to bid date provided request is

submitted to the architect, in writing, no later than ten (10) days prior to bid date; substitution request shall list any and all deviations from this specification. Requests later than ten (10) days prior to bid will not be considered. Acceptable substitutions will be identified in future addenda.

3. All manufacturers must submit the following items to the architect ten days prior to bid date to be qualified to bid.
   a. A Copy of required Seismic Testing Data related to rail casework.
   b. ADA Brochure depicting ADA requirements and compliance
   c. All required independent test reports.
   d. A sample base cabinet of fixed base cabinet with required hardware.
   e. A copy of Guarantee and Limited Warranty.
   f. A detailed deviation list addressing where the requested product deviates from the specified product.

2.2 MATERIALS

A. Core Materials:
   1. MR Moisture Resistant Medium Density Fiberboard: Average 47-pound density grade, ANSI A 208.2.
   2. Medium Density Fiberboard: Average 47-pound density grade, ANSI A 208.2.
   3. Grade AB Plywood

B. Hardboard: 1/4 inch thick prefinished hardboard, CS-251.

C. Decorative Laminates:
   1. High-pressure decorative laminate VGS (.028), NEMA Test LD 3-1995. for vertical surfaces.
   2. High-pressure decorative laminate HGS (.048), NEMA Test LD 3-1995 for horizontal Surfaces.
   3. High-pressure decorative laminate HGP (.039), NEMA Test LD 3-1995 for post formed tops.
   4. High-pressure cabinet liner CLS (.020), NEMA Test LD 3-1995.
   5. High-pressure backer BKH (.048), (.039), (.028), NEMA Test LD3-1995.
   6. Thermally fused melamine laminate, NEMA Test LD 3-1995.

D. Laminate Color Selection: See Finish Legend for color selection.

E. Edging Materials:
   1. 1 mm PVC banding.
   2. 3mm PVC banding, machine profiled to 1/8 inch radius, where required and herein specified.
   3. Finish: To be selected.

F. Grommets:
   1. 2-1/2" x 6" rectangle grommet - equal to Mocket #RG3-P3. See Drawings for location.

2.3 SPECIALTY ITEMS

A. Metal Parts:
   1. Countertop support brackets, undercounter support frames, legs and miscellaneous metal parts shall be furniture steel, welded, degreased, cleaned, treated and epoxy powder painted. Color shall be as selected by Architect from manufacturer's standard colors.
      a. Support brackets shall be equal to Rakks EH Counter Support Bracket unless otherwise noted.

1) For concealed support, provide Inside Wall-Flush Mount bracket.

2.4 CABINET HARDWARE

A. Hinges:
   1. Furnish five knuckle, epoxy powder coated, institutional grade, 2-3/4 inch overlay type with hospital tip. 0.095 inch thick. ANSI-BHMA standard A156.9, Grade 1.
   2. Doors 48 inch and over in height shall have 3 hinges per door.
   3. Provide a magnetic door catch with maximum 5 pound pull provided, attached with screws and slotted for adjustments.

B. Pulls:
   1. Wire pulls equivalent to Stanley No. 4484, stainless steel, satin finish (ANSI B12012), 4-inches long, with 1-inch clearance; finish to match Section 08710 - "Finish Hardware" finish in room(s) where occurs. Pull design shall comply with the Americans with Disability Act (ADA).

C. Drawer Slides:
   1. Regular, knee space and pencil slides shall be 100-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers and have a positive stop both directions with self-closing feature. Paper storage units shall have 150-pound load rated epoxy coated steel slides.
   2. File: Full extension, Shall have 150-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers and have positive stop both directions with self-closing feature.

D. Adjustable Shelf Supports:
   1. Injection molded transparent polycarbonate friction shall fit into cabinet end panels and vertical dividers, adjustable on 32mm centers. Each shelf support shall have 2 integral support pins, 5mm diameter, to interface pre-drilled holes, and to prevent accidental rotation of support. The support shall automatically adapt to 3/4 inch or 1 inch thick shelving and provide a non-tip feature for shelving. Supports may be field fixed if desired. Structural load to 1200 pounds (300 pounds per support) without failure.

E. Locks:
   1. Shall be standard removable core, disc tumbler, cam style lock for drawer with strike. Furnish 2 keys.

F. Coat Rods: Shall be 1 inch diameter, 14-gauge chrome plated steel installed in captive mounting hardware.

G. File Suspension System: Shall be 14-gauge steel file suspension rails, epoxy powder coated. File followers, or other split bottom hardware, will not be acceptable.

2.5 FABRICATION

A. Fabricate casework, countertops and related products to dimensions, profiles, and details shown.

B. Cabinet Body Construction:
   1. Tops and bottoms are glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals, rails and verticals.
   2. Minimum 6 dowels each joint for 24 inch deep cabinets and a minimum of 4 dowels each joint for 12 inch deep cabinets.
   3. Tops, bottoms and sides of all cabinets are 3/4 inch thick particleboard core.

4. Cabinet backs: 1/2 inch thick. Wall and tall cabinets are provided with a 1-inch x 1-3/4 inch PVC mounting strip used to secure the cabinet to the wall.
   a. Exposed back on fixed or movable cabinets: 3/4 inch particleboard with the exterior surface finished in VGS laminate as selected.
   b. Flexible rail mounted cabinet backs: 3/4 inch thick particleboard structurally doweled into cabinet sides and top panels.
5. Fixed base and tall units have an individual factory-applied base, constructed of 3/4 inch exterior grade plywood. Base is 96mm (nominal 4 inch) high unless otherwise indicated on the drawing.
6. Base units, except sink base units: Full sub-top. Sink base units are provided with open top, a welded steel/epoxy painted sink rail full width at top front edge concealed behind face rail/doors, a split back removable access panel.
7. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Mount door hinges, drawer slides and pull-out shelves in the line boring for consistent alignment.
8. Exposed and semi exposed edges.
   a. Edging: 1mm PVC
9. Adjustable shelf core: 1 inch thick particleboard up to 36 inches wide, 1-inch thick particleboard with corrugated metal ribbed stiffener for shelves over 36 inches wide.
   a. Front edge: 1mm PVC.
10. Interior finish, units with open Interiors:
    a. Top, bottom, sides, horizontal and vertical members, and adjustable shelving faces with VGS High Pressure decorative laminate. Match exterior finish.
11. Interior finish, units with closed Interiors:
    a. Top, bottom, sides, horizontal and vertical members, and adjustable shelving faces with thermally fused melamine laminate with matching prefinished back. Color to be selected by Architect.
12. Exposed ends:
    a. Faced with VGS high-pressure decorative laminate.
13. Wall unit bottom
    a. Faced with thermally fused melamine laminate.
14. Wall and tall unit tops:
    a. Top surface is faced with thermally fused melamine laminate.
15. Balanced construction of all laminated panels is mandatory.
16. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), not permitted.
17. Provide specified grommets in bracket supported countertops. 1 per 5'-0" of countertop. Locations to be determined by Architect.

C. Drawers:
   1. Sides, back and sub front: Minimum 1/2 inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with 1mm PVC. Full height sides.
   2. Drawer bottom: Minimum 1/2 inch thick particleboard laminated with thermally fused melamine, screwed directly to the bottom edges of drawer box.
   3. Paper storage drawers: Minimum 3/4 inch thick particleboard sides, back, and sub front laminated with thermally fused melamine. Minimum 1/2 inch thick particleboard drawer bottoms screwed directly to the bottom edges of the drawer box. Provide PVC angle retaining bar at the rear of the drawer.

D. Door/Drawer Fronts:
   1. Core: 3/4 inch thick particleboard.
   2. Provide double doors in opening in excess of 24 inches wide.
   3. Faces:
      a. Exterior: VGS High-pressure decorative laminate.
      b. Interior: High-pressure cabinet liner CLS.
   4. Door/drawer edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

E. Miscellaneous Shelving: Location: Classroom storage closets.
   1. Core material: 3/4 inch or 1 inch particleboard, as required.
   2. Exterior & Interior: VGS High-pressure decorative laminate.
   3. Edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

PART 3 - EXECUTION

3.1 INSPECTION

A. The casework contractor shall examine the job site and the conditions under which the work under this Section is to be performed, and notify the building Owner in writing of unsatisfactory conditions. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 EXAMINATION

A. Verify existing conditions under provisions of Section 01 7000.

B. Verify that openings are ready to receive work.

C. Verify adequacy of support framing anchors.

D. Verify that required utilities are available. In proper locations and ready for use.

E. Beginning of installation means installer accepts existing surface conditions.

3.3 INSTALLATION

A. Install casework, components and accessories in accordance with manufacturer's instructions.

B. Use anchoring devices to suit condition and substrate materials encountered.

C. Set casework items plumb and square.

D. Install casework attachment rails on wall along entire length of wall to facilitate installation of wall cabinets.

E. Hang wall mounted casework on attachment rails. Level and adjust wall casework using adjustment capabilities of wall unit mounting brackets.

F. Assemble and install worksurface tops on site with use of concealed screws on bases such as base cabinets, pedestals or columns

G. Scribe to abutting surfaces and align adjoining components. Apply matching filler pieces where caseworks abuts dissimilar construction.

H. Repair small scratches and surface blemishes on units using manufacturer's supplied touch up materials. Replace damaged cabinets or materials if directed by Architect.

3.4 ADJUSTING

A. Adjust work under provisions of Section 01 7000.

B. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly.

3.5 CLEANING

A. Clean work under provisions of Section 01 7000.

B. Clean casework, counters, shelves, glass, legs, hardware, fittings, and fixtures.

C. Remove dirt with damp cloth and soap and water. Remove stubborn dirt with non-flammable chlorinated solvents or solvents such as: lacquer thinner, M.E.K., or contact adhesive solvent if area is ventilated sufficiently to prevent build-up of fumes and noticeable odors. Do not use harsh abrasive cleaners.

3.6 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01 5000.

B. Do not permit finished casework to be exposed to continued construction activity.

C. Protect finished casework from damage by water, heat and other causes until final acceptance.

D. Replace casework exhibiting warpage, surface discoloration, and damage at no additional cost to owner.

END OF SECTION

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SECTION 14 2123.16
MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes Machine room-less electric traction passenger elevators as shown and specified. Elevator work includes:
   1. Gearless electric traction passenger elevators.
   2. Elevator car enclosures, hoistway entrances and signal equipment.
   3. Operation and control systems.
   4. Accessibility provisions for physically disabled persons.
   5. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
   6. Materials and accessories as required to complete the elevator installation.

B. Related Sections:
   1. Division 1 General Requirements: Meet or exceed all referenced sustainability requirements.
   2. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
   3. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
   4. Division 5 Metals:
      a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
      b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
   5. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
   6. Emergency power supply, transfer switch and auxiliary contacts.
   7. Heat and smoke sensing devices.
   8. Convenience outlets and illumination in control room (if applicable), hoistway and pit.

C. Division 22 Plumbing
   1. Sump pit

D. Division 23 Heating, Ventilation and Air Conditioning
   1. Heating and ventilating hoistways and/or control room.

1.2 SUBMITTALS

A. Product data: When requested, the elevator contractor shall provide standard cab, entrance and signal fixture data to describe product for approval.

B. Shop drawings:

C. Paint selection: Submit manufacturer’s standard selection charts for exposed finishes and materials.

D. Integrated laminate selection: Submit manufacturer’s standard selection charts for exposed finishes and materials.

E. Metal Finishes: Upon request, standard metal samples provided.

F. Operation and maintenance data. Include the following:

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: An approved manufacturer with minimum 15 years of experience in manufacturing, installing, and servicing elevators of the type required for the project.
   1. The manufacturer of machines, controllers, signal fixtures, door operators, cabs, entrances, and all other major parts of elevator operating equipment.
      a. The major parts of the elevator equipment shall be manufactured by the installing company, and not be an assembled system.
   2. The manufacturer shall have a documented, on-going quality assurance program.
   3. ISO 9001:2000 Manufacturer Certified
   4. ISO 14001:2004 Environmental Management System Certified
   5. LEED Gold certified elevator manufacturing facility.

B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than 15 years of satisfactory experience installing elevators equal in character and performance to the project elevators.

C. Regulatory Requirements:
   1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
   2. NFPA 70 National Electrical Code.
   3. NFPA 80 Fire Doors and Windows.
   4. Americans with Disabilities Act - Accessibility Guidelines (ADAAG)
   5. Section 407 inch ICC A117.1, when required by local authorities
   6. CAN/CSA C22.1 Canadian Electrical Code
   7. CAN/CSA B44 Safety Code for Elevators and Escalators.

D. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(b), and NFPA Standard 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).

E. Inspection and testing:
   1. Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
   2. Arrange for inspections and make required tests.
   3. Deliver to the Owner upon completion and acceptance of elevator work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Manufacturing shall deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.5 PROJECT CONDITIONS

A. Temporary Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

1.6 WARRANTY

A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after final acceptance.

1.7 MAINTENANCE

A. Furnish maintenance and call back service for a period of 12 months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours excluding callbacks.
   1. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.
   2. Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Parts shall be produced by manufacturer of original equipment.
   3. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Design based around TK Elevator's EOX Self-Supported Machine Room-Less elevator.
   1. Substitutions: Reference Section 01 6000 – Product Requirements.

2.2 MATERIALS, GENERAL

A. All Elevator Cab materials including frame, buttons, lighting, wall and ceiling assembly, laminates and carpet shall have an EPD and an HPD.

B. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.

C. Steel:
   1. Shapes and bars: Carbon.
   2. Sheet: Cold- and hot-rolled stainless steel sheet, galvanized.
   3. Finish: Factory-applied paint for structural parts, painted for architectural parts. Color selection must be based on elevator manufacture's standard selections.

D. Integrated laminate: Decorative surface finishes, pressure sensitive, acrylic type, nominal 0.014" thickness. Laminate selection must be based on elevator manufacture's standard selections.

E. Flooring by others.

2.3 HOISTWAY EQUIPMENT

A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and riveted/clinched. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.

B. Deflector Sheaves: None

C. Guide Rails: Dry, non-lubricated steel, fastened to the building with steel brackets.

D. Guides: Slide guides shall be mounted on top and bottom of the car.

E. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Predefined buffer stands for 4' and 5' pit depths.

F. Machine: The hoisting machine shall be a compact energy efficient permanent magnet Gearless traction type, consisting of PMAC motor, brake and driving sheave mounted on a rigid bedplate

in the top of the hoistway. A large solid, forged shaft shall serve as a support for the motor rotor assembly and for the drive sheave and brake system. It shall be supported by roller bearings mounted in the machine housing.

G. Drive System:
   1. The drive system shall be of the Variable Voltage Variable Frequency (VVVF) regenerative.
   2. The system shall be a vector controlled pulse-width modulated AC drive. The variable voltage variable frequency drive shall convert the AC power supply using a two-step process to a variable voltage variable frequency power supply for use by the hoist motor.
   3. The speed control shall be by means of vector control providing direct torque and field excitation automatically provided by permanent magnet. A digital absolute velocity encoder shall be provided giving feedback to the controller on armature position and motor speed.
   4. Dual solid state electronics (IGBT Insulated Gate Bipolar Transistor) in series shall be used in place of mechanical contactors.

H. Motor/Machine: The motor shall be PMAC, totally enclosed, non-ventilated with class "F" insulation. The motor armature shall be dynamically balanced and supported by roller bearings of ample capacity. The armature and driving sheave shall be properly balanced for smooth, high-speed elevator performance. The PM machine shall be mounted horizontally in the top of the hoistway in a unitized formed steel structure on bearing plates furnished by the elevator installer. The unitized formed steel structure shall be securely fastened to the supports supplied by other trades.

I. Brake: The brake shall be a spring applied electric brake; held open by an electro-magnet actuated by a digital brake controller and designed to make smooth, positive stops. The Brake shall be designed to automatically apply in the event of interruption of power supply from any cause. Operation and control of the brake shall be all digital. The setting and lifting of the brake shall be software based and all electronic. All adjustments and setup of the brake shall be made using a PC interface. No contactors or resistors shall be used in the actuation of the brake.

J. Suspension Belts and Governor Rope: Suspension belts shall be flat belts of polyurethane with an inner core of 14 steel cords with an FT1 fire rating such that hoistway sprinklers are not required by NFPA 13. Each belt shall have a suspension strength of 64 KN (14,388 pounds) for 150 and 200 fpm car speed. Suspension strength increases to 80 KN (17,985 pounds) for 350 fpm car speed.
   1. Three belts.
   2. Suspension tension monitor shall detect differences in belt tension and for loss of tension. If fault is detected, the car shall stop at the nearest floor and an Out of Service call be registered.
   3. Trip criteria shall be monitored, and data shall be stored in redundant non-volatile locations. Belts shall be replaced prior to the end of service life. Messages shall be issued at 180, 90, and 30 days prior to the last day of service life.
   4. Governor ropes shall be of steel wire construction.
   5. Any special tools, devices, software or equipment required for monitoring the wear of suspension shall be included with the installation of the equipment and become the property of the owner at time of elevator completion. This includes special ongoing monitoring systems, special tools and instruction needed to monitor the suspension system.

K. Counterweight: Counterbalance each elevator for smooth and economical operation by using steel and/or cement weights securely fastened in a steel counterweight frame. Counterweight shall equal the weight of the complete elevator car and approximately 50 percent of the specified capacity load.

L. Safety and Governor: Car safety shall be mounted on the bottom members of the car frame and be operated by a centrifugal speed governor. The governor shall be designed to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed. The governor shall function when the car over speeds.

M. Emergency Terminal Limits: Place electric limit devices in the hoistway near the terminal landings. Limit switch(es) shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

N. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for over travel or under travel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

2.4 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening boltedknock down construction.
   1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates (where required), sight guards, and necessary hardware.
   2. Hoistway design: Entrance jamb has a fixed depth so provisions must be made to finish the edge of the wall that may not be covered by the entrance.
   3. Communication failure indicator: A Communication failure is a jewel that is located in the jamb and lights up if the connection with the phone in the elevator becomes faulty. Communication failure is tested on the SIL3 rated devices by inspectors to ensure the car will not run or accept a car call when there is a loss of communication between the car and controller.
   4. Main landing door & frame finish: Factory painted door panels with factory painted finish entrance frame.
   5. Typical door & frame finish: Factory painted door panels with same entrance frame finish.

B. Interlocks: Equip each hoistway entrance with an approved type of interlock, tested as required by code. Provide door restriction devices as required by code.

C. Door Hanger and Tracks: Provide sheave type two-point suspension hangers and tracks for each hoistway horizontal sliding door.
   1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
   2. Hangers: Provide an adjustable device beneath the track to limit the up thrust of the doors during operation.
   3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

D. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.5 PASSENGER ELEVATOR CAR ENCLOSURE

A. Car Enclosure:
   1. Walls: Cab type, steel shell. Wall panels shall be constructed of steel with factory painted panels. Column panels shall be factory painted.
   2. Canopy: Galvanized steel with chain rope exit.

3. Ceiling: Stainless steel downlight type, metal pans with suspended LED downlights. Number of downlights shall be dependent on platform size with a minimum of four. The metal pans shall be finished with a stainless steel, no. 4 brushed finish.
4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
   a. Door Finish: Stainless steel.
   b. Cab Sills: Extruded, aluminum mill finish.
6. Handrail: Provide 1.5" 1.5 inch diameter formed cylindrical metal bar on side and/or rear walls on front opening cars and side walls only on front and rear opening cars. Support rails shall have a stainless steel, no. 4 brushed finish.
7. Ventilation: Manufacturer’s standard exhaust fan, mounted on the car top.
8. Protection pads: Not required

B. Car Top Inspection: Provide a car top inspection station with an “Auto-Inspection” switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station shall give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

2.6 DOOR OPERATION

A. Door Operation: Provide a direct or alternating current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. The door control system shall be digital closed loop and the closed loop circuit shall give constant feedback on the position and velocity of the elevator door. The motor torque shall be constantly adjusted to maintain the correct door speed based on its position and load. All adjustments and setup shall be through the computer based service tool. Door movements shall follow a field programmable speed pattern with smooth acceleration and deceleration at the ends of travel. The mechanical door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. AC controlled units with oil checks, or other deviations are not acceptable.
   1. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.
   2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
   3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel shall reverse and the door shall reopen to answer the other call.
   4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer shall sound. When the obstruction is removed, the door shall begin to close at reduced speed. If the infra-red door protection system detects a

person or object while closing on nudging, the doors shall stop and resume closing only after the obstruction has been removed.

5. Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors shall reverse and reopen. After the obstruction is cleared, the doors shall begin to close.
6. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors shall recycle closed then attempt to open six times to try and correct the fault.
7. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors shall recycle open then attempt to close six times to try and correct the fault.
8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

B. Door Protection Device: Provide a door protection system using microprocessor controlled infra-red light beams supporting 2D or 3D light curtains per code. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

2.7 CAR OPERATING STATION

A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in a surface-mounted panel requiring no applied faceplate. COP shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LEDs shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided. Visual highlight is the standard equipped, integrated multimedia display.

B. Emergency Communications System: Integral phone system provided. For improved accessibility, there are visual and acoustic confirmation for button inputs as well as a voice synthesizer for travel and floor announcements.

C. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate, and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

D. Special Equipment: Not Applicable

E. Digital Services: Cloud-based IoT monitoring system comes standard with these options:
   1. ADA Phone - Code Compliant Cellular Connectivity

F. Digitally Native: Digital expansion for evolving ecosystem of digitally augmented services. DEP infotainment display comes standard.

2.8 CONTROL SYSTEMS

A. Controller: The elevator control system shall be microprocessor based and software oriented. The system shall operate in real time, continuously analyzing the car(s) changing position, condition, and work load. All controller and operational circuits including the brake control and drive system shall be digital. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.

1. Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered.
2. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "up" hall buttons have been pressed. The car shall not stop at floors where "down" buttons have been pressed, unless the stop for that floor has been registered by a car button or unless the down call is at the highest floor for which any buttons have been pressed. Pressing the "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button or unless the up call is the lowest for which any button has been pressed.
3. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction. If both up and down calls are registered at an intermediate floor, only the call corresponding to the direction of car travel shall be canceled upon the stopping of the car at the landing.
4. A car that is stopping for the last hall call in the preference direction, and that hall call is for the opposite direction with no onward car calls, shall reverse preference when the selector position advances to the landing at which the car is committed to stop. A car that is stopping for the last hall call in the preference direction, and that hall call is for the same direction, shall hold its preference until the door is almost closed allowing time for a passenger to register an onward car call which shall maintain the preference. If no car call is registered before the door is almost closed, the car shall lose its preference and shall be available to accept calls in either direction.

B. Operation: Selective Collective – ETA based. The system is optimized to get a car to the floor where a hall call has been registered, in the shortest time. The system receives input information from standard call pushbuttons located in the hall, car position and car load information from individual car loadweighers.
1. When group operation is required, the group supervisory operation shall be embedded within selected car controllers. No separate group controller shall be supplied. The microprocessor shall constantly scan the system for hall calls. When hall calls are registered, the control system shall immediately calculate the estimated time for arrival using such information as, number of floors to travel from the current position, the time it takes to travel one floor at top speed, calls assigned to a car, and car reversal time to respond to a call in the opposite direction of travel. When a car’s status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.
2. Traffic Pattern: The microprocessor shall provide flexibility to meet well defined patterns of traffic, including up peak, down peak, and heavy interfloor demands, and adjust for indeterminate variations in these patterns which occur in buildings.
3. Artificial Intelligence: Artificial Intelligence shall be an integral part of the group control system software. The enhanced artificial intelligence shall optimize the interfloor traffic performance. Inputs for the artificial intelligence shall include accurate passenger load from an electronic loadweigher, probable car calls generated from each hall call, type of building and observed traffic patterns.

C. Load Weighing Device: Provide a load weighing device on each car which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass

landing calls but not car calls. The passed landing calls shall remain registered for the next following car.

1. The device shall be unaffected by the action of compensating chain or rope. The device shall detect a 50-pound (23 Kg.) load change under all conditions.
2. The load sensor shall use a load cell to accurately measure the weight in the car. The information shall be transferred via a serial link to the elevator controller.

D. Anti-Nuisance Call Control: The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be canceled after the first call has been answered.

E. Position Selector: The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor position and slow down points in memory.

F. Motion Control: The drive control system shall be dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity encoder shall permit continuous comparison of machine speed to velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.

G. Motor Pre-Torque: Current shall be applied to the elevator drive before the brake is released and the speed pattern is dictated to eliminate roll back and sling shot effects of unbalanced loads in the car. The electronic loadweigher shall determine the load on the car determining a pre-torque reference to send to the drive.

H. Emergency Power Operation: In the event of power loss, this elevator(s) should be equipped with a battery powered automatic rescue operation device. This operation is designed to only move the car up or down to the nearest landing depending on the load in the car. It is NOT designed to lower the car to a specified landing such as Battery Lowering used for Hydraulic applications. An isolation transformer is required if the building voltage is NOT 480VAC. A single rescue unit is not capable of rescuing a group of cars --- this is a per car option. Maximum travel on rescue operation is 100 feet. Average time of operation for Rescue is 3 minutes. This feature is only available for jobs with 60HP and below. This battery automatic rescue operation is not allowed with the Green Drive.

I. Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.

J. Special Operation: Not Applicable

K. Digital Services:

1. Cloud-based IoT Monitoring System (standard): Contractor shall provide a cloud-based IoT (internet of things) monitoring system capable of tracking door movements and timing, trips, power cycles, car calls, out-of-service events and modes. This observation will continue 24/7 and it shall be capable of providing service technicians a minimum of three recommended solutions for defined failure events and automatically dispatch service technicians in the event of failure(s) while sending notifications to end users of changes in their equipment's state via both email and mobile device. Access to IoT and related equipment data and status will be made available in both a web portal and mobile

application secured by password and username with at least two-factor authentication. Finally, this system must be self-contained and not require internet provision by others.

2. ADA Phone – Code Compliant Cellular Connectivity: Contractor shall provide a phone service through a self-contained cellular based VoIP system. This system shall meet code, include a backup battery capable of powering the emergency communication equipment for 4+ hours in the event of a power outage. The solution shall have remote monitoring capability to ensure continuous connectivity with a means of remote troubleshooting. Remote monitoring capability shall include, at a minimum, the ability to monitor connectivity and power supply. Remote monitoring shall be capable of providing local alerts to response personnel when on-site intervention is required.

2.9 HALL STATIONS

A. Hall Stations, General: Buttons shall illuminate to indicate call has been registered at that floor for the indicated direction.
   1. Provide one pushbutton riser with faceplates having a brushed stainless steel finish, surface-mounted in the entrance jamb.
      a. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the entrance frame at the designated level.

B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

C. Combo Hall Lantern and Position Indicator: An electronic position indicator shall be provided and mounted for optimal viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alphanumeric character corresponding to the landing which the elevator is stopped or passing. Hall lantern is combined in the display with the directional arrow to indicate the travel direction in the same faceplate. Faceplates shall match the hall stations.

D. Special Equipment: Not Applicable

2.10 CONTROLLER LOCATION

A. Location: Door Jamb Mount is integrated with controller in the door jamb. Control power and cab light are provided by the elevator contractor and included with the integrated assembly. Main power disconnect is provided by others.

PART 3 EXECUTION

3.1 EXAMINATION

A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and/or control room, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.2 INSTALLATION

A. Install elevator systems components and coordinate installation of hoistway wall construction.
   1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
   2. Comply with the National Electrical Code for electrical work required during installation.

B. Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.

C. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.

D. Welded construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualification of welding operators.

E. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.

F. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.

G. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

H. Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascia and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.

I. Lubricate operating parts of system, including ropes, as recommended by the manufacturer.

3.3 FIELD QUALITY CONTROL

A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.

B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.4 ADJUSTING

A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.5 CLEANING

A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

1. Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.

3.6 PROTECTION

A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect

elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.7 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

END OF SECTION

SECTION 21 0500

GENERAL PROVISIONS – FIRE SUPPRESSION

PART 1 – GENERAL

1.1 SCOPE:

A. Provisions of this Section apply to all Fire Protection work.

B. Include the provisions of General Conditions as part of this Section.

C. Provide all labor, materials, equipment, and services necessary for the completion of all Fire Protection work shown or specified, complete and ready for operation, consisting in general of the following:

1. Rework of existing wet automatic sprinkler system to provide proper sprinkler coverage in areas undergoing renovation.

D. Give required notices, file drawings, obtain and pay for permits, deposits and fees necessary for the installation of the Fire Protection work. Obtain and pay for inspections required by laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain and pay for certificates of such inspections, and file such certificates with Owner.

E. Permitting is required for sprinkler system flush-out water discharged to surface waters.

The State Contact:
Alabama Department of Environmental Management
Attn: Water Division
Post Office Box 301463
Montgomery, Alabama 36130-1463
Telephone Number: (334) 271-7823
Fax Number: (334) 279-3051
E-Mail: H2omail@adem.state.al.us

F. "Provide" means to furnish and install, complete and ready for operation.

1.2 DRAWINGS:

A. The Fire Protection design is a delegated design. The routing and sizing of mains, branches, runouts and all sprinkler locations is the responsibility of the contractor and is based on the criteria established by the locally adopted codes, NFPA and the Engineer of Record.

B. Fire Protection Drawings are diagrammatic and subject to requirements of Architectural Drawings and conditions existing in the field. Fire Protection Drawings indicate generally the location of components and are not intended to show all fittings or all details of the work.

C. Follow the drawings closely, coordinate dimensions with Architectural Drawings and field conditions. DO NOT scale Fire Protection drawings for location of system components.

D. Make no changes without Architect's written permission. In case of doubt, obtain Architect's decision before proceeding with work. Failure to follow this instruction shall make the Contractor liable for damage to other work and responsible for removing and repairing defective or miss-located work in proper manner.

E. DO NOT scale drawings to locate sprinkler heads. COORDINATE with lighting and ceiling grids. Contractor for Fire Protection work is responsible for coordinating with all trades.

1.3 APPLICABLE CODES AND STANDARDS:

A. Comply with the current editions of the following Codes and Standards:

1. 2021 International Building Code
2. 2021 International Fire Code
3. 2021 International Mechanical Code
4. NFPA 13 – Standard for the Installation of Sprinkler Systems
5. NFPA 24 – Standard for the Installation of Private Fire Service Mains and Their Appurtenances
6. NFPA 25 – Standard for Inspection, Testing, and Maintenance of Water-based Fire Protection Systems.
7. NFPA 70 - National Electrical Code
8. NFPA 101 - Safety to Life from Fire in Buildings and Structures
9. ANSI/B31.9 - Code for Building Services Piping
10. Other standards as referenced in other sections of Division 210000

1.4 QUALIFICATIONS OF SUBCONTRACTOR:

A. The Fire Protection sub-contractor shall meet the following minimum qualifications:

1. He shall have been in business as a Contractor for Fire Protection work continuously, for at least **5 years** prior to the date of opening bids for this project.
2. He shall have a satisfactory experience record with Fire Protection installations of character and scope comparable with this project and shall have completed **five** such installations in the past **5 years**.
3. He shall be qualified, certified and licensed by the State of **Alabama** Fire Marshal. He shall meet all laws pertaining to fire protection in the Code of **Alabama** 1975 and any amendments of same.

1.5 CONFLICTS AND INTERFERENCES:

A. If systems interfere or conflict, the Architect shall decide which equipment to relocate regardless of which was first installed.

B. Coordinate with all other trades in regard to location and arrangement of all sprinkler system components.

C. The routing of mechanical systems (ductwork) due to its size along with drain, waste and vent piping (e.g. sanitary) due to its reliance on gravity, takes precedence over the routing of fire protection piping. Fire protection mains, branches, run-outs, drops etc. shall be coordinated, routed and installed with deference to the mechanical and gravity drainage systems. Coordinate routing of piping with all other trades during preparation of shop drawings and prior to installation. **This includes any necessary modifications to existing fire protection piping to facilitate the installation of new mechanical or drainage designs**.

1.6 WORKMANSHIP:

A. Do all work in a neat and first-class manner. Remove and replace work not done in such manner as directed by the Architect.

1.7 COOPERATION:

A. Cooperate with all other crafts. Perform work in a timely manner. Do not delay the execution of other work.

1.8 VISITING SITE:

A. It is mandatory that the contractor visit the site and become familiar with location and various conditions affecting work. No additional allowance will be granted because of lack of knowledge of such conditions.

1.9 MATERIALS:

A. **Unless otherwise noted, provide new, standard, first-grade materials throughout. Unless otherwise noted, all products and materials shall be manufactured in the U.S.A. This shall include but not limited to: Pipe, fittings, hangers, valves, switches, gauges, sprinklers, pumps and all other associated equipment.**

B. Where materials or products are specified by manufacturer's name, brand, trade name, or catalog reference, such named materials or products shall be the basis of the estimate, without substitution, and shall be furnished under the contract unless requests for equivalents are approved as noted below. Where two or more brands are named the choice of these shall be optional with the Contractor.

C. Equivalents will be considered only if written request for approval has been received by the Architect (from a general contract bidder) 10 days prior to the date established for receipt of Proposals. Each request shall include the name of the material or equipment for which an equivalent is proposed and a complete description of the proposed equivalent including drawings, cuts, performance and test data, and deviation from the specification and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the equivalent may require shall be included. The burden of proof of the merit of the proposed equivalent is upon the proposer. The Architect's decision of approval or disapproval of a proposed equivalent is final.

D. If the Architect approves any proposed equivalent prior to receipt of Proposals, approval will be set forth in an Addendum. **DO NOT RELY UPON APPROVALS MADE IN ANY OTHER MANNER.**

E. No proposed equivalent will be considered after the Contract has been executed, except as described in paragraph C above.

F. Within 45 days of execution of contract and before ordering materials or equipment, submit to Architect and obtain his approval of a detailed list showing each item which is to be furnished by make, trade name, catalog number, or the like; together with manufacturer's specifications, certified prints, and other data sufficient for making comparisons with items specified. When approved, such schedule shall be of equal force with these specifications in that no variation there from shall be allowed except with Architect's written approval. Submit PDF format files for approval. Provide PDF files of approved data for project close-out.

G. All pressure vessels shall be constructed and tested in accordance with applicable ASME codes and shall bear ASME stamps. Certificates of inspection and approval shall be submitted to Architect.

H. Similar items of equipment shall be the product of the same manufacturer.

1.10 SHOP DRAWINGS:

A. Fire protection design and associated hydraulic calculations are a delegated design. The contractor shall generate all shop drawings and hydraulic calculations under the direct supervision of an engineer licensed in the state of Alabama.

B. Submit pdf of working shop drawings, material data, and hydraulic calculations. Shop drawings and hydraulic calculations are required to be sealed and signed by an engineer licensed in the state of Alabama. Shop drawings shall include low point drain locations, piping elevations, piping connection details, sprinkler locations, and a list of piping materials. All shop drawings shall be produced using AutoCad and a copy of the shop drawing files shall be provided in pdf format for shop drawing review. An electronic copy of all approved shop drawings shall be provided for project closeout.

1. Complete Fire Protection equipment plans showing location of equipment, conduit stubs for motors, floor drains, and equipment pads and foundations.

2. Equipment piping.

C. Thirty days before starting work, submit Fire Protection shop drawings bearing seals of approval of Owner's Underwriters and all Governmental Agencies having jurisdiction. Complete shop drawings are required to be submitted at one time. (See Section 21 4000.)

D. Engineers' CAD/electronic drawings files will be available upon request for the convenience of the contractor and for use in preparation of shop drawings. A service fee of $100.00 per drawing sheet file shall be remitted to the Engineer prior to delivery of CAD/electronic drawing files along with a signed agreement between the Engineer and Contractor.

1.11 COORDINATION SHOP DRAWINGS:

A. Coordination shop drawings (one set of mylar or paper sepias) will be required of the following areas, drawn to a scale not smaller than 1/4" = 1'-0":

B. Start drawings with HVAC shop drawings**.**

C. Engineers' CAD/electronic drawings files will be available upon request for the convenience of the contractor and for use in preparation of shop drawings. A service fee of $100.00 per drawing sheet file shall be remitted to the Engineer prior to delivery of CAD/electronic drawing files along with a signed agreement between the Engineer and Contractor.

D. Next, the Plumbing Contractor shall add all piping and plumbing to the drawings, indicating all equipment and piping. Indicate elevations of all piping. Draw sections as required to clarify congested situations.

E. Next, the Fire Protection Contractor shall add all sprinkler heads and fire protection piping.

F. Next, the Electrical Contractor shall add all electrical fixtures, conduit and equipment.

G. Next, the drawings shall be submitted to the General Contractor for final coordination.

H. Finally, after the General Contractor has approved the drawings they shall be submitted to the Architect for his review and comments.

1.12 RECORD DRAWINGS:

A. When work starts the Architect will furnish two complete sets of white prints of the Fire Protection Drawings. All corrections, variations, and deviations, including those required by change orders, if any, must be recorded in colored ink or colored pencil at the end of each working day on these drawings. The marked prints shall be available at all times for the Architect's inspection.

B. Prior to examining the request for final payment or making any response thereto, the Architect shall receive from the Contractor one complete set of the white prints, marked as stated above, indicating the actual completed installation of the work included under this contract.

1. Accurately show location, size and elevation of new exterior utility work and its relationship to any existing utilities, obstructions, etc., contiguous to the area of work.

2. Block out areas modified by change-order & identify them by change-order number.

3. The Architect will forward the marked white prints to the Consulting Engineers for review. They will then be returned by the Architect to the Contractor for use in preparing record drawings.

C. When work is completed, the Engineers' CAD/electronic drawing files will be made available upon request for the convenience to the contractor for a service fee of $100.00 per CAD/electronic drawing sheet file and for use in preparing record drawings. Contractor shall transfer the information from the marked white prints to the CAD files, removing all superseded data in order to show the actual completed conditions. Include the contract drawings equipment schedules, details, and sections, edited to show actual completed conditions. When record drawings are complete, provide 2 sets of bond prints, and one complete set of AutoCAD drawing files (AutoCAD 2016 format) and one set of PDF drawing files on CD-ROM disks.

D. Fire Protection Drawings shall be a set of CAD shop drawings, up-dated to show actual conditions at completion of work. Include the contract drawings equipment schedules and details edited to show actual completed conditions.

1.13 PROTECTION OF EQUIPMENT:

A. During construction, protect Fire Protection piping and equipment damage or deterioration and prevent water, dust, etc. from entering the equipment.

B. During construction, keep all openings of piping and equipment securely covered to prevent entry of water or dust.

C. When installation is complete, clean piping and equipment and make ready for painting.

D. Sprinklers shall have their factory applied protective covers installed for the duration of construction and only be removed at substantial competition. Any sprinklers that are painted, damaged or otherwise fouled with construction debris shall be replaced at no additional cost to the owner.

1.14 INSTALLATION OF EQUIPMENT:

A. Install equipment to provide normal service access to all components.

B. Where drawings show sufficient space for removing components, install equipment to provide such clearance. ***Provide space at all equipment power and control panels as required by local codes.***

C. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with contract documents, obtain Architect's decision before proceeding.

D. All equipment shall be firmly fastened in place:

1. Pad mounted equipment shall be secured to pads using poured in place anchor bolts or cinch anchors.

2. Vibration isolators shall be secured to floors or pads and equipment shall be bolted to the isolators.

1.15 EQUIPMENT SUPPORTS:

A. Provide supports for piping and equipment. Hot dip galvanize after fabrication all supports, etc., located outdoors. Where noted provide 304 stainless steel supports. At the Contractor’s option, all supports, etc. located outdoors may be 304 stainless steel instead of hot dip galvanized.

1.16 CUTTING AND PATCHING AND INCIDENTAL WORK:

A. Set sleeves and inserts and lay out and form openings in walls, beams, girders and structural floors in this Section.

B. Cut, patch and repair as required to accomplish Fire Protection Work and finish to match adjacent work. Architect's approval required before cutting any part where strength or appearance of finished work is involved.

1.17 FLASHING:

A. General: Furnish all pitch cups, metal base flashing and counter flashing required for Fire Protection Work. Installation of above items is specified in Roofing Section.

B. Pitch Cups: 20 gauge galvanized steel, at least 8" deep, bases mitered and soldered and extending at least 4" horizontally.

C. Metal Base Flashing: Galvanized steel for ferrous items, and stainless steel for stainless steel items. Minimum thickness 22 gauge (0.034") galvanized steel, 20 gauge (0.038") stainless steel, 0.032" aluminum. Bases mitered and soldered extending out at least 4" horizontally and 8" vertically.

D. Metal Counter Flashing: Of material and gauges specified for base flashing, lapping base flashing at least 3".

1.18 EXCAVATION & BACKFILLING:

A. Include all excavation and backfilling required to bring the work to line and grade shown, including excavation of rock and all other materials which may be encountered.

B. Excavate trenches wide enough for proper installation of work. Grade trench bottoms evenly. Provide bell holes as necessary to ensure uniform bearing for pipes. Excavate minimum 6" below pipe. Refill cuts below required pipe grade with sand or compacted gravel. Support pipe continuously along its entire length. (Do not use piers to support piping.)

C. Backfill after inspection by Architect and authorities having jurisdiction. Backfill compacted areas (engineered fill) with sand or fine gravel (89/10) in accordance with requirements of "Sitework" no less than 95% compactancy. Backfill paved areas with sand or fine gravel (89/10) compacted to meet requirements of Paving Section. Backfill shall be free of rock, wood, steel, brick, etc. Do not disturb pipe. Restore or repair pavements and the like after backfilling, matching adjacent work.

D. Resod grassed areas and replace bushes, etc.

1.19 ELECTRICAL EQUIPMENT:

A. Provide electrical equipment compatible with the current shown on electrical drawings. Verify current characteristics before ordering equipment.

B. Should the Contractor with the Architect's approval make changes in electrical equipment from that shown on the Electrical Drawings, the Contractor shall be responsible for the cost of required changes.

C. All control panels, electrical assemblies, etc. must bear a label from a recognized testing laboratory as an assembly, not as individual components and be UL/FM listed.

1.20 SLEEVES:

A. For pipe through floors inside fire rated chases or through non-fire-rated walls: 20 gauge galvanized steel, 1" larger than pipe or pipe covering.

B. For pipe through concrete beams: schedule 40 black steel pipe, 1" larger than pipe or pipe covering.

C. For pipe passing through floors outside fire rated chases and fire rated wall and partitions, provide 20 gauge steel sleeve leaving the annular space between pipe or pipe covering as required by UL systems. Where pipe is insulated, insulation shall be continuous thru sleeve. Refer to Section Through-Penetration Firestop Systems where included in the contract documents. Otherwise, seal between sleeve and pipe or pipe covering with 3M Brand Fire Barrier CP 25WB caulk, Flamestop V, Specified Technologies, Inc. "Spec Seal Sealant", Rectorseal Corp. Metacaulk 950 or Hilti FSONE bearing UL listing for actual conditions of installation, thickness and application in strict accord with UL reference for each type installation. Any equivalents must meet the 10 day prior approval provision and must show UL approval for all conditions, bare pipe, insulated pipe, etc. For plastic piping material submittal must show UL approval for each application and if caulk comes in direct contact with pipe, it must be compatible and not injurious to the pipe.

D. Set sleeves before concrete is poured or masonry is erected. In existing construction, grout sleeves firmly in place.

E. Extend floor sleeves 1-1/2" above finish floor in areas where floor is subject to being wet during normal usage (mechanical rooms, etc.).

F. Where exposed pipes pass through walls and partitions in finished spaces, provide chrome plated F & C plates or escutcheons.

1.21 PAINTING:

A. Refinish equipment damaged during construction to new condition.

B. Prime and paint all bare, exposed piping using type specified in Painting Section. All exposed exterior piping shall be galvanized.

C. Prime and paint all supports, etc. located indoors.

D. Other painting is specified in Painting Section, Finishes Division.

1.22 PIPE IDENTIFICATION:

A. Identify all piping exposed to view or accessible through removable ceilings or access panels with plastic snap-on pipe line markers. Color code markers in accordance with ANSI A13.1. Show pipe contents and direction of flow. Markers on lines 8" OD and smaller shall be taped in place; on lines over 8" OD secure with spring clips. Markers shall be equal to Craftmark, Brady, Seton or Brimar.

B. Protect all factory identification tags, nameplates, model and serial numbers, stenciling, etc., during construction and replace if damaged.

C. Label Spacing and Extent:

1. On straight run of pipes: Above suspended ceilings space labels approximately 10 feet on center; elsewhere, 20 feet on center.

2. Wherever a pipe enters or leaves a room or building.

3. At change of direction.

4. At main valves and control valves (not equipment valves).

5. At manifolds.

6. On risers, just above and below floors.

1.23 VALVE TAGS:

A. 2" X 3" laminated plastic with 1/2" numbers engraved at top, leaving space for further engraving by others. Secure tags with chains to valve yoke or stem, not handles.

B. Valve tag colors:

1. Fire Protection: White tags with red numbers.

C. Valve tag locations: At all valves on mains, risers and branches (not equipment service valves).

D. Valve tag numbers: Starting with Number 1, number tags in sequence from the lowest point to the highest point in the building. In existing buildings extend existing sequences.

1.24 VALVE CHARTS:

A. In all mechanical rooms, provide charts showing number and locations of all labeled valves, type of service, etc. Laminate in heavy plastic and provide brass grommets for attaching to wall. Attach to wall with anchors and brass screws.

B. In existing buildings include existing valves in the charts of new valves.

1.25 EQUIPMENT IDENTIFICATION:

A. Provide 2" x 3" or larger laminated plastic nameplates with 1/2" numbers and letters in colors specified below. Screw tags to equipment in obvious locations. Engrave equipment designation and numbers as shown on plans and drawings on upper half of tag, leaving lower half of tag for future engraving by Owner.

B. Provide similar nameplates for motor starters furnished under this division.

C. Secure nameplates with acorn head screws.

D. Colors:

1. Equipment connected to utility power only - black letters on white nameplates.

2. Equipment connected to emergency power - red letters on white nameplates.

1.26 ACCESS DOORS:

A. Furnish and install access doors for valves, low point drain valves, zone controls, inspectors test connections, air vents, and other items located above non-liftout ceilings or behind partitions or walls. Doors in non-fire rated walls and ceilings: 16-gauge steel with hinges and screwdriver latches. Doors in fire rated walls and ceilings: UL labeled with fire rating equal to fire rating of wall or ceiling. Doors in security ceilings to be 10 ga. steel panels, white powder coat, 2” x 2” x 3/16” steel angle frame heavy duty butt hinges with security screws. Provide door styles compatible with adjoining surfaces as selected by Architect. Size doors to permit removal of equipment and/or maintenance. Doors: Bar-Co, Nystrom, Williams Bros., or equal.

B. Mark lay-in ceilings with colored vinyl self adhering disc stuck on grid adjacent to maintenance access points.

1.27 TESTING, & ADJUSTMENTS:

A. All tests shall be witnessed by the Architect in addition to authorities having jurisdiction. A minimum of 72 hour notice is required prior to performance of test.

B. After systems have been installed complete, adjust and test systems for proper operation. ***All instruments used for testing work shall have been calibrated within 6 months and checked for accuracy prior to start of work.***

C. Perform all tests as required by local codes. Contractor shall furnish testing equipment. ***All piping pressure tests shall be hydrostatic tests.***

D. If local codes are more stringent than the following, local codes shall govern.

1.28 WARRANTY & INSTRUCTIONS:

A. See General Conditions - One-Year Warranty.

B. Contractor shall and hereby does warrant all materials, workmanship and equipment furnished and installed by him to be free from defects for a period of one year after date of substantial completion of the Contract. Should any defects in material, workmanship, or equipment be made known to Contractor within the one-year warranty period, Contractor shall replace such materials, workmanship, or equipment without charge.

C. After completion of the work, Contractor shall operate the equipment which he installs for a period of (10) working days, as a test of satisfactory operating conditions. During this time, Contractor shall instruct the Owner's operating personnel in the correct operation of the equipment.

D. Provide PDF of manufacturer's operating and maintenance manuals and parts lists for all equipment and materials furnished. Provide a maintenance schedule listing routine maintenance operations and suggested frequency thereof. Include all warranty dates on equipment and guarantees.

1.29 PROJECT CLOSE-OUT:

A. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:

1. Record drawings - Fire protection systems: PDF files and CAD files.
2. Equipment Submittal Data PDF files.
3. Equipment operating and maintenance manuals PDF files.
4. Maintenance schedule.
5. Equipment warranty dates and guarantees.
6. List of Owner's Personnel who have received maintenance instructions.
7. Test results of fire protection systems and names of those witnessing test. (See Section 21 4000 and NFPA 25 for testing requirements.)
8. Install valve charts in Mechanical Rooms.
9. Provide metal storage cabinet(s) and additional sprinklers, for each type of sprinkler installed, in quantities per NFPA 13.

1.30 TRAINING OF OWNER PERSONNEL:

A. The General Contractor shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed.

B. The Engineer shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.

1. The Fire Protection Engineer shall determine the special needs and areas where training will be most valuable. The Owner and Engineer shall decide how rigorous the training should be for each piece of commissioned equipment. The Fire Protection Engineer shall communicate the results to the Subs and vendors who have training responsibilities.

2. Each Sub and vendor responsible for training shall submit a written training plan to the Fire Protection Engineer for review and approval prior to training. The plan will cover the following elements:

   a. Equipment (included in training)

   b. Intended audience

   c. Location of training

   d. Objectives

   e. Subjects covered (description, duration of discussion, special methods, etc.)

   f. Duration of training on each subject

   g. Instructor for each subject

   h. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)

   i. Instructor and qualifications

3. The General Contractor shall develop an overall training plan and shall coordinate and schedule, with the Subcontractors and other consultants, the overall training for the commissioned systems. The Engineer will recommend approval of the training to the Owner upon satisfactory completion using a standard approval form. The Owner and Contractors sign the approval form.

4. Video taping of the training sessions will be provided at the Owners request.

C. Fire Protection Contractor. The Fire Protection Contractor shall have the following training responsibilities:

1. Provide the Fire Protection Engineer and Owner with a training plan two weeks before the planned training.

2. Provide designated Owner personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of equipment.

3. Training shall normally start with classroom sessions followed by hands-on training on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.

4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.

5. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing contractor or manufacturer's representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment are required. More than one party may be required to execute the training.

6. The training sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.

7. Training shall include:

    a. Use of the printed installation, operation and maintenance instruction material included in the O&M manuals.

    b. A review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include start-up, operation in all modes possible, shut-down, seasonal changeover and any emergency procedures.

    c. Discussion of relevant health and safety issues and concerns.

    d. Discussion of warranties and guarantees.

    e. Common troubleshooting problems and solutions.

    f. Explanatory information included in the O&M manuals and the location of all plans and manuals in the facility.

    g. Discussion of any peculiarities of equipment installation or operation.

    h. Classroom sessions shall include the use of overhead projections, slides, video/audio-taped material as might be appropriate.

8. Hands-on training shall include start-up, operation in all modes possible, including manual, start-up shut-down and any emergency procedures and preventative maintenance for all pieces of equipment.

9. The Fire Protection contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls.

10. Training shall occur after functional testing is complete, unless approved otherwise by the Owner.

END OF SECTION

SECTION 21 4000

FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SCOPE:

A. Section 21 0500 - "General Provisions - Fire Suppression" shall apply to and become part of this Section.

B. It is the Contractor's responsibility to verify flow test data prior to ordering any equipment. If results do not meet demand, he is to notify the Architect prior to preparing shop drawings. If the test is more than one year old, the Contractor shall have the system retested.

C. All materials, components and appurtenances are required to be UL/FM listed.

1.2 SHOP DRAWINGS:

A. Hydraulic calculations and sprinkler shop drawings for building fire protection systems must be prepared under the supervision of an engineer licensed in the State of Alabama. Layout to show precise locations and elevations of sprinkler heads and piping with sizes indicated. Coordinate location of piping and sprinkler heads with other work, including piping, ducts, diffusers and lighting fixture layout. When submitted to Architect, drawings and calculations shall bear the stamps of approval from Owner's Underwriter and local Fire Marshal's office.

B. Shop drawings, hydraulic calculations and material data may be submitted in PDF format electronically by e-mail.

C. Provide all information on drawings as required by NFPA 13.

1.3 CODES:

A. Refer to section 21 0500 "General Provisions – Fire Suppression" for a list of applicable codes and standards.

B. Provide all UL/FM listed equipment, piping, valves, switches and complete operating system to standard of NFPA 13 in compliance with local, county and state authorities, Owner's Insurance Provider, and these Specifications.

1.4 SERVICE:

A. Coordinate with Civil and provide for connection at approximately 5 feet outside of building foundation as shown on drawings.

PART 2 - PRODUCTS Unless otherwise noted, provide new, standard, first-grade materials throughout. Unless otherwise noted, all products and materials shall be manufactured in the U.S.A. This shall include but not limited to: Pipe, fittings, hangers, valves, switches, gauges, sprinklers, pumps and all other associated equipment.

2.1 GENERAL:

A. Refer to Electrical Drawings and Specifications for alarms, wiring of supervisory switches and related equipment.

2.2 FIRE PROTECTION PIPING:

A. System shall comply with NFPA 13.

B. All fire protection piping within building: black steel. All underground fire protection piping outside building: ductile iron. All fire protection piping above ground on outside of building: galvanized.

C. Nonstandard OD, Thin wall, Hybrid, Schedule 5, or any Black steel piping with a wall thickness less than Schedule 10: **NOT ALLOWED**.

D. Black steel pipe 2” and smaller: schedule 40, ASTM A-53, A-106 or A-135. Threaded fittings on piping.

E. Black steel pipe 2-1/2” and larger: schedule 10, rolled groove with Victaulic, Anvil or Gustin Bacon fittings, ASTM A-47 or welded fittings, ANSI B 16.9.

F. Ductile iron pipe: cement lined, ANSI A 21.50.

G. Galvanized steel pipe 2” and smaller: schedule 40, ASTM A53/A53M, type E.

H. Galvanized steel pipe 2-1/2” and larger: schedule 10, ASTM A153/A153M or ASTM A795/A795M, type E.

I. Joints on black steel screwed piping: Make up with Teflon tape applied to male threads.

J. Joints on black steel welded piping: Comply with ANSI standard. B 16.9 and B 16.25.

K. Joints on black steel rolled groove piping: Victaulic, Anvil or Gustin Bacon couplings, ASTM-A-47. Note: Victaulic #920 or #922 Mechanical T’s are approved for use only where connections to existing systems are required. All joints must be cut or roll grooved.

L. Joints on ductile iron piping: standard mechanical joint ANSI A21.11. Provide retainer glands on all fittings. Provide concrete thrust block, minimum 1 cubic yard, at all fittings. Thrust block must bear against virgin soil.

M. Joints on threaded galvanized steel piping: ASTM A865/A865M, with galvanized gray iron fittings, ASME B16.4, class 125

N. Joints on rolled groove galvanized steel piping: AWWA C606 and UL213, rigid pattern, with ASTM A47/A47M, malleable iron casting or ASTM A536 ductile iron, and rubber gasket.

O. Arrange for connection to existing water main, backflow preventer as required by local utility, service line from main to building as required by local utility. Pay all charges, fees, temporary deposits, etc.

2.3 PIPE HANGERS:

A. Pipe hangers above ceiling / high in space shall be attached to structure as allowed by structural engineer. Hangers shall not be attached to roof deck or other non-structural items.

B. General: Pipe hangers, Anvil, PHD, Michigan Hanger, B-Line or Elcen. Anvil figure numbers are given for reference.

C. Provide pipe hangers with vibration isolators as specified under Vibration Isolators.

D. Pipe hangers for lines 8" and smaller: Anvil Fig. 69.

E. Pipe hangers for 3” and smaller: adjustable wrought ring hangers, Anvil Fig. 97, Fig. 69 or wrought clevis hangers.

F. Pipe hangers for 4” and larger: adjustable wrought clevis hangers.

G. Trapezes where required to bridge between structural members, Unistrut P2000 channel, or equal, with rods sized as specified below for largest pipe on trapeze.

H. Parallel piping graded in the same direction may be grouped on trapezes. Trapezes for 4” and smaller, Unistrut P2000 channel, or equal, with rods sized as specified below, for largest pipe on trapeze. Provide Unistrut series P1100 rigid steel conduit clamp for each pipe. Trapeze shall not exceed 36” in length. Maintain minimum 3” separation between adjacent pipe or pipe covering and hanger rods. Trapezes shall be spaced based on the smallest pipe size being supported.

I. Provide riser clamps on pipe risers on each floor.

J. Beam Clamps: Anvil Fig. 92.

K. Inserts for hangers in concrete structures: Underwriter's listed cast iron inserts. Anvil Fig. 282.

L. For fasteners in existing concrete structures use drilled in expansion anchors with load rating at least 150% of pipe hanger rating (powder driven anchors are not acceptable).

M. Size rods for pipe hangers not smaller than the following: 3/8" rods for pipe 3" and smaller, 1/2" rods for 4", 5", 6" and 8", 5/8" rods for pipe 10" and larger.

N. Pipe hanger spacing for screwed, cut or roll groove joint and welded piping in strict accord with NFPA 13. Install additional hangers at change of direction, valve clusters, and at ends of branch lines.

O. Provide sway bracing where sprigs are 4’-0” or longer.

2.4 GAUGES:

A. Provide 4-1/2” dial pressure gauges per NFPA 13. Gauges shall have bronze or stainless steel bourdon tubes, 316 steel movement, aluminum or polypropylene solid front cases, adjustable micrometer pointer and accuracy grade 2A (not less than 1/2% of full scale over the entire range) without mounting flange.

B. Gauges shall be Ashcroft 1279, Marsh series P01, Trerice 450-B, Weksler AA44-2 or US Gauge 1980L with minimum bourdon tube diameter of 3”.

C. Provide ball valves for all pressure gauges.

2.5 IN BUILDING RISER [IBR]

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AMES Fire & Waterworks, a Watts Brand
2. WATTS.
3. Zurn

B. Type 304 Stainless steel, continuous piping lead in between site piping and fire service riser in building.

C. Meets AWWA C900 Inlet/DIP and AWWA C606 Outlet.

D. 6’-0” x 6’-0” standard length

E. Pipe Size: NPS 6.

2.6 FIRE PROTECTION VALVES:

A. Ball valves for pipe sizes 1” to 2”: all bronze, 2-piece, full port chrome plated brass ball, 400 WP, UL/FM listed, gear operated, slow close, threaded connections and tamper switch. AMES LFAFBV-FP series..

B. Gate valves 2" and smaller: all bronze, 175 psig WP, UL/FM listed, OS&Y, solid disc, Stockham B-133, Nibco T-104-0, Milwaukee Valve BB-SC100.

C. Gate valve 2 1/2" and larger: iron body, bronze trim, flanged, 175 psig WP, UL/FM listed, OS&Y, Stockham G-634, American Darling 55, Kennedy 68, Mueller A2073-6, Nibco F-607-0.

D. Butterfly Valves: Central Figure 570 or 580 complete with supervisory switch for indoor or waterproof on exterior UL/FM approved.

E. Check valves: iron body, bronze trim, 175 psig WP, UL/FM listed, Stockham G-939, American Flow Control 50-SC, Kennedy 126, Mueller A2120-6, Nibco F-908-B.

F. Outside water main valves: iron body, bronze trim, 200 psig WP, non-rising stem, double disc, parallel seat, Stockham G-743-0, American Darling 55, Kennedy 571X, M&H 67-01 or Mueller A2380-20. Provide cast or ductile iron access to grade with tee handle wrench.

G. Post indicator valve: Stockham G-951, Crane 510, American Darling 1241.

2.7 SPRINKLER WATER FLOW INDICATOR AND SUPERVISORY SWITCHES:

A. UL/FM approved paddle switch type water flow indicator, 120/1/60, two single pole, double throw contacts, one set for remote alarm, one set for alarm bell, complete with supervised cover on device. Automatic, Viking, or Anvil.

B. UL/FM listed 6" electric bell, 120/1/60, or water motor alarm gong, paint exterior of bell as required by Architect.

C. UL/FM listed supervisory switches, equal to Notifier Company Model NGV or SGV or Potter OSYSU-1 or -2 with NEMA 6P enclosure shall be used where subject to any condition where water is present, such as, in exterior vaults, complete with supervised cover on device. Potter waterproof switches must be used where installed outside building. All valves shall be supervised open. Provide with 2 sets of single pole double throw contacts.

D. Verify location of any bells or alarms with Architect and authority having jurisdiction.

2.8 SPRINKLERS:

A. Sprinklers shall be Quick Response commercial type, UL/FM listed by Reliable, Victaulic, Tyco, Viking, Globe or approved equal. Sprinkler heads shall be centered both directions in ceiling tile**.**

B. Provide quick response brass upright sprinklers in areas without ceilings.

C. Provide quick response recessed chrome plated pendent type sprinklers with chrome plated removable escutcheons in areas with acoustical ceiling tiles.

D. Provide quick response concealed style pendent sprinklers with factory painted cover plates in hard gypsum ceilings or soffits. Where ceilings or soffits are a color other than white, the cover plate shall be factory painted to match the surrounding surface. Coordinate all color options with architect.

E. Where sidewall sprinklers are used provide quick response type.

F. Submit sample of any proposed alternate sprinklers prior to bid date. See Substitutions Section.

G. Sprinklers subject to mechanical damage or installed at an elevation of 8’-0” or less above finished floor shall be protected with listed guards.

2.9 SPARE SPRINKLERS:

A. Provide sprinklers in a metal storage cabinet per NFPA 13. Provide one wrench for each type of sprinkler.

2.10 EQUIVALENT MANUFACTURERS:

A. Where Croker/Standard is listed above Potter/Roemer, Elkhart, Guardian or Sierra may be utilized.

PART 3 - EXECUTION

3.1 PIPING:

A. Provide drain piping to approved locations for all low points. Provide inspectors test piping to the building exterior at approved locations. Provide splash blocks for all exterior drains. (All drain piping to be galvanized.)

B. Install using tradesmen certified in sprinkler pipe and system installations.

C. Fire protection piping may be factory cut to lengths, but field modifications will be required to coordinate with other trades.

3.2 PERIODIC INSPECTION:

A. Make two periodic inspections within the first year after completion and acceptance of the work. Furnish a complete written report of each inspection to the Architect and the Underwriter.

3.3 HYDROSTATIC TESTING:

A. Fire protection piping tests: Test in accordance with NFPA 13. Architect, Owner's Underwriters and local Fire Marshal shall witness tests. Provide certificate of inspection to the Architect including the names of those witnessing the test.

B. On completion of installation test all piping and attached appurtenances subjected to system working pressure at 200 psi or 50 psi in excess of the system working pressure, whichever is greater, the system shall maintain that pressure for 2 hours. Pressure loss shall be determined by a drop in gauge pressure or visual leakage. The test pressure shall be read from one of the following, located at the lowest elevation of the system or the portion of the system being tested:

1. A gauge located at one of the hydrant outlets

2. A gauge located at the lowest point where no hydrants are provided

C. To reduce the possibility of serious water damage in case of a break, pressure can be maintained by a small pump, the main controlling gate meanwhile being kept shut during the test.

D. Hydrostatic tests should be made before the joints are covered so that any leaks can be readily detected.

E. The test procedure is as follows: Apply additional pressure, by temporary pump or compressed air connection. The water pressure is to be increased in 50 psi increments until the test pressure described above is attained. After each increase in pressure, observations are to be made of the stability of the joints. These observations are to include such items as protrusion or extrusion of the gasket, leakage, or other factors likely to affect the continued use of a pipe in service. During the test, the pressure is not to be increased to the next increment until the joint has become stable. This applies particularly to movement of the gasket. After the pressure has been increased to the required maximum value and held for 1 hour, the pressure is to be decreased to 0 psi while observations are made for leakage. The pressure is again to be slowly increased to the value specified above and held for 1 more hour while observations are made for leakage.

F. Loss shall be determined by a drop in gauge pressure or visual leakage.

G. The test pressure shall be read from a gauge located at the low elevation point of the system or portion being tested.

END OF SECTION

SECTION 22 0500

GENERAL PROVISIONS – PLUMBING

PART 1 - GENERAL

1.1 SCOPE:

A. Provisions of this Section apply to all Plumbing work.

B. Include the provisions of General Conditions as part of this Section.

C. Provide all labor, materials, equipment, and services necessary for the completion of all Plumbing work shown or specified, complete and ready for operation, consisting in general of the following:

1. A system of sanitary drain, waste, and vent piping.

2. A system of domestic water piping.

3. Providing plumbing fixtures and equipment as shown on drawings.

D. Give required notices, file drawings, obtain and pay for permits, deposits and fees necessary for the installation of the Plumbing work. Obtain and pay for inspections required by laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain and pay for certificates of such inspections, and file such certificates with Owner.

E. "Provide" means to furnish and install, complete and ready for operation.

1.2 DRAWINGS:

A. Plumbing Drawings are diagrammatic and subject to requirements of Architectural Drawings and conditions existing in the field. Plumbing Drawings indicate generally the location of components and are not intended to show all fittings or all details of the work.

B. Follow the drawings closely, coordinate dimensions with Architectural Drawings and field conditions. DO NOT scale Plumbing drawings for location of system components.

C. Make no changes without Architect's written permission. In case of doubt, obtain Architect's decision before proceeding with work. Failure to follow this instruction shall make the Contractor liable for damage to other work and responsible for removing and repairing defective or mislocated work in proper manner.

D. Contractor for Plumbing work is responsible for coordinating with all trades.

1.3 APPLICABLE CODES AND STANDARDS:

A. Comply with the current editions of the following Codes and Standards:

1. 2021 International Building Code
2. 2021 International Plumbing Code
3. 2021 International Mechanical Code
4. 2021 International Energy Conservation Code
5. ANSI/B31.9 - Code for Building Services Piping
6. ASME Boiler and Pressure Vessel Code
7. NFPA 13 - Installation of Sprinkler Systems
8. NFPA 70 - National Electrical Code
9. NFPA 90A – Installation of Air Conditioning and Ventilating Systems
10. NFPA 101 - Safety to Life from Fire in Buildings and Structures
11. Other standards as referenced in other sections of Division 22

1.4 QUALIFICATIONS OF SUBCONTRACTOR:

A. The Plumbing Subcontractor shall meet the following minimum qualifications:

1. He shall have been in business as a Plumbing Contractor for at least **5 years** prior to the date of opening bids.
2. He shall have a current Master Plumber's Certificate of competency issued by the State of **Alabama** and the City and County in which work occurs.
3. He shall have a satisfactory experience record with Plumbing installation of character and scope comparable with this project and shall have completed **five** such installations in the past **5 years**.
4. He shall have held a license from the **Alabama** State Licensing Board for General Contractors for at least **5 years**.

1.5 CONFLICTS AND INTERFERENCES:

A. If systems interfere or conflict, the Architect shall decide which equipment to relocate regardless of which was first installed.

B. Conflicts with active systems: Where existing, active piping or equipment conflicts with new Architectural features, the contractor shall make provisions to modify, re-route or relocate the existing piping or equipment to accommodate the Architectural design and then return the existing piping or equipment back to operable status. Returning the existing piping or equipment to operable status includes using like materials and sizes, pressure testing, leak testing, insulating, connecting power etc.

C. Conflicts with abandoned systems: Where existing abandoned piping or equipment conflicts with new Architectural features, the contractor shall make provisions to remove the abandoned piping or equipment to accommodate the Architectural design.

D. The routing of mechanical systems (ductwork) due to its size takes precedence over the routing of plumbing piping. Plumbing mains, branches, run-outs etc. shall be coordinated, routed and installed with deference to the mechanical systems.

1.6 WORKMANSHIP:

A. Do all work in a neat and first class manner. Remove and replace work not done in such manner as directed by the Architect.

1.7 COOPERATION:

A. Cooperate with all other crafts. Perform work in a timely manner. Do not delay the execution of other work.

1.8 HYDROFLUSHING AND VIDEO INSPECTION:

A. The hydroflushing equipment used for sewer cleaning shall be designed and constructed for sewer cleaning and be capable of removing sludge, grease, dirt and other foreign materials. It shall consist of, but not be limited to, booster pump, high pressure hose, water spray jet, cutting nozzles and all accessories required to complete the work.

B. Prior to beginning work and again prior to substantial competition of the project, hydroflush clean all existing and new below slab, non-pressure, gravity drainage systems (sanitary piping) 2 inches and larger. Use cutting nozzles when applicable. Do not mechanically auger or use cutting nozzles when piping is clay tile or plastic piping.

C. Hydroflush piping utilizing full length of jet hose. Thoroughly flush all piping for 30 minutes after completion of hydro-flushing. Piping shall be clean.

D. Field verify existing piping layout prior to commencement of cleaning operations.

E. Field verify the existing piping materials prior to cleaning. Should pipe be any material other than cast iron or PVC, do not proceed. Notify the Architect and Owner's Representative.

F. All hydro-flushing shall be performed against the direction of flow of the waste water, unless otherwise noted.

G. The video camera used for inspection shall be designed and constructed for sewer inspection and shall be sufficient to allow a clear, visible picture. It shall consist of, but not be limited to, camera, video display, digital recording equipment and all accessories required to complete the work.

H. After completion of hydroflushing, furnish all labor, materials and equipment necessary to provide a video inspection and record of all hydroflushed piping.

I. Provide a digital video copy accompanied with a written report and drawings locating all sources of infiltration, blockages and obstructions, broken pipe, collapsed pipe, misalignments, low points (bellies) and unusual conditions observed. The digital video copy and report shall be cross-referenced. Provide a copy of each to the Architect and Owner's Representative.

1.9 VISITING SITE:

A. Visit site and become familiar with location and various conditions affecting work. No additional allowance will be granted because of lack of knowledge of such conditions.

1.10 MATERIALS:

A. Unless otherwise noted, provide new, standard, first grade materials throughout. **Unless otherwise noted, all pipe, fittings and valves shall be made in the United States of America.**

B. Where materials or products are specified by manufacturer's name, brand, trade name, or catalog reference, such named materials or products shall be the basis of the estimate, without substitution, and shall be furnished under the contract unless requests for equivalents are approved as noted below. Where two or more brands are named the choice of these shall be optional with the Contractor.

C. Equivalents will be considered only if written request for approval has been received by the Architect (from a general contract bidder) 10 days prior to the date established for receipt of Proposals. Each request shall include the name of the material or equipment for which an equivalent is proposed and a complete description of the proposed equivalent including drawings, cuts, performance and test data, and deviation from the specification and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the equivalent may require shall be included. The burden of proof of the merit of the proposed equivalent is upon the proposer. The Architect's decision of approval or disapproval of a proposed equivalent is final.

D. If the Architect approves any proposed equivalent prior to receipt of Proposals, approval will be set forth in an Addendum. **DO NOT RELY UPON APPROVALS MADE IN ANY OTHER MANNER.**

E. No proposed equivalent will be considered after the Contract has been executed, except as described in the General Conditions.

F. Within 45 days of execution of contract and before ordering materials or equipment, submit to Architect and obtain his approval of a detailed list showing each item which is to be furnished by make, trade name, catalog number, or the like; together with manufacturer's specifications, certified prints, and other data sufficient for making comparisons with items specified. When approved, such schedule shall be of equal force with these specifications in that no variation there from shall be allowed except with Architect's written approval. Submit PDF format files for approval. Provide PDF files of approved data for project close-out.

G. All pressure vessels shall be constructed and tested in accordance with applicable ASME codes and shall bear ASME stamps. Certificates of inspection and approval shall be submitted to Architect.

H. Similar items of equipment shall be the product of the same manufacturer.

1.11 COORDINATION SHOP DRAWINGS:

A. ***Coordination shop drawings (one set of mylar or paper sepias) will be required of the following areas, drawn to a scale not smaller than 1/4" = 1'-0":

B. Start drawings with HVAC shop drawings.

C. Engineers' CAD/electronic drawings files will be available upon request for the convenience of the contractor and for use in preparation of shop drawings. A service fee of $100.00 per drawing sheet file shall be remitted to the Engineer prior to delivery of CAD/electronic drawing files along with a signed agreement between the Engineer and Contractor.

D. Next, the Plumbing Contractor shall add all piping and plumbing to the drawings, indicating all equipment and piping. Indicate elevations of all piping. Draw sections as required to clarify congested situations.

E. Next, the Fire Protection Contractor shall add all sprinkler heads and fire protection piping.

F. Next, the Electrical Contractor shall add all electrical fixtures, conduit and equipment.

G. Next, the drawings shall be submitted to the General Contractor for final coordination.

H. Finally, after the General Contractor has approved the drawings they shall be submitted to the Architect for his review and comments.

1.12 RECORD DRAWINGS:

A. When work starts the Architect will furnish two complete sets of white prints of the Plumbing Drawings. All corrections, variations, and deviations, including those required by change orders, if any, must be recorded in colored ink or colored pencil at the end of each working day on these drawings. The marked prints shall be available at all times for the Architect's inspection.

B. Prior to examining the request for final payment or making any response thereto, the Architect shall receive from the Contractor one complete set of the white prints, marked as stated above, indicating the actual completed installation of the work included under this contract.

1. Accurately show location, size and elevation of new exterior utility work and its relationship to any existing utilities, obstructions, etc., contiguous to the area of work.

2. Block out areas modified by change-order & identify them by change-order number.

3. The Architect will forward the marked white prints to the Consulting Engineers for review. They will then be returned by the Architect to the Contractor for use in preparing record drawings.

C. When work is completed, the Engineers' CAD/electronic drawing files will be made available upon request for the convenience to the contractor for a service fee of $100.00 per CAD/electronic drawing sheet file and for use in preparing record drawings. Contractor shall transfer the information from the marked white prints to the CAD files, removing all superseded data in order to show the actual completed conditions.

1.13 PROTECTION OF ROTATING PARTS:

A. For this paragraph only, "exposed" shall mean located in a casing or room or plenum with door large enough to admit a man.

B. Equip exposed belt drives with belt guards with holes for measuring speeds of driven shafts.

C. Provide exposed couplings with coupling guards.

1.14 PROTECTION OF EQUIPMENT:

A. During construction, protect Plumbing equipment from damage or deterioration.

B. When installation is complete, clean equipment and make ready for painting.

1.15 INSTALLATION OF EQUIPMENT:

A. Install equipment to provide normal service access to all components.

B. Where drawings show sufficient space for removing components, install equipment to provide such clearance. **Provide space at all equipment power and control panels as required by local codes.**

C. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with contract documents, obtain Architect's decision before proceeding.

D. All equipment shall be firmly fastened in place:

1. Pad mounted equipment shall be secured to pads using poured in place anchor bolts or cinch anchors.

2. Vibration isolators shall be secured to floors or pads and equipment shall be bolted to the isolators.

1.16 EQUIPMENT SUPPORTS:

A. Provide supports for piping and equipment. Hot dip galvanize after fabrication all grillage, supports, etc., located outdoors. Prime coat and paint all grillage, supports, etc. located indoors. Where noted provide 304 stainless steel supports. At the Contractor's option, all grillage, supports, etc. located outdoors may be 304 stainless steel instead of hot dip galvanized.

B. Set floor mounted equipment on concrete pads or platforms (as indicated) of height shown, but not less than 3 1/2" high. Chamfer pads 1". Extend pad 6" beyond equipment in all directions. Provide pads as follows:

1. Water heaters: 6" high, No. 4 rebar 12" o.c. both ways.

1.17 CUTTING AND PATCHING AND INCIDENTAL WORK:

A. Set sleeves and inserts and lay out and form openings in walls, beams, girders and structural floors in this Section.

B. Cut, patch and repair as required to accomplish Plumbing Work and finish to match adjacent work. Architect's approval required before cutting any part where strength or appearance of finished work is involved.

C. Where by necessity of installation, piping will conflict with concrete structure, the structural engineer shall be contacted first. No holes shall be cored, nor any tee's penetrated without the review and consent of the structural engineer first.

1.18 FLASHING:

A. General: Furnish all pitch cups, metal base flashing and counter flashing required for Plumbing Work. Installation of above items is specified in Roofing Section.

B. Pitch Cups: 20 gauge galvanized steel, at least 8" deep, bases mitered and soldered and extending at least 4" horizontally.

C. Metal Base Flashing: Galvanized steel for ferrous items, and stainless steel for stainless steel items. Minimum thickness 22 gauge (0.034") galvanized steel, 20 gauge (0.038") stainless steel, 0.032" aluminum. Bases mitered and soldered extending out at least 4" horizontally and 8" vertically.

D. Metal Counter Flashing: Of material and gauges specified for base flashing, lapping base flashing at least 3".

E. Vent Pipe and Roof Drain Flashing: Specified in "Roofing Section".

F. Shower pans specified in another section. Securely clamp drain to pan under this section.

1.19 EXCAVATION & BACKFILLING:

A. Include all excavation and backfilling required to bring the work to line and grade shown, including excavation of rock and all other materials which may be encountered.

B. Excavate trenches wide enough for proper installation of work. Grade trench bottoms evenly. Provide bell holes as necessary to ensure uniform bearing for pipes. Excavate minimum 6" below pipe. Refill cuts below required pipe grade with sand or compacted gravel. Support pipe continuously along its entire length. (Do not use piers to support piping.)

C. Backfill after inspection by Architect and authorities having jurisdiction. Backfill compacted areas (engineered fill) with sand or fine gravel (89/10) in accordance with requirements of "Sitework" no less than 95% compactancy. Backfill paved areas with sand or fine gravel (89/10) compacted to meet requirements of Paving Section. Backfill shall be free of rock, wood, steel, brick, etc. Do not disturb pipe. Restore or repair pavements and the like after backfilling, matching adjacent work.

D. Resod grassed areas and replace bushes, etc.

1.20 REMOVAL OF EXISTING WORK:

A. Dismantle the following items and remove them from the premises. Upon removal they shall become the Contractor's property:

1. All plumbing fixtures, equipment, and piping shown “to be removed”.

1.21 CONNECTIONS TO EXISTING SYSTEMS:

A. Make connections to existing systems only at time authorized, in writing, by Owner.

B. Take existing systems and/or equipment out of service only at times authorized in writing by Owner.

C. Drain existing systems and fill, vent, and put existing systems into operation after connections have been made.

D. Repair existing insulation at points of connection to existing work.

1.22 MOTORS, STARTERS & ELECTRICAL EQUIPMENT:

A. Provide electrical equipment compatible with the current shown on electrical drawings. Verify current characteristics before ordering equipment.

B. Should the Contractor with the Architect's approval make changes in electrical equipment from that shown on the Electrical Drawings, the Contractor shall be responsible for the cost of required changes.

C. Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.

D. Motors: 1750 RPM open drip proof construction unless otherwise shown or specified. Integral horsepower motors shall be of energy efficient design with apparent efficiency (power factor x efficiency) not less than 75%, Allis Chalmers, General Electric, Goulds, Louis Allis, Westinghouse.

E. Where motors are shown or scheduled to be connected to a variable frequency drive, this motor shall be an inverter duty rated by the motor manufacturer and shall comply with NEMA MG1, Article 31.

F. Where shown on Electrical Drawings, furnish increment wound motors for 2 step starting.

G. Do not run motors until correct overload elements are installed in starters. Trading overload elements for elements of correct size for motors actually furnished shall be included in this Section.

H. Provide H O A switches, fused control circuit transformers, auxiliary contacts, etc., as shown on control diagrams or required by control sequences (and/or arrange for these items to be furnished with the starters specified in Division 26, Electrical Work.)

I. All starters shall be the product of the same manufacturer.

J. All control panels, electrical assemblies, etc. must bear a label from a recognized testing laboratory as an assembly, not as individual components.

1.23 SLEEVES:

A. For pipe through floors inside fire rated chases or through non fire rated walls: 20 gauge galvanized steel, 1" larger than pipe or pipe covering.

B. For pipe through concrete beams: schedule 40 black steel pipe, 1" larger than pipe or pipe covering.

C. For pipe passing through floors outside fire rated chases and fire rated wall and partitions, provide 20 gauge steel sleeve leaving the annular space between pipe or pipe covering as required by UL systems. Where pipe is insulated, insulation shall be continuous thru sleeve. Refer to Section Through-Penetrations Firestop Systems where included in the contract documents, Otherwise, seal between sleeve and pipe or pipe covering with 3M Brand Fire Barrier CP 25WB caulk, Flamestop V, Specified Technologies, Inc. "Spec Seal Sealant", Rectorseal Corp. Metacaulk 950 or Hilti FSONE bearing UL listing for actual conditions of installation, thickness and application in strict accord with UL reference for each type installation. Any equivalents must meet the 10 day prior approval provision and must show UL approval for all conditions, bare pipe, insulated pipe, etc. For plastic piping material submittal must show UL approval for each application and if caulk comes in direct contact with pipe, it must be compatible and not injurious to the pipe.

D. Set sleeves before concrete is poured or masonry is erected. In existing construction, grout sleeves firmly in place.

E. Extend floor sleeves 1 1/2" above finish floor in areas where floor is subject to being wet during normal usage (Plumbing rooms, toilets, etc.).

F. Where exposed pipes pass through walls and partitions in finished spaces, provide chrome plated F & C plates or escutcheons.

1.24 PAINTING:

A. Refinish equipment damaged during construction to new condition.

B. Paint all non potable water pipe and insulation yellow in accordance with Plumbing Code using paint of type specified in Painting Section.

C. Prime and paint all bare, exposed, exterior piping using type specified in Painting Section. Gas piping shall be painted yellow unless otherwise noted.

D. Prime and paint all grillage, supports, etc. located indoors, except where noted to be galvanized.

E. Other painting is specified in Painting Section, Finishes Division.

1.25 PIPE IDENTIFICATION:

A. Identify all piping exposed to view or accessible through removable ceilings or access panels with plastic snap on pipe line markers. Color code markers in accordance with ANSI A13.1. Show pipe contents and direction of flow. (Markers on lines 8" OD and smaller shall be taped in place; on lines over 8" OD secure with spring clips.) Markers shall be equal to Craftmark, Brady, Seton or Brimar.

B. Protect all factory identification tags, nameplates, model and serial numbers, stenciling, etc., during construction and replace if damaged.

C. Label Spacing and Extent:

1. On straight run of pipes: Above suspended ceilings space labels approximately 10 feet on center; elsewhere, 20 feet on center.

2. Wherever a pipe enters or leaves a room or building.

3. At change of direction.

4. At main valves and control valves (not equipment valves).

5. At manifolds.

6. On risers, just above and below floors.

1.26 EQUIPMENT IDENTIFICATION:

A. Provide 2" x 3" or larger laminated plastic nameplates with 1/2" numbers and letters in colors specified below. Screw tags to equipment in obvious locations. Engrave equipment designation and numbers as shown on plans and drawings on upper half of tag, leaving lower half of tag for future engraving by Owner.

B. Provide similar nameplates for motor starters furnished under Division 26.

C. Secure nameplates with acorn head screws.

D. Colors:

1. Equipment connected to utility power only black letters on white nameplates.

2. Equipment connected to emergency power red letters on white nameplates.

1.27 ACCESS DOORS:

A. Furnish and install access doors for valves, fire dampers, dampers, controls, air vents, and other items located above non liftout ceilings or behind partitions or walls. Doors in non fire rated walls and ceilings: 16 gauge steel with hinges and screwdriver latches. Doors in fire rated walls and ceilings: UL labeled with fire rating equal to fire rating of wall or ceiling. Doors in security ceilings to be 10 ga. steel panels, white powder coat, 2” x 2” x 3/16” steel angle frame heavy duty butt hinges with security screws. Provide door styles compatible with adjoining surfaces as selected by Architect. Size doors to permit removal of equipment and/or maintenance. Doors: Bar Co, Nystrom, Williams Bros., or equal.

B. Mark lay in ceilings with colored vinyl self adhering disc stuck on grid adjacent to maintenance access points.

C. Coordinate the location, color and size of all access doors in hard ceilings with the Architect.

1.28 TESTS, CLEANING & ADJUSTMENTS:

A. All tests shall be witnessed by the Architect in addition to authorities having jurisdiction. A minimum of 72 hour notice is required prior to performance of test.

B. After systems have been installed complete, adjust and test systems for proper operation and correct all noise or vibration conditions. Perform all tests as required by local codes. Contractor shall furnish testing equipment. All piping pressure tests shall be hydrostatic tests.

C. If local codes are more stringent than the following, local codes shall govern.

D. Sanitary Systems:

1. Test piping by stopping lower outlets and filling with water to 10' hydrostatic head. Stop leaks and repeat test until watertight. All joints shall be exposed throughout test.

2. Provide "Ball Test" on all piping 3" and larger with ball 1/2" smaller than pipe diameter.

3. The use of compressed air to pressure test the sanitary, waste, vent system that is PVC, ABS or any plastic material is strictly prohibited by the manufacturer and the International Plumbing Code.

E. Domestic water piping: Test by applying pressure (by temporary pump or compressed air connection) to total hydrostatic pressure 1 1/2 times street pressure but not less than 150 psig for not less than 4 hours. Immediately and completely stop all leaks. On completion of roughing in, cap all outlets, make connections with house supply line, and put under full water pressure. After testing, leave general pressure on until ready to install fixture (except when necessary to drain to avoid freezing during construction). After completion of all tests, repairs and installation of fixtures, flush all domestic hot and cold water piping with water to remove sediment and scale and then disinfect. Disinfect piping with hypochlorite solution of chlorine or compressed chlorine gas applied through an approved chlorinator. Operate valves and faucets several times to ensure the chlorine reaches all parts of the system. Feed water and chlorination agent into the system at rates that will provide a residual chlorine content of not less than 50 ppm after a retention period of 6 hours. Upon completion of treatment, flush treated water from each system until the water supply is satisfactory to the public health authority having jurisdiction. Provide Architect a certificate of compliance from the local Health Department as required.

F. Start Up and Service:

1. The Contractor and factory authorized service representative for the air compressors, vacuum pumps, water heaters, domestic booster pump, and variable frequency drives shall place each item of such equipment into satisfactory operation with all automatic and safety devices. Further, all adjustment service required shall be performed during the warranty period.

2. In addition, submit equipment manufacturers' start up reports for items listed above. See Paragraph "Project Close Out", below.

3. The Contractor shall balance all hot water pumps and circuit setters to flow shown on drawings. Balancing shall not be started until 1) Systems have been completed, including leak testing and cleaning and until systems have been refilled, pumps are rotating correctly, and strainers have been cleaned and baskets used for the ultimate installation have been installed, and 2) Expansion tanks have been installed and correct system pressure is being maintained, and system has been vented and is free from air.

a. Adjust circuit setters to meet design GPM requirements. Measure and record GPM.

b. Produce a report documenting the measured flows and submit three (3) copies of the report to the Architect.

1.29 WARRANTY & INSTRUCTIONS:

A. See General Conditions One Year Warranty.

B. Contractor shall and hereby does warrant all materials, workmanship and equipment furnished and installed by him to be free from defects for a period of one year after date of substantial completion of the Contract. Should any defects in material, workmanship, or equipment be made known to Contractor within the one year warranty period, Contractor shall replace such materials, workmanship, or equipment without charge.

C. Provide PDF of manufacturer's operating and maintenance manuals and parts lists for all equipment and materials furnished. Provide a maintenance schedule listing routine maintenance operations and suggested frequency thereof. Include all warranty dates on equipment and guarantees.

D. During the period of tests, adjust all controls, regulators, etc., to comply with these Specifications.

E. Make available to the Owner, without additional cost, service and adjustment of the equipment for the guarantee period.

1.30 PROJECT CLOSE OUT:

A. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:

1. Record drawings – plumbing: PDF files and CAD files.
2. Equipment Submittal Data PDF files.
3. Equipment operating and maintenance manuals PDF files.
4. Maintenance schedule.
5. Equipment warranty dates and guarantees.
6. Pressure vessel certificates.
7. Circulating hot water balance report.
8. Certificate of disinfection of domestic water lines as required by local authority.
9. List of Owner's Personnel who have received maintenance instructions.
10. Install valve charts in Mechanical Rooms.
11. Submit factory start-up reports for:
    a. Water heaters
12. Include with insulation material submittal letters from the insulation material manufacturer certifying that the insulation material does not contain asbestos in any shape, form or quantity.

1.31 TRAINING OF OWNER PERSONNEL:

A. The General Contractor shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed.

B. The Engineer shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.

1. The Plumbing Engineer shall determine the special needs and areas where training will be most valuable. The Owner and Engineer shall decide how rigorous the training should be for each piece of commissioned equipment. The Plumbing Engineer shall communicate the results to the Subs and vendors who have training responsibilities.

2. Each Sub and vendor responsible for training shall submit a written training plan to the Plumbing Engineer for review and approval prior to training. The plan will cover the following elements:

   a. Equipment (included in training)

   b. Intended audience

   c. Location of training

   d. Objectives

   e. Subjects covered (description, duration of discussion, special methods, etc.)

   f. Duration of training on each subject

   g. Instructor for each subject

   h. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)

   i. Instructor and qualifications

3. The General Contractor shall develop an overall training plan and shall coordinate and schedule, with the Subcontractors and other consultants, the overall training for the commissioned systems. The Engineer will recommend approval of the training to the Owner upon satisfactory completion using a standard approval form. The Owner and Contractors sign the approval form.

4. Video taping of the training sessions will be provided at the Owners request.

C. Plumbing Contractor. The Plumbing Contractor shall have the following training responsibilities:

1. Provide the Plumbing Engineer and Owner with a training plan two weeks before the planned training.

2. Provide designated Owner personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of equipment.

3. Training shall normally start with classroom sessions followed by hands-on training on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, power failure, etc.

4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.

5. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing contractor or manufacturer's representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment are required. More than one party may be required to execute the training.

6. The training sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.

7. Training shall include:

   a. Use of the printed installation, operation and maintenance instruction material included in the O&M manuals.

   b. A review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include start-up, operation in all modes possible, shut-down, seasonal changeover and any emergency procedures.

   c. Discussion of relevant health and safety issues and concerns.

   d. Discussion of warranties and guarantees.

   e. Common troubleshooting problems and solutions.

   f. Explanatory information included in the O&M manuals and the location of all plans and manuals in the facility.

   g. Discussion of any peculiarities of equipment installation or operation.

   h. Classroom sessions shall include the use of overhead projections, slides, video/audio-taped material as might be appropriate.

8. Hands-on training shall include start-up, operation in all modes possible, including manual, start-up shut-down and any emergency procedures and preventative maintenance for all pieces of equipment.

9. The Plumbing contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls.

10. Training shall occur after functional testing is complete, unless approved otherwise by the Owner.

11. Minimum Duration of Training. The Plumbing contractor shall provide training on each piece of equipment according to the following schedule.

Hours	**System**
4	**Water Heaters**

END OF SECTION

SECTION 22 1000

MATERIALS AND METHODS – PLUMBING

PART 1 - GENERAL

1.1 SCOPE:

A. Section 22 0500 - "General Provisions - Plumbing" shall apply to and become part of this Section.

PART 2 - MATERIALS: (Unless otherwise noted, all pipe, fittings and valves shall be manufactured in the United States of America)

NOTE: All materials used in systems that may be used for potable water shall meet the Reduction of Lead in Drinking Water Act.

2.1 SANITARY, WASTE, AND VENT PIPING:

A. Piping below slab (all sizes):

1. PVC-DWV, solid wall, Schedule 40 with solvent welded joints.

B. Piping below slab (high temperature wastes, 120 deg F or higher)

1. Cast iron service weight, hub and spigot, epoxy lined, with compression gaskets

C. Piping above slab (all sizes), branches, mains and stacks:

1. Cast iron service weight, hubless with heavy-duty couplings.

D. Piping connections between equipment and branches, mains and stacks:

1. No hub cast iron with heavy duty shielded couplings
2. DWV Copper with low lead solder joints
3. PVC DWV, solid wall, schedule 40, with solvent welded joints (below grade only).

E. Equipment drain piping, terminating indirectly:

1. Pipe sizes up to NPS 1: Type M copper with low lead solder joints
2. Pipe sizes NPS 1-1/4 and larger: DWV Copper with low lead solder joints
3. High Temperature (above 120^{o}F): schedule 10 stainless steel

F. The use of Foam Core / Cellular Core PVC is strictly prohibited.

G. Cast iron: hub-and-spigot soil pipe: tar coated with cast iron fittings of corresponding weight. Service weight, ASTM Specification A 74.

H. DWV copper pipe: copper drainage tube DWV meeting ASTM B 306 with cast bronze solder joint drainage fittings, ANSI B-16-23.

I. Type M copper: ASTM B-88, hard temper, wrought copper fittings, long radius, ANSI B16.18 or B16.22, for pipe sizes 1" and smaller.

J. PVC-DWV plastic pipe: PVC-DWV, ASTM D-2665 shall not be used in ceiling plenum return. Solid core only permitted. Cell core not allowed. Provide PVC to cast iron adaptors below slab on grade for caulking or compression joint. No hub bands are not allowed. As an alternative provide coupling equal to Mission Heavyweight at the finish floor.

K. Joints for cast iron piping: compression gasket especially made for cast iron soil pipe, ASTM FC-564-85.

L. Joints for no-hub cast iron piping: no-hub neoprene gasket and stainless steel coupling CISPI Standard 310 & ASTM C1277. Bands shall be 4-band heavy-weight equal to Husky. No hub bands are not allowed below slab on grade.

M. Joints in galvanized pipe: screwed with Teflon tape applied to male threads.

N. Joints in ductile iron pipe: push on joints applied as directed by manufacturer meeting ANSI/AWWA C111/A21.11 requirements.

O. Joints for PVC-DWV plastic pipe: solvent welded cement, ASTM D-2564, made in accord with ASTM D-2855. Provide cast iron to PVC adaptors, for caulking or compression joint when connecting to a cast iron drain or when converting from cast iron to PVC.

P. Install vent stacks through roof. Terminate 6" above finish roof or according to local code. Flashing is specified under Roofing Section.

Q. Connect to existing sanitary piping. Verify exact location and invert prior to installing any pipe.

2.2 DOMESTIC WATER PIPING:

A. Piping above slab:

1. NPS 3" and smaller: Type L copper tube.

B. Copper tube, ASTM B 88, copper water tube, type "L" hard temper inside building, type "K" outside building. Fittings: wrought copper water tube fittings, ANSI B 16.18 or B 16.22.

C. Joints for copper tube: soldered as recommended by manufacturer, using 95-5 solder. Lead free solder, flux, etc. is required. For pipe 2" and smaller. For pipe size 2-1/2" and larger use BCuP Brazing. Mechanically formed tee fitting, as created by T-Drill, is an acceptable method of installation. All joints created in this manner shall be brazed in compliance with code and in accordance with manufacturer's recommendation. Soft solder joints are prohibited. Installation shall be performed by certified T-Drill crafts people.

D. Provide temporary construction water at site as required.

2.3 PLUMBING VALVES:

A. Supply water piping valves as specified. All valves shall meet the Reduction of Lead in Drinking Water Act.

1. Gate valves 2" and smaller: All bronze, 125 psig WSP, solid wedge, Nibco S-113-LF, Milwaukee, or Watts.

2. Gate valves 2-1/2" and larger: Iron body, bronze trim, 200 psi WOG/125 psi WSP, wedge disc, Nibco F-619-RW, Milwaukee, or Watts.

3. Ball valves: (2" and smaller) all bronze, 600 psig WOG, 150 psig WSP, stainless ball and stem, full port, Teflon seats, stem packing seal and thrust washer. Nibco T585-66-LF or S-585-66-LF, Watts, Apollo, Milwaukee or Josam. Provide extension stem capable of clearing 2" insulation, with memory stop, when operated will not disturb vapor seal of insulation.

4. Ball valves: (2-1/2" thru 6") Watts G-4000, Conbraco IBV-125, Josam, or Kitz 90 cast- iron flanged valve, stainless steel stem and ball, full port.

5. Butterfly Valves 2-1/2" and larger: Butterfly shall have a ductile iron body with EPDM seal and aluminum bronze disc. The butterfly valve shall meet MSS SP-67, type I standard. The butterfly valve shall have a CWP rating of 1380 kPa (200 psig). The valve design shall be lug type suitable for bidirectional dead-end service at rated pressure with downstream flange removed. The body material shall meet ASTM A 536, ductile iron. Nibco LD2000 or equal by Watts or Bray.

6. Check valves 2" and smaller: All bronze, 125 psig WSP, swing check, Nibco S-413-Y-LF, Milwaukee or Watts.

7. Check valves 2 1/2" and larger: Iron body, bronze trim, swing check, 125 psig WSP, Kitz 78, Nibco F-918-B, Milwaukee F-2974-A Domestic or Watts F-511.

8. Water pressure reducing valves: For low flow Watts LFU5B; higher capacity Watts Series LF115, or Wilkins, Conbraco or Cash Acme, complete with inlet strainer, unions and inlet and outlet pressure gauges.

9. Thermostatic Balancing Valves: Self-actuating type for domestic hot-water recirculation service, with stainless-steel body and internal components, integral union and check valve, fixed factory set point selected to maintain the return-water temperature 5°F below the design hot-water supply temperature, and no external power requirement. ThermOmegaTech CircuitSolver CSUA or equal.

10. Flow Splitter: Lead free brass, female NPT connections with quarter-turn ball valves, maximum operating temperature of 194˚F, Kemper #651 Series.

2.4 PIPE HANGERS:

A. General: Pipe hangers, Anvil, PHD, Michigan Hanger, B-Line or Elcen. Anvil figure numbers are given for reference. Provide copper clad or plastic coated hangers on bare copper lines.

B. Equip pipe hangers with vibration isolators as specified under Vibration Isolators.

C. Pipe hangers for lines 3" and smaller: adjustable wrought ring hangers, Anvil Fig. 97 or 69 or wrought clevis hangers.

D. Pipe hangers for piping 4" and larger: adjustable wrought clevis hangers.

E. Parallel piping graded in same direction may be grouped on trapezes. Trapezes for line 4" and smaller, Unistrut P2000 channel, or equal, with rods sized as specified below for largest pipe on trapeze. Guide lines on (but not anchor to) trapezes using Unistrut Series P1100 clamps. Trapezes shall not exceed 3' in length. Space lines to allow at least 3" clear between adjacent pipe or pipe covering and between pipes or pipe covering and rods. Space trapezes as specified for pipe hangers based upon smallest size of pipe on trapeze.

F. Provide riser clamps on pipe risers on each floor. Clamps in contact with copper or plastic pipe, plastic coated.

G. Beam Clamps: Anvil Fig. 228.

H. Inserts for hangers in concrete structures: Underwriter's listed cast iron inserts. Anvil Fig. 282.

I. For fasteners in existing concrete structures use drilled in expansion anchors with load rating at least 150% of pipe hanger rating (powder driven anchors are not acceptable).

J. Size rods for pipe hangers not smaller than the following: 3/8" rods for pipe up to 2", 1/2" for 2-1/2" and 3" pipe, 5/8" rods for 4" and 5" pipe, 3/4" rods for 6" pipe, and 7/8" rods for 8", 10" and 12" pipe, 1" rods for 14" and 16" pipe and 1-1/8" rods for 18" pipe.

K. Support plumbing water, medical gas and vacuum piping within stud partitions with brackets as manufactured by P&M Bracket Company, Sumner Products, B-Line Ruff-in or Holdrite. Wire is expressly prohibited. Support horizontal plumbing soil and waste piping within stud partitions with Unistrut anchored to floor. Provide fire treated wood backing where required to anchor fixtures and brass securely.

L. Space pipe hangers at maximum: 5' intervals for cast iron pipe. Pipe hanger spacing for screwed, solder joint and welded piping: 1/2" and 3/4", 6 ft.; 1" to 1-1/4", 8 ft.; 1-1/2" to 2-1/2", 10 ft.; 3” and over, 12 ft. Install additional hangers at change of direction and valve clusters.

M. Install pipe hangers on insulated pipe over pipe covering. Provide factory fabricated insulated pipe shields equal to Pipe Shields, Inc. "Thermal Hanger Shields" or Tru-Balance insulated saddles at hangers. Provide shield insulation of rigid calcium silicate indoors or rigid Perlite Silicate outdoors, the same thickness as adjacent pipe covering. (At Contractor's option, pipe shields may be field fabricated using rigid calcium silicate or foamglass insulation with ASJ and 20 gauge galvanized steel protector. Shield length: 1.5 times nominal pipe size but not less than 4".)

2.5 THERMOMETERS AND GAUGES:

A. Non-mercury in glass blue reading separable socket industrial thermometers with die cast aluminum or high impact plastic casings of appropriate pattern for each installation, 9” scale lengths and ranges shown, Palmer, Trerice or Weksler. Install thermometers in brass or stainless steel wells. Equip thermometers installed in insulated lines with 1” extension stems or stems long enough to permit unions to clear insulation whichever is greater.

B. Where shown install brass thermometer wells with screwed caps. Install wells at an angle to retain oil. Size well to fit thermometers specified.

C. Enlarge pipe 2" and smaller to 2-1/2" at thermometers and thermometer wells.

D. Install 4-1/2" dial pressure gauges where shown. Gauges shall have bronze or stainless steel bourdon tubes, 316 stainless steel movement, aluminum or polypropylene solid front cases, adjustable micrometer pointer and accuracy Grade 2A not less than 1/2% of full scale over the entire range, without mounting flange. Gauges shall be Ashcroft 1279, Marsh Series P01, Trerice 450-B, Weksler AA44-2 or U.S. Gauge 1980L with minimum bourdon tube diameter of 3". Provide ball valves for all pressure gauges. Provide siphons for steam gauges.

E. Where shown, provide temperature and pressure measurement plugs and caps equal to Peterson Equipment Co., Inc. "Pete's plug with Nordel seats and seals". Provide one Pressure and Temperature Kit consisting of a 0-100 psi pressure gauge with adaptors, and two thermometers (25-125°F and 0-220°F), all in carrying cases. Provide nipples for Pete's plugs as required to extend through pipe insulation.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION:

A. Cut pipe square and ream full size after cutting. Clean pipe. Make threaded joints with Teflon tape. Do not spring pipe into place.

B. Slope Sanitary Drain Lines:

1. 3" and larger: minimum 1/8" per 1'.

2. Less than 3": minimum 1/4" per 1'.

C. For glycol solutions, joints on black steel screwed pipe made up with thread sealant compatible with glycol; Rectorseal No. 7, or equal.

D. Provide welding material and labor in accordance with the welding procedures of the Heating, Piping, and Air Conditioning Contractors' National Association or other approved procedure conforming to the requirements of ANSI B31.9 "Building Service Piping". Employ only welders fully qualified in the above specified procedure and currently certified by recognized testing authority. Use either electric arc or oxyacetylene welding. Provide full perimeter welds at both face end and collar end of each slip-on flange.

E. Install piping to allow for expansion. Make connections to plumbing fixtures and all equipment to eliminate undue strains in piping and equipment. Furnish necessary fittings and bends to avoid springing of pipes during assembly.

F. Install chrome plated floor and ceiling plates on pipe passing through finished surfaces in finished spaces.

G. Make horizontal water line size reductions using eccentric reducers (tops flat).

H. Install 3/4" ball valve drains with hose adaptors at low points of water piping and at bases of all risers (where shown provide larger drains). Provide screwed caps with chains on hose adaptors.

I. Make connections to equipment using screwed unions in sizes 2" and smaller and flanged unions in sizes 2-1/2" and larger. Install unions in all piping connections to each piece of equipment. Provide unions on all sides of control valves.

J. Wherever ferrous pipes or tanks and copper tubing connect, provide dielectric insulating unions or couplings, equal to Victaulic style 47, "V-line" insulating couplings as manufactured by Lochinvar, thread to thread or CTS fabrication flange adaptors for flange connections.

K. Near heating and air conditioning equipment requiring water provide valved and capped water outlets of sizes shown for connection to equipment, including reduced pressure principal backflow preventers. Make final connections under HVAC work. ***Note that all piping and insulation downstream from backflow preventer must be painted purple.***

L. Run piping concealed, except where specifically shown or specified to be exposed. Plumb all vertical lines and run mains parallel to building walls unless specifically shown otherwise.

M. Lay underground pressure piping so top of pipe is at least 18" below finished grade. Support all underground piping solidly along body of pipe. Strongly suspend other piping from building construction.

N. Pipe shall be braced at flexible connections to prevent blowouts under operating conditions.

O. Lay out and grade all gas piping so as to have a minimum of trapped lines. Where trapping of pipe is unavoidable, provide 4" to 6" scale pocket at low point, with removable cap fitting accessible for cleaning out pocket. Install 175 psig WP bronze cock and union at all connections to gas-fired equipment.

P. Install no gas piping beneath interior slabs on grade. Where gas piping must be installed below slab on grade, pipe must be encased in steel pipe sealed and vented to exterior as shown on detail.

Q. Run no piping or tubing in direct contact with slag fill. Where necessary to pass through slag, protect piping with not less than two wrappings of polyvinyl chloride tape or equivalent protection approved by Architect.

R. Provide water hammer arrestors equal to Wilkins WH2950XL. Refer to drawings for location and P.D.I. size. Shock arrestors are required on all equipment with solenoid shutoff valves such as washing machines and dishwashers whether shown or not. Select WH2950XL for use with fixtures which may supply drinking water. Equal by Josam, J.R. Smith, Wade, or Sioux Chief is acceptable.

S. All water piping shall be installed within the heated envelope of the building, or otherwise protected from freezing.

3.2 INSTALLATION OF VALVES:

A. Provide shut-off valves in supply and return connections to each item of equipment. Locate valves to isolate each item to facilitate maintenance and/or removal.

B. Provide check valve in discharge line adjacent to each pump.

C. Locate valves in piping connections to heat exchangers, water heaters, etc., so heads and tube bundles can be removed without disconnecting equipment or piping other than union or flange connections immediately adjacent to the equipment.

D. Provide sweat to screw adaptors where required.

E. Install with valve stems upright or horizontal. Ensure clearances are met for full operability.

END OF SECTION

SECTION 22 1500

THERMAL AND ACOUSTICAL INSULATION FOR PLUMBING SYSTEMS

PART 1 - GENERAL

1.0 GENERAL:

A. All insulation shall be installed by an insulation contractor in business a minimum of 3 years as an insulation contractor and has completed projects similar in scope to this project.

1.1 SCOPE:

A. Section 22 0500 - “General Provisions – Plumbing” shall apply to and become part of this Section.

B. Repair existing insulation at points of connection and/or alterations to existing work.

C. “Exposed” is defined as: Exposed to view when construction is complete. (Items which are not “exposed” are considered “concealed”.)

D. The use of any material containing asbestos is strictly prohibited.

E. Include with insulation material submittal letters from the insulation material manufacturer certifying that the insulation material does not contain asbestos in any shape, form or quantity.

1.2 INSULATION:

A. Comply with NFPA 90A.

B. Pipe hanger shields are specified in Section 22 1000 - “Materials and Methods - Plumbing.”

C. Use insulation and adhesives with Underwriter's Laboratories and ASTM E-84 flame spread rating not over 25 without evidence of continued progressive combustion, and smoke developed rating not exceeding:

1. 50 for pipe covering located in air ducts, plenum or casings.

2. 150 for all other pipe and equipment insulation.

PART 2 - MATERIALS

2.1 FIBERGLASS PIPE COVERING:

A. Snap-on glass fiber insulation minimum density 5#/cu. ft. maximum thermal conductivity at 75°F mean temperature 0.25 BTU/(hr)(sq. ft.)(°F/in) with UL rated vinyl coated and embossed vapor barrier laminate of aluminum foil and kraft reinforced with glass fiber yarns (ASJ). For domestic hot water circulating system, thermal conductivity shall be 0.27 BTU/(h)(sq.ft.)(°F/in.) at 75°F mean temperature.

B. For all lines seal jacket with self sealing lap. Butt adjoining sections of insulation tightly and seal with self-adhering butt joint strips.

C. Cover fittings to thickness of adjacent covering with factory pre-molded fitting covers. Cover flanged valve bodies and flanged unions. Do not cover screwed unions on hot lines. Finish concealed fittings with a skim-coat of mastic and when mastic is dry, fitting shall be covered with glass fab and vinyl acrylic mastic unless otherwise noted below. Zeston type fitting covers may be substituted for glass fab and final coat of mastic on concealed fittings provided fire and smoke ratings are met. Finish fittings exposed in equipment rooms, boiler room, and in finished spaces with vinyl acrylic mastic over glass fab over mastic.

D. At contractor's option, concealed tees may be insulated with field fabricated tee covers consisting of straight pipe covering on run of tee with notch at branch together with pipe covering on branch contoured to fit notch. Glass fab over skim coat of mastic shall be applied around main, lapping contoured joint at branch by 2" minimum for the full 360° of joint. Cover entire fitting covering with vinyl-acrylic mastic over glass fab, 1/8" thick (dry) coat. Submit sample of fabricated tee covering to Architect for approval before work is begun.

2.2 CELLULAR GLASS PIPE COVERING, RIGID:

A. Cellular glass insulation having a maximum K factor at 50°F mean temperature not exceeding 0.28, and a compressive strength not less than 87#/sq. in., Pittsburgh Corning “Foamglas”.

B. Apply pipe covering in a single layer. Tightly butt and butter all joints and seams with vapor barrier mastic. Finish with a UL rated vapor barrier laminate of aluminum foil and Kraft reinforced with fiberglass yarn. Seal all laps and butt strips with suitable adhesive and cover with coat of vinyl acrylic mastic.

C. Insulate fittings with prefabricated or field fabricated fitting covers of the same material, buttered with mastic, securely held in place with stainless or copper wire with twisted ends turned in or fiberglass packing tape. Finish with glass fab over vinyl acrylic mastic with flooding coat of mastic applied over fabric.

D. Fit pipe hangers over insulation (See PIPE HANGERS). Hanger Shields are specified under pipe hangers.

2.3 FLEXIBLE CLOSED-CELL ELASTOMERIC PIPE INSULATION COVERING: (DO NOT USE IN PLENUMS UNLESS COMPLIES WITH PARAGRAPH 1.2 ABOVE):

A. Fire retardant foamed plastic pipe covering, maximum K factor at 75°F mean temperature not exceeding 0.27 BTU/(hr)(sq.ft.)(°F/in).

B. Pipe covering may be seamless insulation slipped over piping before erection or may be slit longitudinally and installed over erected piping.

C. Make fitting covers from segments of pipe covering.

D. Cement all joints and seams in accordance with manufacturer's instruction.

E. Fit pipe hangers over insulation (see PIPE HANGERS). Use hanger shields as specified under pipe hangers.

F. Where exposed outside, cover insulation with aluminum jacket.

G. Armacell, Aeroflex or Normaco.

PART 3 - INSTALLATION

3.1 PLUMBING PIPING:

A. Bodies of floor drains and floor sinks serving refrigeration equipment, AC units and ice machines and traps and waste piping between such drains and waste stack: “Foamed plastic pipe covering”, 1" thick.

B. Cold water piping, interior, above grade: “Fiberglass Pipe Covering”.

C. Hot water piping, interior, above grade: “Fiberglass pipe covering”.

END OF SECTION

SECTION 22 2000

PLUMBING FIXTURES AND EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE:

A. Section 22 0500 - "General Provisions - Plumbing" and Section 22 1000 - "Materials and Methods - Plumbing" shall apply to and become part of this Section.

PART 2 - PRODUCTS

2.1 DRAINS:

A. See **Piping Specialties Connection Schedule – Non-Pressure** schedule on Sheet P6.01.

2.2 TRAP GUARD:

A. See **Plumbing Specialties Connection Schedule – Pressure** schedule on Sheet P6.01.

2.3 WALL HYDRANT:

A. See **Plumbing Specialties Connection Schedule – Pressure** schedule on Sheet P6.01.

2.4 CLEANOUTS:

A. Furnish and install cleanouts where indicated on drawings and at all 90-degree bends, angles, upper terminals and not over 50' apart on straight runs. All cleanouts on cast iron piping to have bronze countersunk rectangular tapered slotted plugs. PVC or acid waste piping cleanouts shall be standard of piping system used. Flush-with-floor cleanout access covers shall have non-skid covers. All wall cleanout access covers shall have polished satin finish. All cleanouts shall be full size of pipe, 8" and less.

B. Exposed Cleanouts: Cast brass plug type, J.R. Smith 4470T.

C. Wall type cleanout plug and access covers, J.R. Smith 4472T. Cleanout plug must be within 1" of finish wall and must be tapped for access cover. On PVC plastic and acid waste pipe in wall: Cleanout access cover J.R. Smith 4710.

D. Floor type cleanout access covers in unfinished areas: J.R. Smith 4239L/LXH-NB. Finished areas: J.R. Smith 4111L/LXH-NB. Plug must be within 3" of finished floor. Provide 4193L/LXH-NB covers where installed in terrazzo floors. Grout cleanout below access cover to seal watertight. Provide option 14 cleanout carpet markers where installed in carpeted floors.

E. Floor type cleanouts for acid waste piping: Orion FCO-NB.

F. **Coordinate the exact location of all cleanouts with the Architect.**

2.5 PLUMBING FIXTURES:

A. Unless otherwise specified, all fixtures complete as catalogued, white color, exposed metal trim chromium plated. Fixtures shall be without discoloration, chips or flaws and shall be free from cracks. Warped or otherwise imperfect fixtures will not be acceptable.

B. Clean all fixtures to a clean and sanitary condition.

C. Fixtures and brass shall be securely anchored. Carriers shall be securely anchored to floor with lag bolts, as recommended by the manufacturer. Single water closet carriers shall include J.R. Smith M-51 rear anchor foot support. Do not conceal until Architect has observed anchors.

D. Flush valve supports equal to Sloan "YJ" shall be installed 1" below vacuum breaker, on all flush valves. Flush valves on A.D.A. water closets must be set so that handle is to the wide side of the stall and handle is no more than 44" above finish floor. Urinal flush valves on A.D.A. urinals shall be no more than 44" above finish floor.

E. Seal wall hung fixtures at wall with white caulk. Seal countertop fixtures with clear silicone sealant. Seal floor mounted fixtures at floor with grout.

F. All fixtures noted to be A.D.A. approved must be set with great care to assure proper mounting height and proper distance from wall. Elevation of flush valves shall be coordinated with grab bars (see Architect). All shower control valves for ADA showers shall be set with centerline 44" above finish floor. Trip levers for tank type water closets shall be installed to the wide side of the stall.

G. All supplies, stops, faucets, etc. on fixtures that could be used for drinking water shall meet the Reduction of Lead in Drinking Water Act.

H. Contractor shall coordinate all sinks and faucets with casework/millwork shop drawings prior to purchase of sink/faucet. In particular, coordinate A.D.A. vs. non-A.D.A. fixtures with casework/millwork. Failure to do so will make contractor liable for incorrect fixtures.

I. See **Plumbing Fixture Connection and Description Schedule** on Sheet P6.01.

2.6 PLUMBING EQUIPMENT:

A. See **plumbing equipment schedules** on Sheet P6.01.

2.7 EQUIVALENT MANUFACTURERS:

A. Where Kohler fixtures are listed above, Zurn, American Standard, or Toto may be utilized.

B. Where Sloan flush valves are listed above, Zurn or Delaney may be utilized.

C. Where Smith is listed above, Josam, Watts, Zurn or Wade may be utilized.

D. Where Elkay water coolers are mentioned above, Halsey Taylor, Sunroc, or Oasis may be utilized.

E. Where B&G is listed above, the equal of Armstrong, Taco, or Thrush may be utilized.

F. Where Elkay sinks are listed above, Just may be utilized.

G. Where Zurn water closet seats are listed above, Church, Beneke, Bemis, Centoco or Olsonite may be utilized.

H. Where Lawler combination pressure balanced and thermostatic mixing valves are listed above, Powers, Symmons, or Leonard may be utilized.

I. Where Weil is listed above, Chicago Pump Co., Enpo or Federal may be utilized.

J. Where T&S Brass is listed above, Chicago Brass, Cambridge or Zurn may be utilized.

K. Where T&S Brass is listed above, Chicago Brass, American Standard, Kohler, Zurn, Cambridge, Delta HDF or Speakman may be utilized provided that manufacturer can furnish all fixture brass specified.

L. Where Delta is listed above, Moen, Symmons or Elkay may be utilized.

M. Where Lochinvar water heaters are listed above, A.O. Smith, State or Bradford White may be utilized.

N. Where Stern Williams is listed above, Fiat, or Zurn may be utilized.

O. Where Zurn is listed above, the equal of McGuire, Watts, Dearborn or Brasscraft may be utilized.

P. Where Navien is listed, Bosch may be utilized.

Q. Where Chronomite is listed, Eemax or Stiebel may be utilized.

R. Where Guardian is listed, Haws or Acorn may be utilized.

S. Where Symmons is listed above, Zurn or Powers may be used.

PART 3 - EXECUTION:

3.1 MANUFACTURER'S INSTRUCTIONS:

A. Install all plumbing equipment and fixtures as recommended by the manufacturer's recommendations.

END OF SECTION

SECTION 23 0500

GENERAL PROVISIONS – HVAC

PART 1 - GENERAL

1.1 SCOPE:

A. Provisions of this Section apply to all Heating, Ventilating, and Air Conditioning (HVAC), Controls, and Test and Balance work.

B. Include the provisions of General Conditions as part of this Section.

C. Provide all labor, materials, equipment, and services necessary for the completion of all HVAC work shown or specified, complete and ready for operation, consisting in general of the following:

1. Two (2) air-cooled chillers, CH-1 & CH-2.
2. Three (3) air handling units, AHU-1, AHU-2 and AHU-3.
3. Three (3) Rooftop air handling units, RTU-1, RTU-2, RTU-3.
4. One (1) Energy recovery unit, ERU-1.
5. Two (2) Electric hot water boilers, B-1 and B-2.
6. Two (2) Secondary chilled water pumps, SCHP-1 and SCHP-2.
7. Two (2) Hot water pumps, HWP-1 and HWP-2.
8. Five (5) Ceiling exhaust fans, EF-1, EF-2, EF-3, EF-4, and EF-6.
9. One (1) In-line exhaust fan, EF-5.
10. Two (2) Split systems, CU-1/AC-1 and CU-2/AC-2.
11. Four (4) Mini-Split Systems.

D. Give required notices, file drawings, obtain and pay for permits, deposits and fees necessary for the installation of the HVAC work. Obtain and pay for inspections required by laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain and pay for certificates of such inspections, and file such certificates with Owner.

E. "Provide" means to furnish and install, complete and ready for operation.

1.2 DRAWINGS:

A. HVAC Drawings are diagrammatic and subject to requirements of Architectural Drawings and conditions existing in the field. HVAC Drawings indicate generally the location of components and are not intended to show all fittings or all details of the work.

B. Follow the drawings closely, coordinate dimensions with Architectural Drawings and field conditions. DO NOT scale HVAC drawings for location of system components.

C. Make no changes without Architect's written permission. In case of doubt, obtain Architect's decision before proceeding with work. Failure to follow this instruction shall make the Contractor liable for damage to other work and responsible for removing and repairing defective or miss-located work in proper manner.

D. DO NOT scale drawings to locate ceiling diffusers. COORDINATE with lighting and ceiling grids. Contractor for HVAC work is responsible for coordinating with all trades.

E. Drawings and specifications are complementary. Work shown or specified in one is binding as if shown or specified in both. Any discrepancies between the drawings and specifications shall be brought to the attention of the Consultant for clarification during the bidding period. No allowance shall be subsequently made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the Consultant during the bidding period or by reason of any error on the Contractor's part.

F. No attempt has been made to establish the required sections or splits of equipment relative to the size of access into the space, building, etc. Contractor shall establish all said splits, sections, etc. necessary to install equipment complete without undue disassembly of equipment or demolition of building parts at site of work.

1.3 APPLICABLE CODES AND STANDARDS:

A. Comply with the current editions of the following Codes and Standards:

1. ANSI/B31.9 - Code for Building Services Piping
2. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration
3. ASHRAE 62.1 - Ventilation for Acceptable Indoor Air Quality
4. ASHRAE 90.1 – Energy Compliance
5. NFPA 54 - National Fuel Gas Code
6. NFPA 70 - National Electrical Code
7. NFPA 90A - Installation of Air Conditioning and Ventilating Systems
8. NFPA 101 - Safety to Life from Fire in Buildings and Structures
9. Other standards as referenced in other sections of Division 23
10. 2021 International Building Code
11. 2021 International Plumbing Code
12. 2021 International Fuel Gas Code
13. 2021 International Mechanical Code
14. 2021 International Energy Conservation Code

1.4 QUALIFICATIONS OF SUBCONTRACTOR:

A. The HVAC Subcontractor shall meet the following qualifications:

1. He shall have been in business as a HVAC contractor for at least **5 years** prior to the date of opening bids, and shall have held a license from the **Alabama** State Licensing Board for General Contractors for at least **5 years**.

2. He shall have a satisfactory experience record with HVAC installations of character and scope comparable with this project, and for at least **5 years** prior to the date of opening bids shall have had an established service department capable of providing service inspection or full maintenance contracts.

3. If the HVAC subcontractor, with the Engineer's approval, uses a sub-subcontractor to provide another discipline that the subcontractor does not normally furnish, that sub-subcontractor shall meet the same qualifications as the subcontractor.

1.5 CONFLICTS AND INTERFERENCES:

A. If systems interfere or conflict, the Architect shall decide which equipment to relocate regardless of which was first installed.

1.6 WORKMANSHIP:

A. Do all work in a neat and first class manner. Remove and replace work not done in such manner as directed by the Architect.

1.7 COOPERATION:

A. Cooperate with all other crafts. Perform work in a timely manner. Do not delay the execution of other work.

1.8 VISITING SITE:

A. Visit site and become familiar with location and various conditions affecting work prior to bid. No additional allowance will be granted because of lack of knowledge of such conditions. No consideration shall be given to future claims due to existing conditions. Any discrepancies or interferences shall be reported immediately to the Architect/Consultant.

1.9 MATERIALS:

A. Unless otherwise noted, provide new, standard, first grade materials throughout. **Unless otherwise noted, all pipe, fittings and valves shall be made in the United States of America.**

B. Where materials or products are specified by manufacturer's name, brand, trade name, or catalog reference, such named materials or products shall be the basis of the estimate, without substitution, and shall be furnished under the contract unless requests for equivalents are approved as noted below. Where two or more brands are named the choice of these shall be optional with the Contractor.

C. Equivalents will be considered only if written request for approval has been received by the Architect (from a general contract bidder) 10 days prior to the date established for receipt of Proposals. Each request shall include the name of the material or equipment for which an equivalent is proposed and a complete description of the proposed equivalent including drawings, cuts, performance and test data, and deviation from the specification and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the equivalent may require shall be included. The burden of proof of the merit of the proposed equivalent is upon the proposer. The Architect's decision of approval or disapproval of a proposed equivalent is final.

D. If the Architect approves any proposed equivalent prior to receipt of Proposals, approval will be set forth in an Addendum. DO NOT RELY UPON APPROVALS MADE IN ANY OTHER MANNER.

E. No proposed equivalent will be considered after the Contract has been executed, except as described in the General Conditions.

F. Within 45 days of execution of contract and before ordering materials or equipment, submit to Architect and obtain his approval of a detailed list showing each item which is to be furnished by make, trade name, catalog number, or the like; together with manufacturer's specifications, certified prints, and other data sufficient for making comparisons with items specified. When approved, such schedule shall be of equal force with these specifications in that no variation there from shall be allowed except with Architect's written approval. Submit PDF format files for approval. Provide PDF files of approved data for project close-out.

G. All pressure vessels shall be constructed and tested in accordance with applicable ASME codes and shall bear ASME stamps. Certificates of inspection and approval shall be submitted to Architect.

H. Similar items of equipment shall be the product of the same manufacturer.

1.10 SHOP DRAWINGS:

A. Before starting work, submit and obtain approval of detailed drawings, fully dimensioned (including elevations of ductwork and piping) and drawn to 1/4" to 1'-0" scale.

Submit a minimum of 2 sets of bond shop drawings or PDF format digital files of shop drawings. Piping shop drawings shall include drain and vent locations, pipe slopes down to drains and up to vents, piping elevations, piping connection details, and a list of piping materials. Ductwork shop drawings shall include elevations, construction methods, re-inforcements, gauges, and access door locations and sizes. Provide section drawings of locations where ducts cross or demonstrate with elevations that ducts will fit. All shop drawings shall be produced using AutoCad and a copy of the shop drawing files shall be provided in PDF format for shop drawing review. A thumb-drive with a copy of all approved shop drawings in CAD and PDF format shall be provided for project closeout. Shop drawings shall be received within 60 days of the execution of the contract and before consideration of a request for payment.

1. Ductwork (do not scale for diffuser locations, but coordinate with ceiling grids and lighting layout). See Section "Air Distribution". Shop drawings shall include material type (stainless steel, galvanized), finish (paint grip, etc.), actual sizes increased to allow for internal insulation and gauges along with fabrication section notes for individual sections. In addition, include elevations of bottom of duct above finished floor level. Show building sections through congested areas for coordination with structure and other disciplines. Provide joint details, duct seal methods, insulation type, etc.

2. Submit details of all apparatus casings and plenums.

3. Apparatus casings.

4. Complete mechanical equipment and fan room plans showing location of equipment, conduit stubs for motors, floor drains, and equipment pads and foundations.

5. Equipment piping.

B. Submit complete control and power wiring diagrams for approval before installing controls. See Controls Section.

C. Engineers' CAD/electronic drawings files will be available upon request for the convenience of the contractor and for use in preparation of shop drawings. A service fee of $100.00 per drawing sheet file shall be remitted to the Engineer prior to delivery of CAD/electronic drawing files along with a signed agreement between the Engineer and Contractor.

1.11 COORDINATION SHOP DRAWINGS:

A. Coordination shop drawings (2 sets of bond and PDF digital format files) will be required, drawn to a scale not smaller than 1/4" = 1'-0".

B. Start drawings as HVAC shop drawings indicating all ductwork piping, equipment and locations of mechanical room floor drains, and electrical connections to motors. Indicate elevations of all ductwork and piping. Draw sections as required to clarify congested situations.

C. Engineers' CAD/electronic drawings files will be available upon request for the convenience of the contractor and for use in preparation of shop drawings. A service fee of $100.00 per drawing sheet file shall be remitted to the Engineer prior to delivery of CAD/electronic drawing files along with a signed agreement between the Engineer and Contractor.

D. Next, the Plumbing Contractor shall add all piping and plumbing to the drawings.

E. Next, the Fire Protection Contractor shall add all sprinkler heads and fire protection piping.

F. Next, the Electrical Contractor shall add all electrical fixtures, conduit and equipment.

G. Next, the drawings shall be submitted to the General Contractor for final coordination.

H. Finally, after the General Contractor has approved the drawings they shall be submitted to the Architect for his review and comments.

1.12 RECORD DRAWINGS:

A. When work starts the Architect will furnish two complete sets of white prints of the HVAC Drawings. All corrections, variations, and deviations, including those required by change orders, if any, must be recorded in colored ink or colored pencil at the end of each working day on these drawings. The marked prints shall be available at all times for the Architect's inspection.

B. Prior to examining the request for final payment or making any response thereto, the Architect shall receive from the Contractor one complete set of the white prints, marked as stated above, indicating the actual completed installation of the work included under this contract.

1. Accurately show location, size and elevation of new exterior utility work and its relationship to any existing utilities, obstructions, etc., contiguous to the area of work.

2. Block out areas modified by change order & identify them by change order number.

3. The Architect will forward the marked white prints to the Consulting Engineers for review. They will then be returned by the Architect to the Contractor for use in preparing record drawings.

C. When work is completed, the Engineers' CAD/electronic drawing files will be made available upon request for the convenience to the contractor for a service fee of $100.00 per CAD/electronic drawing sheet file and for use in preparing record drawings. Contractor shall transfer the information from the marked white prints to the CAD files, removing all superseded data in order to show the actual completed conditions**.**

D. Ductwork and Control Drawings (may be CAD files or a set of PDF shop drawings)**,** up dated to show actual conditions at completion of work. Include the contract drawings equipment schedules and details edited to show actual completed conditions.

E. HVAC piping drawings may be prepared as noted above, or HVAC piping may be added to the ductwork shop drawings noted above.

1.13 PROTECTION OF ROTATING PARTS:

A. For this paragraph only, "exposed" shall mean located in a casing or room or plenum with door large enough to admit a man.

B. Equip exposed belt drives with belt guards with holes for measuring speeds of driven shafts.

C. Provide exposed couplings with coupling guards.

D. Equip propeller fan wheels with wheel guards.

E. Equip inlets and outlets of exposed centrifugal fans with 1 1/2" #10 Diamond mesh galvanized steel screens.

F. Equip all exposed plug fans with wheel screens.

1.14 PROTECTION OF EQUIPMENT:

A. During construction, protect mechanical equipment from damage or deterioration.

B. When installation is complete, clean equipment and make ready for painting.

1.15 INSTALLATION OF EQUIPMENT:

A. Install equipment to provide normal service access to all components.

B. Where drawings show sufficient space for removing components, install equipment to provide such clearance. Provide space at all equipment power and control panels as required by local codes.

C. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with contract documents, obtain Architect's decision before proceeding.

D. All equipment shall be firmly fastened in place:

1. Roof curbs shall be secured to deck and structure and curb mounted items shall be secured to curbs.

2. Pad mounted equipment shall be secured to pads using poured in place anchor bolts or cinch anchors.

3. Vibration isolators shall be secured to floors or pads and equipment shall be bolted to the isolators.

4. Air devices connected by flexible duct shall be secured independently of all other building systems to prevent falling if grid shifts.

1.16 EQUIPMENT SUPPORTS:

A. Provide supports for ductwork, piping and equipment. Hot dip galvanize after fabrication all grillage, supports, etc., located outdoors. Prime coat and paint all grillage, supports, etc. located indoors. Where noted provide 304 stainless steel supports. At the Contractor’s option, all grillage, supports, etc. located outdoors may be 304 stainless steel instead of hot dip galvanized.

B. Set floor mounted equipment on concrete pads or platforms (as indicated) of height shown, but not less than 3 1/2" high. Chamfer pads 1". Provide pads and rails as follows:

1. CH-1, CH-2, SCHP-1, SCHP-2, B-1, B-2, HWP-1, HWP-2, AHU-1, AHU-2, AHU-3, CU-1/AC-1, CU-2/AC-2.

C. Provide factory fabricated equipment roof supports with tops 16" above roof line for roof mounted items as shown. Curbs shall match roof slope as required so units are installed level. Supports shall have integral cants, pressure treated wood nailers, and counter flashing. Supports shall be galvanized steel, gauge as required for loads, 18 gauge minimum.

1.17 CUTTING AND PATCHING AND INCIDENTAL WORK:

A. Set sleeves and inserts and lay out and form openings in walls, beams, girders and structural floors in this Section.

B. Cut, patch and repair as required to accomplish HVAC Work and finish to match adjacent work. Architect's approval required before cutting any part where strength or appearance of finished work is involved.

C. Provide all motors incidental to the HVAC systems. Wiring of motors, switches and starters is included in "Electrical Sections".

D. Do all control wiring required for HVAC work and all power wiring required by Control Panels, Control System, and Control Devices.

E. Furnish motor starters as specified below.

F. Final water connections to services are included in this Section.

G. Permanent drain connections from AC units, etc., and auto air vents to nearest floor drain are included in this Section.

H. Door louvers are not included in this Section.

1.18 FLASHING:

A. General: Furnish all fan curbs, pitch cups, metal base flashing and counter flashing required for HVAC Work. Installation of above items is specified in Roofing Section.

B. Fan curbs for power roof ventilators are specified with the fans.

C. Pitch Cups: 20 gauge galvanized steel, at least 8" deep, bases mitered and soldered and extending at least 4" horizontally.

D. Metal Base Flashing: Galvanized steel for ferrous items, and stainless steel for stainless steel duct items. Minimum thickness 22 gauge (0.034") galvanized steel, 20 gauge (0.038") stainless steel, 0.032" aluminum. Bases mitered and soldered extending out at least 4" horizontally and 8" vertically.

E. Metal Counter Flashing: Of material and gauges specified for base flashing, lapping base flashing at least 3".

1.19 EXCAVATION & BACKFILLING:

A. Include all excavation and backfilling required to bring the work to line and grade shown, including excavation of rock and all other materials which may be encountered.

B. Excavate trenches wide enough for proper installation of work. Grade trench bottoms evenly. Provide bell holes as necessary to ensure uniform bearing for pipes. Excavate minimum 6" below pipe. Refill cuts below required pipe grade with sand or compacted gravel. Support pipe continuously along its entire length. (Do not use piers to support piping.)

C. Backfill after inspection by Architect and authorities having jurisdiction. Backfill compacted areas (engineered fill) with sand or fine gravel (89/10) in accordance with requirements of "Sitework" no less than 95% compactancy. Backfill paved areas with sand or fine gravel (89/10) compacted to meet requirements of Paving Section. Backfill shall be free of rock, wood, steel, brick, etc. Do not disturb pipe. Restore or repair pavements and the like after backfilling, matching adjacent work.

D. Resod grassed areas and replace bushes, etc.

1.20 MOTORS, STARTERS & ELECTRICAL EQUIPMENT:

A. Provide electrical equipment compatible with the current shown on electrical drawings. Verify current characteristics before ordering equipment.

B. Should the Contractor with the Architect's approval make changes in electrical equipment from that shown on the Electrical Drawings, the Contractor shall be responsible for the cost of required changes.

C. Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.

D. Motors: 1750 RPM open drip proof construction unless otherwise shown or specified. Integral horsepower motors shall meet NEMA premium efficiency levels as stated in the latest version of NEMA MG-1. Allis Chalmers, General Electric, Goulds, Louis Allis, Westinghouse.

E. Where motors are shown or scheduled to be connected to a variable frequency drive, this motor shall be an inverter duty rated by the motor manufacturer and shall comply with NEMA MG1, Article 31.

F. Where shown on Electrical Drawings, furnish increment wound motors for 2 step starting.

G. Where shown on electrical drawings, furnish 2 speed separate winding motors (1800/1200 rpm).

H. Do not run motors until correct overload elements are installed in starters. Trading overload elements for elements of correct size for motors actually furnished shall be included in this Section.

I. Furnishing all starters is included in this Section. Starter installation is specified under "Electrical Section". Starters shall be equipped with melting alloy thermal overload and phase loss protection, in all 3 phases.

J. All starters, except those noted below, are specified in "Electrical Section".

K. Starters for the following items are specified with the equipment:

1. CH-1, CH-2, B-1, B-2, SCHP-1, SCHP-2, HWP-1, HWP-2, AHU-1, AHU-2, AHU-3, CU-1/AC-1, CU-2/AC-2, RTU-1 thru RTU-3.

L. Unless otherwise shown or specified for single phase motors provide manual starters equal to Square D Class 2510. When installed in equipment rooms provide surface mounted enclosure, and when installed in finished walls outside equipment rooms provide flush mounted enclosure, key operated.

M. All starters shall be the product of the same manufacturer.

N. All control panels, electrical assemblies, etc. must bear a label from a recognized testing laboratory as an assembly, not as individual components.

1.21 SLEEVES:

A. For pipe through floors inside fire rated chases or through non fire rated walls: 20 gauge galvanized steel, 1" larger than pipe or pipe covering.

B. For pipe through concrete beams: schedule 40 black steel pipe, 1" larger than pipe or pipe covering.

C. For pipe passing through floors outside fire rated chases and fire rated walls and partitions, provide 20 gauge steel sleeve leaving the annular space between pipe or pipe covering as required by UL systems. Where pipe is insulated, insulation shall be continuous thru sleeve. Refer to Through-Penetration Firestop Systems where included in the contract documents. Otherwise, seal between sleeve and pipe or pipe covering with 3M Brand Fire Barrier CP 25WB caulk, Flamestop V, Specified Technologies, Inc. "Spec Seal Sealant", Rectorseal Corp. Metacaulk 950 or Hilti FSONE bearing UL listing for actual conditions of installation, thickness and application in strict accord with UL reference for each type installation. Any equivalents must meet the 10 day prior approval provision and must show UL approval for all conditions, bare pipe, insulated pipe, etc. For plastic piping material submittal must show UL approval for each application and if caulk comes in direct contact with pipe, it must be compatible and not injurious to the pipe.

D. Set sleeves before concrete is poured or masonry is erected. In existing construction, grout sleeves firmly in place.

E. Sleeves for ducts: see fire dampers (Section: Air Distribution).

F. Extend floor sleeves 1 1/2" above finish floor in areas where floor is subject to being wet during normal usage (mechanical rooms, toilets, etc.).

G. Where exposed ducts pass through walls and partitions, provide 4" wide 20 gauge galvanized steel closure plates except at grilles and registers. Fit closure plates snugly to duct and secure to wall. Grout around ducts and sound absorbers at equipment room walls.

H. Where exposed pipes pass through walls and partitions in finished spaces, provide chrome plated F & C plates or escutcheons.

1.22 PAINTING:

A. Refinish equipment damaged during construction to new condition.

B. Paint all non potable water pipe and insulation yellow in accordance with Plumbing Code using paint of type specified in Painting Section.

C. Paint un insulated duct surfaces visible through grilles and registers flat black. If insulation is visible through grilles and registers is not black, it shall be painted flat black.

D. Prime and paint all bare, exposed, exterior piping using type specified in Painting Section.

E. Prime and paint all grillage, supports, etc. located indoors except where noted to be galvanized.

F. Other painting is specified in Painting Section, Finishes Division.

1.23 PIPE IDENTIFICATION:

A. Identify all piping exposed to view or accessible through removable ceilings or access panels with plastic snap on pipe line markers. Color code markers in accordance with ANSI A13.1. Show pipe contents and direction of flow. (Markers on lines 8" OD and smaller shall be taped in place; on lines over 8" OD secure with spring clips.) Markers shall be equal to Craftmark, Brady, Seton or Brimar.

B. Protect all factory identification tags, nameplates, model and serial numbers, stenciling, etc., during construction and replace if damaged.

C. Label Spacing and Extent:

1. On straight run of pipes: Above suspended ceilings space labels approximately 10 feet on center; elsewhere, 20 feet on center.

2. Wherever a pipe enters or leaves a room or building.

3. At change of direction.

4. At main valves and control valves (not equipment valves).

5. At manifolds.

6. On risers, just above and below floors.

D. The refrigerant piping identification shall indicate the refrigerant designation and safety group classification of refrigerant used in the piping system. For Group A2L and B2L refrigerants, the identification shall also include the following statement "WARNING-Risk of Fire. Flammable Refrigerant." For Group A2, A3, B2 and B3 refrigerants, the identification shall also include the following statement: "DANGER-Risk of Fire or Explosion. Flammable Refrigerant." For any Group B refrigerant, the identification shall also include the following statement: "DANGER-Toxic Refrigerant."

1.24 VALVE TAGS:

A. Valve tag locations: At all valves on mains, risers and branches (not equipment service valves).

B. Valve tag numbers: Starting with Number 1, number tags in sequence from the lowest point to the highest point in the building. In existing buildings extend existing sequences.

1.25 VALVE CHARTS:

A. In all mechanical rooms, provide charts showing number and locations of all labeled valves, type of service, etc. Laminate in heavy plastic and provide brass grommets for attaching to wall. Attach to wall with anchors and brass screws.

B. In existing buildings include existing valves in the charts of new valves.

1.26 EQUIPMENT IDENTIFICATION:

A. Provide 2" x 3" or larger laminated plastic nameplates with 1/2" numbers and letters in colors specified below. Screw tags to equipment in obvious locations. Engrave equipment designation and numbers as shown on plans and drawings on upper half of tag, leaving lower half of tag for future engraving by Owner.

B. Provide similar nameplates for motor starters furnished under Division 23.

C. Secure nameplates with acorn head screws.

1.27 EXHAUST FAN IDENTIFICATION:

A. 2" X 3" or larger laminated plastic nameplates with red letters and numbers on white background, identifying type of fan, number according to plans, and rooms served. Engrave on upper half of tag, leaving lower half for engraving by Owner. Fasten with acorn head screws.

1.28 ACCESS DOORS:

A. Furnish and install access doors for valves, fire dampers, dampers, controls, air vents, and other items located above non liftout ceilings or behind partitions or walls. Doors in non fire rated walls and ceilings: 16 gauge steel with hinges and screwdriver latches. Doors in fire rated walls and ceilings: UL labeled with fire rating equal to fire rating of wall or ceiling. Doors in security ceilings to be 10 ga. steel panels, white powder coat, 2" x 2" x 3/16" steel angle frame heavy duty butt hinges with security screws. Provide door styles compatible with adjoining surfaces as selected by Architect. Size doors to permit removal of equipment and/or maintenance. Doors: Bar Co, Nystrom, Williams Bros., or equal.

B. Mark lay in ceilings with colored vinyl self adhering disc stuck on grid adjacent to maintenance access points.

1.29 TESTS, CLEANING & ADJUSTMENTS:

A. General:

1. All tests shall be witnessed by the Architect in addition to the authorities having jurisdiction. A minimum of 72 hours notice is required prior to performance of tests.

2. All air duct pressure tests are specified in Section Air Distribution.

3. All HVAC air and water balance work and HVAC equipment tests (other than hydrostatic tests) are specified in section 237000, "HVAC Testing & Balancing". Notify the Testing and Balancing Agency when systems are ready for balancing - see Section 237000, "HVAC Testing & Balancing".

4. Testing and Balancing other than that noted above is specified in Section "HVAC Testing & Balancing".

5. All instruments used for testing and balancing work shall have been calibrated within 6 months and checked for accuracy prior to start of work.

6. Cooperate in the execution of work specified in Section 237000 HVAC Testing and Balancing and provide assistance as noted in Section 237000.

7. Perform all tests as required by local codes. Contractor shall furnish testing equipment.

8. If local codes are more stringent than the following, local codes shall govern.

B. Chilled Water, and Hot Water Systems:

1. Before pipe covering has been installed, test all new work and make tight at two times operating pressure but not less than 45 psig. (Provide temporary crossovers and temporary pumps as required for cleaning new work before valves at connections to existing work are opened.)

2. Correct or replace defective workmanship or materials shown by tests, and retest as necessary to ensure tightness.

3. After systems have been made tight, provide a supervised program of chemical cleaning and degreasing prior to start up. Program shall be supervised by the manufacturer of the chemicals involved and upon completion of the cleaning operation manufacturer shall provide a letter certifying that the cleaning program has been completed in accordance with these specifications. Sufficient chemicals shall be added to each system to establish a concentration of 0.5% detergent dispersant chemical containing a minimum of dioctylculfosuccinate or equal detergent and 10% dispersants containing polyacrylate and/or diphosphonate or equal. Systems shall then be circulated for a minimum of 8 hours, dumped, flushed, and refilled, with the correct corrosion inhibitors added for operation. Hand clean strainers after flushing.

4. When systems have been refilled with water, vent air from system, turn on pumps and ensure that flow has been established in all portions of systems.

C. Refrigeration System: When system is complete, but before the pipe covering has been installed, test components with dry nitrogen and make tight at equipment manufacturer's recommended test pressures. Then evacuate the system to 26" Hg. vacuum which the system shall hold for 24 hours. After passing the above tests, charge and leak test under operating conditions using electronic leak detector.

D. Air System:

1. Duct Cleaning:

a. Clean new duct system(s) and existing duct systems to be reused before testing, adjusting, and balancing.

b. Use service openings for entry and inspection.

1) Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation as recommended by insulation manufacturer. Comply with Section 236000 “Air Distribution” for access panels and doors.

2) Disconnect and reconnect flexible ducts as needed for cleaning and inspection.

3) Remove and reinstall ceiling to gain access during the cleaning process.

c. Particulate Collection and Odor Control:

1) When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.

2) When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.

d. Clean the following components by removing surface contaminants and deposits:

1) Air outlets and inlets (registers, grilles, and diffusers).

2) Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.

3) Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.

4) Coils and related components.

5) Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.

6) Supply-air ducts, dampers, actuators, and turning vanes.

7) Dedicated exhaust and ventilation components and makeup air systems.

e. Mechanical Cleaning Methodology:

1) Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.

2) Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.

3) Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.

4) Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.

5) Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

6) Provide drainage and cleanup for wash-down procedures.

7) Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

2. When system has been completed, remove all trash and dirt, leave all balancing dampers open and install specified filters in all equipment. Check all fan motors for rotation. Provide all items as required for work specified in Section 237000 "HVAC Testing & Balancing".

E. At the beginning of the first heating season, adjust and balance operating phases and repeat at the beginning of the first cooling season or vice versa, as the case may be, all without charge.

F. Start Up and Service:

1. The Contractor and factory authorized service representative for the **boilers, variable frequency drives, and chillers** shall place each item of such equipment into satisfactory operation with all automatic and safety devices. Further, all adjustment service required shall be performed during the warranty period. Adjustment services do not include lubricating fans or motors and does not include changing filters or adjusting belts.

2. In addition, submit equipment manufacturers' start up reports for items listed above. See Paragraph "Project Close Out", below.

3. Starting Systems:

a. Coordinate schedule for start-up of various equipment and systems.

b. Notify Owner seven days prior to start-up of each item and provide one copy of manufacturer's Operation and Maintenance instructions.

c. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

d. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

e. Verify wiring and support components for equipment are complete and tested.

f. Execute start-up under supervision of responsible (manufacturer's representative) (contractors' personnel) in accordance with manufacturers' instruction.

g. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

h. Submit a written report in accordance with Section that equipment or system has been properly installed and is functioning correctly.

G. Compressor Test: The compressors shall have an oil acidity test performed in the presence of Engineer at the time of job completion. After units have operated for 30 days, the oil shall be tested again for acidity. If oil tests acid either time, it shall be drained and refilled with new and unused oil. Tests shall be repeated each 30 days and oil replaced until tests show neutral. Reports should be made in writing to the Architect.

1.30 WARRANTY & INSTRUCTIONS:

A. See General Conditions One Year Warranty.

B. Contractor shall and hereby does warrant all materials, workmanship and equipment furnished and installed by him to be free from defects for a period of one year after date of substantial completion of the Contract. Should any defects in material, workmanship, or equipment be made known to Contractor within the one year warranty period, Contractor shall replace such materials, workmanship, or equipment without charge.

C. All reciprocating and scroll refrigeration compressors shall bear 5-year non-pro-rated parts warranty.

D. All gas fired air furnaces shall bear 10 year prorated heat exchanger warranties.

E. After completion of the work, Contractor shall operate the equipment which he installs for a period of (10) working days, as a test of satisfactory operating conditions. During this time, Contractor shall instruct the Owner's operating personnel in the correct operation of the equipment.

F. Provide PDF of manufacturer's operating and maintenance manuals and parts lists for all equipment and materials furnished. Provide a maintenance schedule listing routine maintenance operations and suggested frequency thereof. Include all warranty dates on equipment and guarantees.

G. Any work performed on new or existing air conditioning/refrigeration equipment, whether inside or out, that requires removing the refrigerant from the system will require the use of a recovery/recycling unit. Intentional release of the refrigerant, regardless of type, will not be allowed.

H. Any refrigerant removed from a system that has been properly recycled and has not been exposed to "burn out" can and should be reused in the system. Refrigerant that has been contaminated and cannot be reused after being properly recycled shall be reclaimed by the contractor and returned to the proper company representative.

I. During the period of tests, adjust all controls, regulators, etc., to comply with these Specifications.

J. Supply initial charges of refrigerant, refrigeration lubricating oil and anti freeze necessary for the correct operation of the equipment. Maintain these charges during the guarantee period, with no additional cost to the Owner, unless loss of charge is the fault of the Owner.

K. Make available to the Owner, without additional cost, warranty service and adjustment of the equipment for the guarantee period. Due to critical temperature guidelines Contractor shall respond to Owner's call for service within a 6 hour time period.

1.31 PROJECT CLOSE OUT:

A. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:

1. A letter signed by the subcontractors for HVAC, electrical, temperature control work stating that they have jointly checked each power circuit and control circuit and mutually agree that each item is properly wired and that controls and power circuits will function properly.

2. Record drawings sheet metal work: PDF files and CAD files.

3. Record drawings – piping: PDF files and CAD files.

4. Record drawings control systems: PDF files and CAD files.

5. Control manufacturer's letter of certification.

6. Air balance report PDF files. (See Section 237000 "HVAC Testing & Balancing").

7. Water balance report PDF files. (See Section 237000 "HVAC Testing & Balancing").

8. Equipment Submittal Data PDF files.

9. Equipment operating and maintenance manuals PDF files.

10. Maintenance schedule.

11. Equipment warranty dates and guarantees.

12. Pressure vessel certificates.

13. List of Owner's Personnel who have received maintenance instructions.

14. Install valve charts in Mechanical Rooms.

15. Letter certifying that the cleaning program for the chilled water, hot water and condenser water systems has been completed in accordance to the specifications.

16. Letter certifying and signed by Owner or his representative that the Owner or his representative has received the spare filters and pump seals specified for each HVAC system.

17. Submit factory start-up reports for:

    a. Boilers

    b. Variable frequency drives

    c. Chillers

18. Include with insulation material submittal letters from the insulation material manufacturer certifying that the insulation material does not contain asbestos in any shape, form or quantity.

END OF SECTION

SECTION 23 1000

MATERIALS AND METHODS – HVAC

PART 1 - GENERAL

1.1 SCOPE:

A. Section 23 0500 - "General Provisions - HVAC" shall apply to and become part of this Section.

PART 2 - MATERIALS: All pipe, fittings and valves shall be manufactured in the United States of America

2.1 CHILLED WATER PIPING:

A. Schedule 40 black steel pipe, ASTM A53 or A106, grade B. Fittings 2" and smaller, 150 psig WSP black malleable iron. Fittings 2-1/2" and larger, butt welding fittings. No mitering or notching for fittings permitted. Weldolets permitted where branch size is 2 pipe sizes smaller than main. 45 degree saddles permitted where shown.

B. Unions 2" and smaller black malleable, ground joint, screwed. Union 2-1/2" and larger, flanged.

C. All flanges shall be flat faced. Flange gaskets shall be nonasbestos compressed material in accordance with ASME B16.21, minimum 1/16 in thickness, full face type. Gaskets shall contain aramid fibers bonded with styrene butadiene rubber (SBR) or nitrile butadiene rubber (NBR). Bolts, nuts, and bolt patters shall conform to ASME B16.1 Gaskets shall be Garlock Blue-Gard 3000 or approved equal.

D. Coating for underground lines: Pipe coating: Pipe shall be mill-wrapped with fittings field-wrapped with PVC tape, same thickness as mill-wrapping. Mill wrapping shall be X-TRU-COAT. Coating shall be electrically inspected for holidays.

E. At Contractor's option runouts to room fan-coil AC Units may be type L hard copper with wrought copper sweat fittings made with 95-5 solder. Install dielectric union at copper pipe connections to black steel pipe.

F. Pipe connections to chillers shall be made with Victaulic Style 741 flange adapters or flexible couplings, coordinate with chiller manufacturer.

2.2 HVAC DRAIN PIPING:

A. Standard weight galvanized steel pipe ASTM A106 with galvanized malleable iron fittings, or type L hard copper with wrought copper sweat fittings, at Contractor's option.

B. Provide rubber drain traps for roof mounted AC Units. Trim traps so units will drain under operating conditions.

C. Provide drain traps for AC unit drain pans. Size traps as required to drain under operating conditions. See trap detail on drawings.

2.3 HOT WATER PIPING:

A. Schedule 40 black steel pipe, ASTM A53 or A106, grade B. Fittings 2" and smaller, 125 psig W.P. cast iron screwed fittings. Fittings 2-1/2" and larger, butt welding fittings. No mitering or notching for fittings permitted. Weldolets permitted where branch size is 2 pipe sizes smaller than main. 45 degree saddles permitted where shown.

B. Unions 2" and smaller black malleable, ground joint, screwed. Union 2-1/2" and larger, flanged.

C. All flanges shall be flat faced. Flange gaskets shall be nonasbestos compressed material in accordance with ASME B16.21, minimum 1/16 in thickness, full face type. Gaskets shall contain aramid fibers bonded with styrene butadiene rubber (SBR) or nitrile butadiene rubber (NBR). Bolts, nuts, and bolt patters shall conform to ASME B16.1 Gaskets shall be Garlock Blue-Gard 3000 or approved equal.

D. Coating for underground lines: Pipe coating: Pipe shall be mill-wrapped with fittings field-wrapped with PVC tape, same thickness as mill-wrapping. Mill wrapping shall be X-TRU-COAT. Coating shall be electrically inspected for holidays.

E. At Contractor's option runouts to room fan-coil AC Units may be type L hard copper with wrought copper sweat fittings made with 95-5 solder. Install dielectric union at copper pipe connections to black steel pipe.

2.4 REFRIGERATION PIPING:

A. Type L hard drawn copper tubing with wrought copper sweat fittings. Joints: silfossed with continuous flow of dry nitrogen through lines.

B. Size all lines per manufacturer’s recommendations and requirements based on actual line lengths, distances, and elevations, so as to ensure oil return at minimum loading.

C. Small lines 5/8" OD and smaller may be soft copper with flare fittings, provided that all joints are exposed for visual inspection.

D. Refrigerant piping shall not be left open for a period longer than necessary to assemble the piping, provide nitrogen flow, and solder. In no case shall any piping assembled or stored be left open at the end of the day. Pipe that is assembled but not soldered is open. Piping that is stored shall not be used if it has lost the manufacturer’s nitrogen charge.

E. Refrigerant piping shall be protected against physical damage. Refrigerant piping installed in studs, joists, rafters or similar member spaces, and located less than 1-1/4 inches (32 mm) from the nearest edge of the member, shall be continuously protected by shield plates. Protective steel shield plates shall cover the area of the tube plus the area extending not less than 2 inches (51 mm) beyond both sides of the tube. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.46 mm) (No. 16 gage).

2.5 HVAC VALVES:

A. Hot Water, and Chilled Water Valves:

1. Gate valves 2" and smaller: All bronze, 150 psig WSP, threaded ends, rising stem, union bonnet, solid disc, Nibco #T-134, Milwaukee #1151, or Watts B-3100.

2. Gate valves 2-1/2" and larger: Flanged, iron body, brass trim, 125 psig WSP, wedge disc, non-rising stem, Nibco #F-619, Milwaukee #F-2882-A Domestic, or Watts F502.

3. Globe valves 2" and smaller: All bronze, 150 psig WSP, composition disc, rising stems, Nibco #T-235Y, Milwaukee #590T, or Watts B-4010-T.

4. Globe valves 2-1/2" and larger: Iron bodies, brass trim, 125 psig WSP, flanged, Nibco #F-718B, Milwaukee #F-2981-A, or Watts F-501.

5. Check valves 2" and smaller: 125 psig WSP, threaded ends, brass or bronze body, spring loaded, composition disc, Metraflex, Nibco #T-480Y, Watts #600, or Techno 5002-BR.

6. Check valves 2-1/2" and larger: 125 WSP, spring loaded, non-slam, center guide, globe check valves for installation between faces of 125# cast iron ASA 150 flanges, iron body, bronze seat and disc, stainless steel spring. Metraflex style 900, Nibco F-910, or equal by Keystone, Milwaukee, or Watts. Install a minimum of 5 pipe diameters from pump discharge.

7. Ball valves for hot water: 600 psig WOG, screwed bodies, chrome plated bronze balls, full port, teflon packing, bronze stem and steel handle, suitable for 350°F operating temperature. Include valve handle extension to clear 2" insulation. Nibco Nib-Seal T585-70 (domestic), full port. Provide extension stem capable of clearing 2" insulation, with memory stop, when operated will not disturb vapor seal of insulation.

8. Ball valves for chilled water: 600 psig WOG, screwed bodies, chrome plated, full port, bronze ball, TFE packing, bronze stem and extended handle to accommodate 2" of insulation. Nibco Nib-Seal, T585-70 (domestic), Apollo 77C with thermal seal handle, full port. Provide non-metallic extension stem capable of clearing 2" insulation, with memory stop, when operated will not disturb vapor seal of insulation.

9. Butterfly valves: 200 psi WSP, designed for installation between ASA 150 flanges. Valves shall have ductile iron bodies with tapped lugs for independent bolting to upstream and downstream flanges, bubble tight (rated for bi-directional "dead end" service) under full-rated pressure with no flange on downstream side. Aluminum-Bronze discs, 416 stainless steel stems, EPDM seats and stem seals, extended neck at least 2" beyond OD of flanges, lever handles with infinite throttling and memory stops for valves 6" and smaller, gear operators with memory stops capability for valves 8" and larger. Valves shall be rated for 250°F operating temperature. Provide padlock connections for valves located outdoors. Nibco LD-2000, Demco - NEC5114351 or Dezurik - BG5XLIDIEBS2.

B. For all valves over 7-feet above floor, provide chain wheels with chains extending to 6-1/2-feet above the floor.

C. Control valves: Specified in Control/BAS/DDC Section.

2.6 PIPE HANGERS:

A. Pipe hangers above ceiling / high in space shall be attached to structure as allowed by structural engineer. Hangers shall not be attached to roof deck or other non-structural items.

B. General: Pipe hangers, Anvil, PHD, Michigan Hanger, B-Line or Elcen. Anvil figure numbers are given for reference. Provide copper clad or plastic coated hangers on bare copper lines.

C. Equip pipe hangers with vibration isolators as specified under Vibration Isolators.

D. Pipe hangers for lines 3" and smaller: adjustable wrought ring hangers, Anvil Fig. 97 or 69 or wrought clevis hangers.

E. Pipe hangers for piping 4" and larger: adjustable wrought clevis hangers.

F. Parallel piping graded in same direction may be grouped on trapezes. Trapezes for line 4" and smaller, Unistrut P2000 channel, or equal, with rods sized as specified below for largest pipe on trapeze. Guide lines on (but not anchor to) trapezes using Unistrut Series P1100 clamps. Trapezes shall not exceed 3' in length. Space lines to allow at least 3" clear between adjacent pipe or pipe covering and between pipes or pipe covering and rods. Space trapezes as specified for pipe hangers based upon smallest size of pipe on trapeze.

G. Provide riser clamps on pipe risers on each floor. Clamps in contact with copper or plastic pipe, plastic coated.

H. Beam Clamps: Anvil Fig. 228.

I. Inserts for hangers in concrete structures: Underwriter's listed cast iron inserts. Anvil Fig. 282.

J. For fasteners in existing concrete structures use drilled in expansion anchors with load rating at least 150% of pipe hanger rating (powder driven anchors are not acceptable).

K. Size rods for pipe hangers not smaller than the following: 3/8" rods for pipe up to 2", 1/2" for 2-1/2" and 3" pipe, 5/8" rods for 4" and 5" pipe, 3/4" rods for 6" pipe, and 7/8" rods for 8", 10" and 12" pipe, 1" rods for 14" and 16" pipe and 1-1/8" rods for 18" pipe.

L. Space pipe hangers at maximum: Pipe hanger spacing for screwed, solder joint and welded piping: 1/2" and 3/4", 6 ft.; 1" to 1-1/4", 8 ft.; 1-1/2" to 2-1/2", 10 ft.; 3” and over, 12 ft. Install additional hangers at change of direction, valve clusters, and at all duct and unit mounted coils.

M. Install pipe hangers on insulated pipe over pipe covering. Provide factory fabricated insulated pipe shields equal to Pipe Shields, Inc. "Thermal Hanger Shields" or Tru-Balance insulated saddles at hangers. Provide shield insulation of rigid calcium silicate indoors or rigid Perlite Silicate outdoors, the same thickness as adjacent pipe covering. (At Contractor's option, pipe shields may be field fabricated using rigid calcium silicate or foamglass insulation with ASJ and 20 gauge galvanized steel protector. Shield length: 1.5 times nominal pipe size but not less than 4".)

N. Wrap bare copper refrigerant lines with sheet lead or molded plastic sleeve at hangers.

2.7 VIBRATION ISOLATION:

A. General: Mount piping and rotating equipment using vibration isolators as specified below. Amber Booth, Korfund, Mason Industries, Peabody, Vibration Eliminator Co., or VMC. Mason Industries part numbers are given for reference. Minimum 95% isolation efficiency.

B. Isolators for Floor-Mounted Equipment: Laterally stable free- standing unhoused spring isolators with steel base plates, ribbed neoprene acoustical pads, leveling and anchor bolts, #SLFH. Static deflections: as required to provide 95% isolation efficiency.

1. Mount the following items on concrete inertia bases and mount the inertia bases on the isolators specified above: SCHP-1, SCHP-2, HWP-1 and HWP-2.

C. Isolators for Suspended Equipment: Combination steel spring and rubber in shear isolators, #30N. Static deflections: As required to provide 95% isolation efficiency or 1" static deflection, whichever is greater. Provide isolators for all suspended rotating equipment.

D. Isolators for Pipe Hangers:

1. Equip all pipe hangers on compressed air, vacuum, chilled water, and hot water lines in equipment rooms with 1" static deflection combination neoprene and spring isolators, #30N.

2. Mount piping riser supports on chilled water and hot water lines using 0.1" static deflection all directional neoprene anchors: #ADA.

E. Mount internally isolated air handling unit on continuous single layer of ribbed neoprene on top of housekeeping pads as shown.

F. Provide snubbing isolators, similar to those specified above for pipe hangers for flexible connections at fans.

G. Flexible connections in water lines: Laminated 3-ply corrugated 304 stainless joints designed for 150 psig WP. Joints shall be flanged. For each joint furnish a control unit consisting of tie bolts with required nuts, spacers, 1" deflection springs, washers, and stop and lock nuts. Size spring ID to match tie-bolts or provide washers with sleeves to center springs on tie-bolts. Minimum 1/2” diameter bolts for connectors 6” diameter or less and 3/4” diameter bolts for connections larger than 6”. All thread rods shall not be used for tie bolts. Nuts and bolts for joints in chilled water lines shall be type 304 stainless steel. Ship from factory with wood blocks at relaxed length with spring tensions factory set. Flexible connections Keflex, Flexonics, Hyspan, Southeastern Hose or approved equal. Provide samples if specifically requested (samples will be returned to vendor).

2.8 THERMOMETERS AND GAUGES:

A. Non-mercury in glass blue reading separable socket industrial thermometers with die cast aluminum or high impact plastic casings of appropriate pattern for each installation, 9” scale lengths and ranges shown, Palmer, Trerice or Weksler. Install thermometers in brass or stainless steel wells. Equip thermometers installed in insulated lines with 1” extension stems or stems long enough to permit unions to clear insulation whichever is greater.

B. Where shown install brass thermometer wells with screwed caps. Install wells at an angle to retain oil. Size well to fit thermometers specified.

C. Enlarge pipe 2" and smaller to 2-1/2" at thermometers and thermometer wells.

D. Install 4-1/2" dial pressure gauges where shown. Gauges shall have bronze or stainless steel bourdon tubes, 316 stainless steel movement, aluminum or polypropylene solid front cases, adjustable micrometer pointer and accuracy Grade 2A not less than 1/2% of full scale over the entire range, without mounting flange. Gauges shall be Ashcroft 1279, Marsh Series P01, Trerice 450-B, Weksler AA44-2 or U.S. Gauge 1980L with minimum bourdon tube diameter of 3". Provide ball valves for all pressure gauges. Provide siphons for steam gauges.

E. Where shown, provide temperature and pressure measurement plugs and caps equal to Peterson Equipment Co., Inc. "Pete's plug with Nordel seats and seals". Provide one Pressure and Temperature Kit consisting of a 0-100 psi pressure gauge with adaptors, and two thermometers (25-125°F and 0-220°F), all in carrying cases. Provide nipples for Pete’s plugs as required to extend thru pipe insulation.

2.9 ELECTRIC PIPE LINE HEATERS:

A. Electric heaters equal to Chemetron "Auto-Trace," Letco with "Self Regulator" or Chromolox "Self Regulating Rapid Trace" heating cable, 3.9 watts/foot to prevent freezing in 0°F ambient. Equip heaters with conduit connectors and outdoor thermostat set at 32°F.

B. Extent:

1. All chilled water supply and return lines outdoors above grade.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION:

A. Cut pipe square and ream full size after cutting. Clean pipe. Make threaded joints with Teflon tape. Do not spring pipe into place.

B. For glycol solutions, joints on black steel screwed pipe made up with thread sealant compatible with glycol; Rectorseal No. 7, or equal.

C. Provide welding material and labor in accordance with the welding procedures of the Heating, Piping, and Air Conditioning Contractors' National Association or other approved procedure conforming to the requirements of ANSI B31.9 "Building Service Piping". Employ only welders fully qualified in the above specified procedure and currently certified by recognized testing authority. Use either electric arc or oxyacetylene welding. Provide full perimeter welds at both face end and collar end of each slip-on flange.

D. Install piping to allow for expansion. Make connections to all equipment to eliminate undue strains in piping and equipment. Furnish necessary fittings and bends to avoid springing of pipes during assembly.

E. Pitch steam, condensate and air conditioning unit drain lines down in direction of flow 1/8” per foot of horizontal run. Grade chilled and hot water supply and return lines down to drains and up to air vents.

F. Install chrome plated floor and ceiling plates on pipe passing through finished surfaces in finished spaces.

G. Make horizontal water and steam supply line size reductions using eccentric reducers (tops flat in water lines, bottoms flat in steam lines).

H. Install 3/4" ball valve drains with hose adaptors at low points of water piping and at bases of all risers (where shown provide larger drains). Provide screwed caps with chains on hose adaptors.

I. Make connections to equipment using screwed unions in sizes 2" and smaller and flanged unions in sizes 2-1/2" and larger. Install unions in all piping connections to each piece of equipment. Provide unions on all sides of control valves.

J. Wherever ferrous pipes or tanks and copper tubing connect, provide dielectric insulating unions or couplings, equal to Victaulic style 47, "V-line" insulating couplings as manufactured by Lochinvar, thread to thread or CTS fabrication flange adaptors for flange connections.

K. Near heating and air conditioning equipment requiring water provide valved and capped water outlets of sizes shown for connection to equipment, including reduced pressure principal backflow preventers. Make final connections under HVAC work. Note that all piping and insulation downstream from backflow preventer must be painted yellow.

L. Run piping concealed, except where specifically shown or specified to be exposed. Plumb all vertical lines and run mains parallel to building walls unless specifically shown otherwise.

M. Lay underground pressure piping so top of pipe is at least 18" below finished grade. Support all underground piping solidly along body of pipe. Strongly suspend other piping from building construction.

N. Pipe shall be braced at flexible connections to prevent blowouts under operating conditions.

O. Run no piping or tubing in direct contact with slag fill. Where necessary to pass through slag, protect piping with not less than two wrappings of polyvinyl chloride tape or equivalent protection approved by Architect.

3.2 INSTALLATION OF VALVES:

A. Provide shut-off valves in supply and return connections to each item of equipment. Locate valves to isolate each item to facilitate maintenance and/or removal.

B. Provide check valve in discharge line adjacent to each pump.

C. Locate valves in piping connections to coils, boilers, heat exchangers, refrigeration machine, etc., so heads and tube bundles can be removed without disconnecting equipment or piping other than union or flange connections immediately adjacent to the equipment.

D. Provide sweat to screw adaptors where required.

E. Install with valve stems upright or horizontal.

3.3 ETHYLENE GLYCOL:

A. Fill ethylene glycol system with a solution of 20% by weight inhibited ethylene glycol in water. Mix solution before installing glycol in the system.

END OF SECTION

SECTION 23 1500

THERMAL AND ACOUSTICAL INSULATION FOR HVAC SYSTEMS

PART 1 - GENERAL

1.0 GENERAL:

A. All external duct insulation and flexible duct shall be legibly printed or identified at intervals not greater than 36 inches with the name of the manufacturer, the thermal resistance R-value at the specified installed thickness and the flame spread and smoke-developed indexes of the composite materials.

B. All insulation (except duct liner) shall be installed by an insulation contractor in business a minimum of 3 years as an insulation contractor and has completed projects similar in scope to this project. Submit insulation contractor qualifications.

C. The installation of all insulation shall comply with the requirements of the contract documents unless specifically noted and approved in submittal document. Compliance with contract documentation shall be demonstrated by the insulation contractor as follows:

1. Specific and random selections of the installed insulation shall be removed by the insulation contactor for observation by the owner's representative. The insulation samples removed shall be selected by the owner's representative.

2. The insulation removed per observation selection shall not exceed 6 linear feet of piping insulation (including fittings) or 4 sq. ft. of ductwork or equipment insulation if the sample removed indicates compliance with the contract documents. If the sample removed does not indicate compliance with the contract documents, additional samples shall be removed for observation as directed by the owner's representative up to a total of 4 samples.

3. The total number of observations shall not exceed 10 per project unless the installation of the insulation is found not to comply with the contract documents. Otherwise, the total number of observations shall be as required by the owner's representative to confirm compliance.

4. If the insulation is found not to be installed as required by the contract documents, the insulation shall be removed and new insulation installed to comply with the specifications. After completion of the new insulation, the testing procedure noted above shall be repeated.

1.1 SCOPE:

A. Section 23 0500 - "General Provisions – HVAC" shall apply to and become part of this Section.

B. Repair existing insulation at points of connection and/or alterations to existing work.

C. "Exposed" is defined as: Exposed to view when construction is complete. (Items which are not "exposed" are considered "concealed".)

D. The use of any material containing asbestos is strictly prohibited.

E. Include with insulation material submittal letters from the insulation material manufacturer certifying that the insulation material does not contain asbestos in any shape, form or quantity.

1.2 INSULATION:

A. Comply with NFPA 90A.

B. Pipe hanger shields are specified in Section 23 1000 - "Materials and Methods - HVAC."

C. Use insulation and adhesives with Underwriter's Laboratories and ASTM E-84 flame spread rating not over 25 without evidence of continued progressive combustion, and smoke developed rating not exceeding:

1. 50 for pipe covering located in air ducts, plenum or casings.

2. 150 for all other pipe, duct and equipment insulation.

PART 2 - MATERIALS

2.1 FIBERGLASS PIPE COVERING:

A. Snap-on glass fiber insulation minimum density 5#/cu. ft. maximum thermal conductivity at 75°F mean temperature 0.25 BTU/(hr)(sq. ft.)(°F/in) with UL rated vinyl coated and embossed vapor barrier laminate of aluminum foil and kraft reinforced with glass fiber yarns (ASJ).

B. For all lines seal jacket with self sealing lap. Butt adjoining sections of insulation tightly and seal with self-adhering butt joint strips.

C. Cover fittings to thickness of adjacent covering with factory pre-molded fitting covers. Cover flanged valve bodies and flanged unions. Do not cover screwed unions on hot lines. Finish concealed fittings with a skim-coat of mastic and when mastic is dry, fitting shall be covered with glass fab and vinyl acrylic mastic unless otherwise noted below. Zeston type fitting covers may be substituted for glass fab and final coat of mastic on concealed fittings provided fire and smoke ratings are met. Finish fittings exposed in equipment rooms, boiler room, and in finished spaces with vinyl acrylic mastic over glass fab over mastic.

D. At contractor's option, concealed tees may be insulated with field fabricated tee covers consisting of straight pipe covering on run of tee with notch at branch together with pipe covering on branch contoured to fit notch. Glass fab over skim coat of mastic shall be applied around main, lapping contoured joint at branch by 2" minimum for the full 360° of joint. Cover entire fitting covering with vinyl-acrylic mastic over glass fab, 1/8" thick (dry) coat. Submit sample of fabricated tee covering to Architect for approval before work is begun.

2.2 CELLULAR GLASS PIPE COVERING, RIGID:

A. Cellular glass insulation having a maximum K factor at 50°F mean temperature not exceeding 0.28, and a compressive strength not less than 87#/sq. in., Pittsburgh Corning "Foamglas".

B. Apply pipe covering in a single layer. Tightly butt and butter all joints and seams with vapor barrier mastic. Finish with a UL rated vapor barrier laminate of aluminum foil and Kraft reinforced with fiberglass yarn. Seal all laps and butt strips with suitable adhesive and cover with coat of vinyl acrylic mastic.

C. Insulate fittings with prefabricated or field fabricated fitting covers of the same material, buttered with mastic, securely held in place with stainless or copper wire with twisted ends turned in or fiberglass packing tape. Finish with glass fab over vinyl acrylic mastic with flooding coat of mastic applied over fabric.

D. Fit pipe hangers over insulation (See PIPE HANGERS). Hanger Shields are specified under pipe hangers.

E. Finish piping and fittings on outdoor piping with aluminum jacket (see below).

2.3 FOAMED PLASTIC PIPE COVERING: (DO NOT USE IN PLENUMS UNLESS COMPLIES WITH PARAGRAPH 1.2 ABOVE):

A. Fire retardant foamed plastic pipe covering, maximum K factor at 75°F mean temperature not exceeding 0.27 BTU/(hr)(sq.ft.)(°F/in).

B. Pipe covering may be seamless insulation slipped over piping before erection or may be slit longitudinally and installed over erected piping.

C. Make fitting covers from segments of pipe covering.

D. Cement all joints and seams in accordance with manufacturer's instruction.

E. Fit pipe hangers over insulation (see PIPE HANGERS). Use hanger shields as specified under pipe hangers.

F. Where exposed outside, cover insulation with aluminum jacket (see below).

G. Armacell, Aeroflex or Normaco.

2.4 ALUMINUM JACKET (PIPING):

A. 0.016" thick smooth aluminum jacket with laminated polyethylene and kraft paper adhered liner.

B. Roll jacket slightly smaller than insulation diameter and secure in place with flat aluminum bands 12” o.c. Lap jacket minimum 2” and place overlap at $\pm$ 120° arranged to shed water.

C. Finish fittings on aluminum jacketed lines with 1/8" thick (dry) coat of vinyl acrylic mastic reinforced with glass cloth. In addition, provide preformed aluminum fitting jackets for outdoor fittings.

D. Seal all joints on fitting covers with silicone sealant.

2.5 SPEEDICHANNEL (PIPING ENCLOSURE) BY DIVERSITECH:

A. For refrigerant line sets, mini-split wall mounted evaporator indoor units, condensate drains, etc., install SpeediChannel enclosure for piping from indoor unit to outdoor unit per manufacturer’s instructions.

B. Include all components in natural or white finish made of UV resistant resin.

C. www.diversitech.com

2.6 HOT EQUIPMENT INSULATION:

A. 11 lbs. per cu. ft. density molded hydrous calcium silicate with a maximum K factor of 0.42 at 200 degrees °F mean temperature, similar to Kaylo.

B. Secure with galvanized steel wire or band with 1/2" x 0.015 galvanized steel bands on 12" centers.

C. Fill and point all joints and voids of insulation with mineral wool insulating cement. Next, cover all the insulation with a smoothing coat of finishing cement.

D. Finish exposed equipment with glass cloth imbedded in vinyl acrylic mastic.

E. Insulate sections of equipment requiring periodic servicing with sheet metal casings filled with the same thickness of material as the adjoining insulation.

2.7 COLD EQUIPMENT INSULATION (RIGID):

A. Cellular glass insulating board having a thermal conductivity at 75°F mean temperature not exceeding 0.35 BTU/ (hr) (sq ft) (°F/in). Provide beveled lags for the particular diameter fastened in place with stainless steel bands. Butter all joints with vapor sealer mastic and tightly butt joints.

B. Finish: Cover with white open weave glass cloth, 10-20 mesh embedded in and coated with a 1/8" dry coat Vinyl Acrylic Mastic.

2.8 COLD EQUIPMENT INSULATION (FOAMED PLASTIC): (DO NOT USE IN PLENUMS UNLESS COMPLIES WITH PARAGRAPH 1.2 ABOVE)

A. Fire-retardant foamed plastic insulating board having a thermal conductivity at 75°F mean temperature not exceeding 0.27 BTU/(hr) (sq.ft.) (°F/in.). Fasten in place and seal joints with adhesive in accordance with insulation manufacturer's instructions.

B. Finish: Vimaso 749 vapor-block mastic – color grey.

C. Armacell, Aeroflex or Normaco.

2.9 DUCT INSULATION, INTERNAL:

A. Glass fiber acoustical/thermal insulation complying with NFPA 90A and UL 181 and having an erosion resistant heavy coating on the air side treated with an anti-microbial agent which does not support mold, bacteria nor fungus growth when tested in accordance with ASTM C1071, ASTM G21 and G22. NRC not less than 0.80 at 1-1/2" thickness, minimum density 1-1/2 lb/cu. ft., and maximum friction correction factor at 2000 fpm average velocity 1.15 (per TIMA test method AHS-1S2-76U). Minimum thermal conductance at R6 = 0.17 (ASTM C177). Knauf "Duct Liner E-M", Certainteed "Tough Guard" or approved equal. Submit sample to obtain approval for other manufacturers.

2.10 DUCT INSULATION, EXTERNAL, FOR CONCEALED DUCTS:

A. Flexible glass fiber insulation with foil-scrim-kraft (FSK) facing. Flame spread classification, 25 or less, smoke developed rating not exceeding 50. Minimum density, 1 lb./cu. ft., maximum thermal conductivity at 75°F mean temperature 0.26 BTU/(hr)(sq. ft.)(°F/in).

B. Fire-retardant foamed plastic insulating board having a thermal conductivity at 75° mean temperature not exceeding 0.27 BTU/(hr)(sq.ft.)(°F/in.). Fasten in place and seal joints with adhesive in accordance with insulation manufacturer's instructions.

1. Finish: Vimaso 749 vapor-block mastic – color grey.

2. Armacell, Aeroflex or Normaco.

2.11 DUCT INSULATION, EXTERNAL, FOR EXPOSED INDOOR DUCTS:

A. Fire retardant foamed plastic insulation. Paint with Vimaso 749 vapor-block mastic – color grey. (Do not use in plenums unless complies with Article 1.2.) Armacell, Aeroflex or Normaco.

B. 6 lb/cu. ft. fiberglass board with FSK facing and thermal conductivity not exceeding 0.22 BTU/(hr)(sq.ft)(°F/in) at 75°F mean temperature.

2.12 DUCT INSULATION, EXTERNAL, FOR EXPOSED OUTDOOR DUCTS:

A. 6 lb/cu. ft. fiberglass board with FSK facing and thermal conductivity not exceeding 0.22 BTU/(hr)(sq.ft)(°F/in) at 75°F mean temperature.

B. Cover insulation with aluminum jacket sealed weather tight.

PART 3 - INSTALLATION

3.1 HVAC PIPING:

A. Steam, steam condensate, boiler feed water, hot water supply and return piping and vents from flash tanks; indoors above grade: "Fiberglass pipe covering", thickness per Table 1.

TABLE 1

INSULATION THICKNESS FOR HVAC HOT PIPING

Service	Runouts		Mains & Risers			
	Up to 1-1/2"	Up to 2"	Up to 1-1/2"	2-1/2" to 4"	5" to 6"	8" and Up
Hot Water	1-1/2"	2"	1-1/2"	2"	2"	2"

* Runouts over 12 feet in length shall be classed as mains.

B. Chilled water supply and return piping indoors above grade: “Cellular glass Pipe Covering, Rigid”, 1" thick for lines 2-1/2" and smaller, 1-1/2" thick for lines 3" and larger. (Jacket exposed lines with aluminum jacket).

C. Room fan coil AC unit chilled water runouts: “Foamed plastic Pipe Covering”, 3/4" thick.

D. Chilled water supply and return lines outdoors above grade: Cellular glass pipe covering, 1-1/2" thick over electric pipeline heaters. Jacket with aluminum jacket.

E. Chilled water supply and return piping outdoors below grade: “Cellular glass pipe covering”, 1" thick for lines 2-1/2" and smaller, 1-1/2" thick for lines 3" and larger. Jacket with 2 layers 55# roofing felt or 4 layers 30# secured with 14 gauge stainless steel wire loops 12" on center.

F. Refrigerant suction lines and hot gas bypass lines: “Cellular glass pipe covering, rigid,” 1" thick for lines 2-5/8" OD and smaller, 1-1/2" thick for lines 3-1/8 OD and larger. Jacket lines located outdoors with aluminum jacket.

G. Refrigerant suction lines and hot gas bypass lines: “Foamed plastic pipe covering”, 3/4" thick.

H. AC Unit drain lines: “Foamed Plastic Pipe Covering”, 1/2" thick.

I. Ethylene glycol (antifreeze) supply and return lines: “Fiberglass pipe covering”, thickness per Table 1 for hot water piping.

J. Non-potable water lines outdoors above grade: As specified for chilled water lines outdoors above grade over electric pipeline heaters.

K. Non-potable water lines downstream of backflow preventer shall be insulated the same as hot water piping, indoors above grade.

3.2 HOT EQUIPMENT:

A. Air Separators: “Fiberglass Pipe Covering”, 2" thick.

B. Boiler Blowdown Separator: “Hot Equipment Insulation”, 1-1/2" thick.

3.3 COLD EQUIPMENT:

A. Chilled water compression tanks: cold equipment insulation, rigid, 1" thick (or foamed plastic 1" thick).

B. Chilled water one-shot chemical feeders: cold equipment insulation, rigid 1" thick (or foamed plastic 1" thick).

C. Chiller heads and chilled water pumps: 1" thick foamed plastic insulation inside easily removable 20 gauge galvanized steel covers.

D. Insulation for Strainers in chilled water lines:

1. Equip with 20 gauge galvanized steel covers. Split along strainer centerline and secure with diecast latches. Insulate inside covers with 1" thick foamed plastic insulation. Provide gasketed openings for blow-down valves.

E. Insulation for flexible connections in water lines:

1. Build up insulation to thickness of adjacent pipe covering using foamed plastic sheet with joints sealed and staggered. Last layer shall lap adjacent pipe covering 3" and be sealed and banded to it.

F. Insulation for casings, return bends and headers of duct mounted coils: 1/2" thick foamed plastic.

3.4 DUCT INSULATION, INTERNAL:

A. Apply in accordance with SMACNA "Duct liner application standard" over full coverage adhesive. Coat all edges with adhesive and seal all punctures or tears with mastic before installing ducts. Cut liner to assure overlapped and compressed longitudinal corner joints. Provide mechanical fasteners and metal nosings as noted below:

1. For all velocities, provide metal nosings on upstream edge of liner at connections to equipment: Fans, coils, dampers, AC Units, sound absorbers, etc. Seal all downstream edges of liner at coils, dampers, etc. Provide nosing on all upstream edges of liner. Seal all edges of liner at splitters, take-offs, and spin-ins. Provide nosing on upstream edges of liner at splitters. There shall be no unsealed edges of liner exposed to the air stream.

2. For velocities up to 2,000 feet per minute: start fasteners within 3" of the upstream transverse edges of the liner and 3" from the longitudinal joints and space them a maximum of 12" o.c. around the perimeter of the duct, except that they may be a maximum of 12" from a corner break. Elsewhere locate fasteners a maximum of 18" o.c., except that they shall be placed not more than 6" from a longitudinal joint of the liner nor more than 12" from a corner break.

3. For velocities from 2,001 to 4,000 feet per minute: start fasteners within 3" of the upstream transverse edges of the liner and 3" from the longitudinal joints and space them a maximum of 6" o.c. around the perimeter of the duct, except that they may be a maximum of 6" from a corner break. Elsewhere locate fasteners a maximum of 16" o.c., except that they shall be placed not more than 6" from a longitudinal joint of the liner nor more than 12" from a corner break. In addition to the adhesive edge coating of transverse joints, coat any longitudinal joints with adhesive.

4. For velocities from 4,001 to 6,000 feet per minute: same as 2 above except that metal nosing shall be installed to secure liner at all upstream transverse edges.

B. Thickness and extent (minimum 2" thick): (Do not line supply duct transitions at connections to multizone AC Units or supply duct transitions to air heat pumps or other fan outlets smaller than 6 square feet outlet area. Insulate these transitions as specified for externally insulated supply ducts.) Provide nosing on duct liner at all connections to equipment and at all leading edges (no adjacent upstream liner). Nosing shall fit outside the equipment flange.

3.5 DUCT INSULATION, EXTERNAL, FOR CONCEALED DUCTS:

A. For flexible glass fiber insulation:

1. Lap jacket and vapor seal all joints and seams with suitable mastic.

2. On rectangular and flat oval ducts 30" wide (30" flat on flat oval ducts) and wider, support insulation with weld pins and speed clips 18" on centers. Seal weld pins with mastic and FSK tape.

3. Thickness and Extent: All sheet metal supply and outside air ducts not specified to be lined: Minimum 2" thick except as noted below. Note: Conical and straight spin-ins on both lined and unlined ducts shall be insulated as noted below. (See Foamed Plastic Insulation below.)

B. All metal surfaces of ceiling diffuser (CD) located above the ceiling: 2" thick seal air tight to diffusers.

C. Foamed Plastic Insulation:

1. Insulate portions of fire damper sleeves in insulated ducts, which are not concealed in walls, partitions and floors as specified with 3/4" thick foamed plastic insulation. Do not extend the insulation through the wall, floor or partition. Seal to wall and glass fiber insulation (or if lined duct seal foamed plastic insulation to duct with 3" lap over liner). On externally insulated duct, lap glass fiber insulation over foamed plastic and seal to foamed plastic.

2. Insulate all flexible connectors in sheet metal ducts with 1" thick foamed plastic sheet with joints sealed. Extend insulation minimum 3" upstream and downstream of flex connector joints and seal to sheet metal duct.

3. Insulate portions of lined ducts at manual dampers with 3/4" thick foamed plastic insulation overlapping the liner a minimum 3" upstream and downstream of the damper. Seal foamed plastic insulation to duct.

4. Insulate all casings, headers and return bends on duct-mounted coils, and coils at terminal units with 3/4" thick foamed plastic insulation. Headers and return bends shall be insulated with 3/4" foamed plastic cemented inside galvanized sheet metal covers gasketed to coil casing.

5. Insulate all unlined ducts with dampers, all conical branch duct fittings and straight branch duct spin-ins with 3/4" thick foamed plastic insulation. Glass fiber insulation on the branch ducts shall overlap foamed plastic insulation on the conical fittings and spin-ins. Seal fiberglass to foamed plastic. For connections of flexible duct to spin-ins or conical branch duct fittings, connect flexible duct inner liner to sheet metal with specified clamps and lap outer liner and insulation over foamed plastic and clamp with Panduit strap. Seal flex duct outer cover to spin-in or conical fitting insulation. Insulation contractor shall submit sample of spin-in and conical fitting insulation and flexible duct connection for approval.

D. Insulate portions of fire damper sleeves in insulated ducts which are not concealed in walls, partitions and floors as specified in A or B above. Do not extend the insulation through the wall, floor or partition.

3.6 DUCT INSULATION, EXTERNAL, FOR EXPOSED DUCTS:

A. Insulate all exposed supply, return and outside air ducts and exposed return bends, headers and casings of all duct mounted coils not specified to be lined with 1" thick foamed plastic insulation cemented in place with adhesive in accordance with insulation manufacturer's instructions.

B. Insulate all exposed supply, return and outside air ducts located in Mechanical Room with 2" thick 6#/cu. ft. fiberglass board with FSK jacket. Secure board with weld pins and speed clips 12" on centers. Seal clip indentations with mastic. Seal all joints and seams with mastic.

C. Cover all angles, seams and joint reinforcing with insulation and seal vapor tight.

3.7 DUCT INSULATION, FOR EXPOSED OUTDOOR DUCTS:

A. External: Insulate all exposed outdoor supply, return and outside air ducts with 2" thick 6#/cu. ft. fiberglass board with FSK jacket. Secure board with weld pins and speed clips 12" on centers. Seal clip indentations with mastic. Seal all joints and seams with mastic.

B. Cover all angles, seams and joint reinforcement with insulation and seal vapor tight. Finish with aluminum jacket cover sealed weather tight.

C. In addition, line duct with Internal Duct Insulation.

END OF SECTION

SECTION 23 5000

HEATING AND AIR CONDITIONING EQUIPMENT AND SPECIALTIES

PART 1 - GENERAL

1.1 SCOPE:

A. Section 23 0500 – "General Provisions – HVAC" shall apply to and become part of this Section.

PART 2 - EQUIPMENT AND SPECIALTIES

2.1 DEHUMIDIFIERS

A. U.L. labeled refrigerated dehumidifiers consisting in general of an evaporator coil, condenser coil, fan motor and fans, refrigeration compressor, drain pan, and controls all enclosed in a heavy gauge steel cabinet with baked enamel finish.

B. Santa Fe or approved equal.

2.2 BOILER HOT WATER (ELECTRICAL)

A. General: U.L. labeled electric hot water boiler ASME Section IV Pressure Vessel Precision Series "II" or equal, completely wired, assembled, and pretested.

B. Provide a NEMA 1 control cabinet with power bus, individual fuses and contactor for heating elements, control transformer, high limit pressure switch, low water cut-off, low water cut-off feeder combination, gauge glass set with cocks, try cocks, 4-l/2" dial pressure gauge, and ASME pressure relief valves, 3" inch thick 3/4 pound density fiberglass insulation with 16 gauge steel jacket.

C. Heating elements: Incoloy sheathed elements individually mounted so as to be field replaceable with standard tools. Groups of elements shall be flange mounted. Heating element watt density shall not exceed 75 watts per square inch.

D. Boiler and control panel shall be mounted on steel skids.

2.3 ELECTRIC PIPE LINE HEATERS:

A. Electric heaters equal to "Auto-Trace" or Chromolox "Self-Regulating Freeze Protection" heating cable, wattage as required to prevent freezing in 0°F ambient, equipped with conduit connectors and outdoor thermostat set at 32°F.

B. Extent:

1. All chilled water piping outdoors above grade.

C. Installation: Minimum installation requirements are based on 1-1/2" thick cellular glass insulation over electric pipe line heaters and self-regulating low temperature cable. Provide 1 or 2 straight runs of pipe line heaters as indicated at the heat output noted. Follow manufacturer's recommendations for installation.

Nominal Pipe Size	Electric Heater Output (w/Ft.)	Number Of Straight Runs of Pipe Line Heater Per Pipe
2" and under	3.0	1
2-1/2"	3.0	1
3"	3.0	1
4"	5.0	1
6"	8.0	1
8"	8.0	1
10"	8.0	1
12"	8.0	1
14"	8.0	1
16"	5.0	2
18"	5.0	2
20"	8.0	2
22"	8.0	2
24"	8.0	2
Over 24" Construction Manual		

2.4 FLOW/BTU METER:

A. The entire Energy Measurement System shall be built and calibrated by a single manufacturer, ONICON Incorporated, and shall consist of a flow meter, two temperature sensors, a Btu meter, temperature thermowells, and all required mechanical installation hardware. A certificate of U.S. National Institute of Standards and Technology (NIST) traceable calibration shall be provided with each system. All equipment shall be covered by the manufacturer's two year warranty.

B. BTU Meter: Provide an ONICON System-10 BTU Meter. The BTU meter shall provide the following points both at the integral LCD and as outputs to the building control system: Energy Total, Energy Rate, Flow Rate, Supply Temperature and Return Temperature. Output signals shall be either serial network (protocol conforming to BACnet® MS/TP, BACnet/IP, LONWORKS®, JCI-N2, MODBUS RTU, MODBUS TCP, or Siemens-P1) or via individual analog and pulse outputs. Coordinate BAS interface requirements prior to submittal of meter. Each Btu meter shall be factory programmed for its specific application, and shall be re-programmable using the front panel keypad (no special interface device or computer required).

C. Temperature sensors: Temperature sensors shall be loop-powered current based (mA) sensors and shall be bath-calibrated and matched for the specific temperature range for each application. The calculated differential temperature used in the energy calculation shall be accurate to within $\pm$0.15°F (including the error from individual temperature sensors, sensor matching, input offsets, and calculations).

D. Flow Meter: The flow meter shall be installed as shown following the manufacturer's instructions with particular attention to upstream and downstream straight pipe runs. Insertion type flow meters shall be provided with all installation hardware necessary to enable insertion and removal of the meter without system shutdown and shall be hand insertable up to 400 psi.

E. Insertion Electromagnetic Type: Provide an ONICON Model F-3500 Insertion Electromagnetic Flow Meter. Materials of construction for wetted metal components shall be 316 SS. The flow meter shall average velocity readings from two sets of diametrically opposed electrodes. Each flow meter shall be individually wet-calibrated against a primary volumetric standard that is accurate to within 0.1%. A certificate of calibration shall be provided with each flow meter. Accuracy shall be within ± 1% of rate from 2-20 ft/s. Overall turndown shall exceed 80:1. Output signals shall be completely isolated and shall consist of the following: (1) high resolution frequency output for use with peripheral devices such as an ONICON display module or BTU meter, (1) analog output; 4-20mA, 0-10V, or 0-5V jumper selectable, and (1) scalable dry contact output for totalization. Each flow meter shall be covered by the manufacturer's two-year warranty.

2.5 AIR COOLED WATER CHILLER UNITS:

A. Include multiple microprocessor controlled scroll compressors, condenser and condenser fan and liquid cooler, all enclosed in a single casing. Provide a separate refrigerant circuit for each compressor. Chiller shall have power wiring arranged for a dual power feed to unit. Refrigerant: R-454B or R-32. Chillers shall be certified in accordance with the latest Standard AHRI 550/590. Chillers shall have a minimum NPLV of 15.7 EER.

B. Cabinet: heavy gauge aluminum or galvanized steel for outdoor installation. (Galvanized steel casings shall be finished with enamel over bonderizing.) Equip cabinets with access panels, condenser inlet guards and fan outlet guards. Provide padlock connections for power and control panels.

C. Compressors: hermetic scroll-type compressors, including the following:

1. Complaint design for axial and radial sealing.

2. Refrigerant flow through the compressor with 100% suction cooled motor.

3. Large suction side free volume and oil sump to provide liquid handling capability.

4. Compressor crankcase heaters to provide extra liquid migration protection.

5. Annular discharge check valve and reverse vent assembly to provide low-pressure drop, silent shutdown and reverse rotation protection.

6. Initial oil charge.

7. Oil level sightglass.

8. Vibration isolator mounts for compressors.

9. Brazed-type connections for fully hermetic refrigerant circuits.

10. Compressor motor overloads capable of monitoring compressor motor current.

11. Factory-mounted compressor acoustic sound blankets.

D. Condenser coils: all-aluminum microchannel coils.

E. Condenser fans: dynamically and statically balanced, direct drive, corrosion resistant glass fiber reinforced composite blades molded into a low noise, full airfoil cross section, providing vertical air discharge and low sound. Each fan in its own compartment.

F. Vibration Isolation: Provide seismic deflection rated vibration isolators sized for operational weight of chillers.

G. Fan Motors: High efficiency, direct drive, rigid mounted, with double sealed, permanently lubricated, ball bearings.

H. Water chiller: shell and tube or shell and coil direct expansion chiller (with a separate refrigerant circuit for each compressor), shell baffles to provide capacity shown, drain connection, 1-1/2" thick evaporator foamed plastic insulation. Paint all foamed plastic insulation with two (2) coats of manufacturer approved weather resistant paint.

I. Interconnecting refrigerant piping: Type L hard copper, wrought copper sweat fittings silfossed, foamed plastic insulation.

J. Provide (liquid receiver if condenser coil will not contain entire system charge where 80% full at 100°F) suction and discharge service valves and liquid stop valve.

K. Controls: factory wired, located in a readily accessible rain and dust tight control cabinet with provision for padlocking.

1. Compressor motor controls: line voltage contactors and both temperature and current sensitive overload devices, cycle timer to limit compressor starts to 5 or 6 minute intervals, oil pressure switch, high and low pressure switches and crank case heater.

2. Chiller controls: solenoid liquid valve for each circuit, operating thermostat to cycle solenoids valves, and low limit chilled water thermostat.

3. Provide automatic reset upon power loss.

L. Pump:

1. Pump package includes: two pumps, expansion vessel, drainage valve, shut-off valve at entering and leaving connections.

2. The pump package is single point power integrated into the chiller unit power with a separate factory wired control panel and separate power for freeze protection.

3. The control of the pump is integrated into the chiller controller. The Symbio (TM) 800 unit control module displays evaporator pump starts and run-times. Freeze protection down to an ambient of -29˚C (-20˚F) is included as standard. The cold parts of the pump package will be insulated. Designed with one redundant pump, it is controlled to operate both pumps through a lead/lag and failure/recovery functionality.

4. A variable speed drive is installed in an additional panel to control the pump. The inverter is adjusted upon start up to balance the system flow and head requirements. The purpose is to save on wasted pump energy caused by a traditional balancing valve.

M. Chillers shall have a minimum 14,000 amps interrupting capacity (AIC) rating.

N. The chiller warranty shall include the entire chiller and shall be for 5 years from start-up date. During the warranty period the manufacturer shall furnish all **parts** and **labor** required for any warranty failure. The warranty shall include any expenses required for travel, lodging, meals, etc. for the technician performing the work or any freight costs for replacement parts.

O. The installation, pressure testing, evacuation, dehydration, charging and initial startup, final assembly and alignment of all refrigeration equipment shall be done under the supervision of the manufacturer's factory trained representative. Include services of a factory trained technician for instructing Owner's operating personnel in machine operation: One (1), Eight (8) hour day. Training shall be scheduled and coordinated with the Owner a minimum of two (2) weeks prior to date of training. Review of factory start-up reports along with operation and maintenance (O&M) manuals shall be included in Owner training.

P. Provide a minimum of three (3) sets of hard copies and two (2) CD's with PDF files with manufacturer's operating and maintenance (O&M) manuals and parts lists for all equipment and materials furnished. Provide a maintenance schedule listing routine maintenance operations and suggested frequency thereof. Include all warranty dates on equipment and guarantees. Refer to O&M requirements.

Q. Verification of Capacity and Efficiency: Chiller shall be run-tested at the manufacturer's plant or laboratory, to check performance (tons and KW), vibration, operating controls, safety cutouts and to confirm reliable operation with no oil loss. The manufacturer shall provide to the Owner a certified test report to confirm that the chiller performs as specified before final payment. Attach a sample test report with the proposal to insure conformance with AHRI 550/590. Each proposal must include a factory sample test report. The performance test shall be run in accordance with AHRI 550/590. The procedures and instrumentation listed below conforms to AHRI 550/590. The guidelines must be followed to insure the accuracy of this performance test.

R. The equipment will be accepted if the test procedures and results are in conformance with AHRI Standard 550/590. If the equipment fails to perform within allowable tolerances, the manufacturer will be allowed to make necessary revisions to his equipment and retest as required. In the event that these revisions do not achieve submitted performance the following penalties will be imposed. If such test revisions are required or the testing is delayed and the travel time is extended at the fault of the manufacturer, the manufacturer will be responsible for all incidental costs associated with such delays (hotel, meals, flight change fees, etc.)

1. Capacity Test: For each ton below AHRI 550/590 tolerance; five hundred dollars per ton will be assessed to the chiller manufacturer or deducted from the contract price.

2. Power Consumption Test: The power consumption penalty shall be based on the tolerances set forth in AHRI Standard 550/590. The power consumption penalty (P.C.P.) will be calculated based upon the following formula:

P.C.P. = [Measured KW - (scheduled KW)] x $1000/KW

S. Mount chiller on seismic vibration isolators on structural steel as shown. Coordinate exact location and mounting with Structural.

T. Provide differential pressure switch with chiller.

U. Provide full integrated BAS connectivity via BACnet® MS/TP. Coordinate requirements with Andover Controls vendor prior to order being placed. See controls sequences on drawings for capabilities. BAS shall have capability of load limiting chiller.

V. Provide 5 year non-prorated compressor parts and labor warranty as part of the chiller warranty.

W. Chillers shall be Trane or approved equal.

2.6 VARIABLE FREQUENCY SPEED CONTROLLERS:

A. For each motor so scheduled provide a variable frequency, AC, solid state, induction motor speed controller. The speed controller shall be self-contained, with all components enclosed in a NEMA 1 cabinet and be capable of operation 1-40 degrees centigrade. The controller shall be capable in operating with ± 10% of system voltage and 60 Hz ± 3% frequency variation. It shall have 10-1 frequency range. The speed controller shall be wall mounted.

B. The speed controller shall be automatically controlled by a pneumatic 3-15 psi signal, 10 volt dc, 4-20 milliamps, control signal. 20 milliamps shall correspond to maximum speed and 4 milliamps shall correspond minimum speed. The controller shall have capability to invert the input signal, if necessary due to process requirements. Coordinate control signal with controls contractor.

C. The VFD's shall limit harmonic distortion reflected onto the utility system to a voltage and current level as defined by IEEE 519 for general systems applications, by utilizing the standard 3% nominal impedance integral ac three-phase line reactor. An isolation transformer or external line reactor may be substituted as an option. Provide line reactor on the output of the drive to limit standing wave and to prevent damage to the VFD and motor. **All VFD's for motors 100 HP or more shall be Active Front End (AFE) utilizing insulated gate bipolar transistors (IGBTs) instead of diodes in the rectifier circuit. Active Front End (AFE) drives shall limit total harmonic distortion to 3%.**

D. Total harmonic distortion shall be calculated under worst case conditions in accordance with the procedure outlined in IEEE Standard 519-1992. Copies of these calculations shall be provided in the submittal. The contractor shall provide any needed information to the VFD supplier three (3) weeks prior to submittal date.

E. If the system cannot meet the IEEE 519-1992 harmonic levels with VFD's provided with the standard input line reactor or optional input isolation transformer, the VFD manufacturer shall supply a twelve pulse, multiple bridge rectifier ac to dc conversion section with a phase shifting transformer.

F. The speed controller shall be completely prewired at the factory and shall have one input power connection and one output power connection to the motor. If isolation transformer, line filters, or other equipment is required external to the speed controller cabinet, then all interconnecting wiring shall be provided at no extra cost to the Owner. See Electrical single line wiring diagram for input wire size and lug size required.

G. Sound power developed by speed controllers shall not numerically exceed NC-75 sound pressure and by motors shall not exceed 4 dB(A) above specific motor across the line delivered sound pressure levels in 2nd through 8th octave bands.

H. VFD programmable parameters shall be adjustable from the keypad. The display shall be alphanumeric, programmable with status indicators. The display shall be in plain English words for parameters, status and diagnostic messages. Alphanumeric codes and/or tables are unacceptable.

I. Standard advanced programming and trouble-shooting functions shall be available by using a personal computer's RS-232 port or RS-485 port and Windows™ based software. In addition, the software shall permit control and monitoring via the VFD's RS-232 port or RS-485 port. VFD manufacturer may offer a BAS serial link and field bus adapter for standard protocols.

J. Provide two (2) programmable Form C contact outputs (one for motor running and one for fault trip) and one (1) programmable 24VDC open collector output (for drive ready).

K. Provide six (6) digital inputs for start/stop, local/remote, external interlock, two preset speeds and run enable.

L. The drive shall record and log faults. The VFD shall display all faults in plain English.

M. The variable frequency drive(s) and all components shall be designed, manufactured and tested and approved in accordance with the latest applicable ANSI, IEC, UL, CUL, CSA and NEMA standards. Each drive shall be rated to withstand a minimum of 65,000 amps fault current. (Verify available fault current with electrical.)

N. The supplier of the drive assembly shall be the manufacturer of the electromechanical power components used within the assembly, such as bypass contactors, circuit breaker, fused disconnect switch devices when specified.

O. The supplier of this equipment shall have produced similar electrical equipment for a minimum period of ten (10) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

P. The VFD's shall be of the Pulse Width Modulated (PWM) design converting the utility input voltage and frequency to a variable voltage and frequency output via a two-step operation. Adjustable Current Source VFD's are not acceptable. Insulated Gate Bipolar Transistors (IGBT's) shall be used in the inverter section. Bipolar Junction Transistors, GTO's or SCR's are not acceptable.

Q. The VFD's shall be capable of operating any NEMA Design B squirrel cage induction motor, regardless of manufacturer, with a horsepower and current rating within the capacity of the VFD. VFD carrier frequency shall be limited to 3-8 kHz for optimum motor performance.

R. The VFD's shall be able to start into a spinning motor. The VFD's shall be able to determine the motor speed in any direction and resume operation without tripping. If the motor is spinning in the reverse direction, the VFD's shall start into the motor in the reverse direction, bring the motor to a controlled stop, and then accelerate the motor to the preset speed.

S. The speed controller shall incorporate the following minimum features:

1. Door interlocked circuit breaker or disconnect switch with input fuses capable of being locking in off/open position.

2. All control inputs isolated from ground and power.

3. Hand-off-automatic selector (on face of panel).

4. Ground fault protection, over current, over voltage, under voltage, over temperature, loss of speed reference, and UL 5086 motor overload protection.

5. Pilot light indication for VFD and bypass modes (on face of panel).

6. Individual acceleration/deceleration adjustments.

7. Maximum and minimum speed adjustments.

8. 120V AC control power transformer for low voltage control that can easily interface with building safe interlock circuits.

9. Solid State microprocessor based logic for starting and stopping motors.

10. One analog output signal for output frequency.

11. Insensitivity to incoming phase rotation.

12. Auto reset with coast down timer with 0.05 second dropout (after power or thermal shutdown).

13. Output current limiters.

14. Motor stall protection.

15. Manufacturer's warranty of 2 years from date of start-up.

16. Output isolation contactor.

17. Bypass contactor mechanically and electrically interlocked with the output isolation contactor.

18. Overload relays for bypass contactor.

T. Provide factory check-out and start-up service.

U. Speed controllers shall be suitable for use with current shown on the Electrical drawings.

V. Speed controllers shall be ABB ACH-580, Danfoss, Reliance, Square D, Cutler-Hammer.

2.7 BASE MOUNTED PUMPS:

A. Base mounted pumps: enclosed impeller design, arranged to permit removing impeller without dismantling piping. Motors: 1800 rpm, drip proof, high efficiency (see Motors). Provide casings designed for pressure shown, but not less than 175 psig at suction. Provide motors sized to prevent overload at zero head horse power with impeller furnished.

B. Shafts: turned from heat treated carbon steel, key seat for the impeller, threaded for shaft nuts, finish turned over entire surface.

C. Shaft Sleeves: Equip portions of the shafts coming in contact with the water with removable bronze or stainless steel sleeves.

D. Impeller: bronze with machined finish on the outside and smooth surfaces inside, balanced to prevent vibration. Impeller diameters shall not exceed 85% of maximum diameter for volute.

E. Casing wearing rings: bronze, easily replaced, installed to prevent rotation.

F. Equip pumps with mechanical seals suitable for use with design water temperatures. Provide 1 spare shaft seal of each size used on job.

G. Bearings: ball grease lubricated type of ample size to insure cool running without the necessity of water cooling, effectively sealed against the entrance of water, dust or dirt and leakage of grease.

H. Couple motor to pump with flexible coupling equal to Dodge "Paraflex".

I. Mount motor and pump on common rigid steel or cast iron base and grout pump base per manufacturer's recommendations.

J. Pumps shall be Armstrong, Aurora, Bell & Gossett, Patterson or Taco.

K. Align pump and motor in accordance with manufacturer's instructions. Check alignment after first 8 hours operation.

2.8 CUSTOM (PANEL CONSTRUCTION) HORIZONTAL AIR HANDLING UNITS:

A. Horizontal air handling units: factory fabricated units having capacity shown, consisting in general of a mixing box section, a filter section, a preheat coil section, an access section, a cooling coil section, drip pan and drain sections, and supply and return fan sections, all the product of a single manufacturer. Provide all sections of the same frame size with support rails for all sections. Mount units on ribbed neoprene pads on concrete curbs as shown.

B. Casing: not lighter than 18 gauge galvanized steel, all sections of casing insulated with 2" thick 3 lb./cu.ft. coated fiberglass insulation. All sections shall be of double wall construction with solid 26 gauge galvanized steel liner on air side of all sections except coil section, which shall be solid.

C. Drain pans: double construction with insulation between pans and 16 gauge type 304 stainless steel inner pan.

D. Coil sections shall be double wall solid construction with the coils scheduled. Coils shall comply with the requirements below for coils. Cooling coils shall have stainless steel coil casings.

E. Provide spacer sections for installing control bulbs between pre-heat and cooling coils. At least 18" space must be provided between preheat and chilled water coils.

F. Provide hinged and latched access doors in casings at fan sections, filter sections, plenum sections, upstream and downstream from cooling coils and elsewhere as shown and/or required for access to equipment and/or controls. Doors shall be double wall construction with insulation between 2 sheets 24-gauge galvanized steel. Set doors in frames arranged so that doors will be sealed to exterior of casing. Equip each door with at least 2 hinges and 2 sets of double acting latches. Latches shall be heavy-duty cast, UV-rated, nylon handles with a lever handle on the outside and a lever handle on the inside of the casing. The door frame shall be extruded aluminum with a built in thermal break barrier and full perimeter gasket. The door hinge assembly shall be die cast zinc with stainless steel pivot mechanism, completely adjustable. All pressurized access doors shall open into the fan section. Install gaskets at all section connections. Provide ETL, UL1995 and Cal-OSHA approved tool operated safety latch on all fan section access doors.

G. Automatic dampers shall comply with the requirements for automatic dampers below.

H. Air filters: see equipment schedule and "Air Filters". Provide side access filter sections, complying with the requirements under "Air Filters".

I. Provide vapor proof marine lights in all sections. Lights shall be factory wired with switches located next to access door. Wiring to be in compliance with NEC and Division 26.

J. Smoke dampers shall comply with the requirements for smoke dampers below.

K. Fans: Plug fan forward curved or backward curved blade centrifugal fans, complying with the requirements for "Centrifugal Fans, General" statically and dynamically balanced to a peak vibration velocity of 0.157 inch/second, with corrosion resistant coating. Bearings shall be minimum L_{10} 200,000 hour self-aligning grease lubricated ball bearings. Grease fittings shall be extended to accessible locations after units are installed. Fan and fan motor shall be mounted on spring isolated base inside unit, and snubbing isolators shall be provided for discharge flexible connections. Isolators shall comply with the requirements for Vibration Isolators (Section Materials & Methods, HVAC). Fan motor shall be mounted on an adjustable base and shall be equipped with V-belt drive sized for 150% motor nameplate rating, adjustable pitch motor pulley for motors 25 H.P. and smaller. Provide variable frequency drive. For plug fan section access doors provide time delay door switches, chains and screened wheel guards.

L. AC units shall be Trane Air System or equal.

2.9 SPLIT SYSTEM AIR CONDITIONERS - SMALL:

A. Split system air conditioners shall consist of a wall mounted indoor section, outdoor condensing unit, connecting refrigerant piping, and electronic controls. System shall be UL rated.

B. Indoor unit shall consist of centrifugal evaporator fan(s), evaporator coil, drain pan with condensate pump and safety switch, all enclosed in a plastic casing equipped with adjustable supply grille and return air grille. Provide 3 pole disconnect switch.

C. Outdoor unit shall consist of compressor, condenser coil, condenser fan, and controls, all enclosed in a metal grilled cabinet suitable for roof or pad mounting. Provide refrigerant piping kit, pre-insulated, properly sized for capacity shown. (See drawings to determine length.) Provide low ambient operation to 20°Fdb outdoors.

D. Controls shall consist of a wall mounted remote controller utilizing a microprocessor. Functions shall include:

1. Computerized dehumidification.
2. Operation mode setting.
3. Self-diagnostic display.
4. Room temperature display.
5. Twenty-four hour on-off timer.
6. Fan speed indicator.
7. Memory.
8. Low ambient operation.

E. Split system air conditioners shall be Trane-Mitsubishi, Carrier, Daikin, Gree or approved equal.

2.10 SPLIT SYSTEM HEAT PUMP - VRF:

A. Split system air conditioners shall consist of a wall or ceiling mounted indoor section, outdoor heat pump unit, connecting refrigerant piping, and electronic controls. System shall be UL rated.

B. Indoor unit shall consist of centrifugal evaporator fan(s), evaporator coil, drain pan with condensate pump and safety switch, all enclosed in a plastic casing equipped with adjustable supply grille and return air grille. Provide 3 pole disconnect switch.

C. Outdoor unit shall consist of compressor, condenser coil, condenser fan, and controls, all enclosed in a metal grilled cabinet suitable for roof or pad mounting. Provide refrigerant piping kit, pre-insulated, properly sized for capacity shown. (See drawings to determine length.)

D. Refrigerant: R-454B or R-32.

E. Controls shall consist of a wall mounted remote controller utilizing a microprocessor. Functions shall include:

1. Computerized dehumidification.
2. Operation mode setting.
3. Self-diagnostic display.
4. Room temperature display.
5. Twenty-four hour on-off timer.
6. Fan speed indicator.
7. Memory.

F. Split system heat pump – VRF shall be Trane-Mitsubishi, Carrier, Daikin, Gree, or approved equal.

2.11 COILS

A. Rated in accordance with ARI Standard 410-72 with capacities and dimensions shown.

B. Provide coils (other than sprayed coils) with aluminum fins and seamless copper tubes.

C. Sprayed coils shall have copper fins and seamless copper tubes. Solder coat fins and tubes.

D. Headers may be iron castings or steel or copper tubing. Braze return bends.

E. Space fins not closer than 10 per inch except that fin spacing may be decreased to maintain maximum coil depth of 8 rows.

F. Circuit water coils to maintain pressure drops shown.

G. Prove coils tight with 200 psig under water air test.

H. Coil casings: 16 gauge stainless steel with flanges drilled for mounting.

I. Coils: Trane or approved equal.

2.12 AIR FILTERS:

A. 2” thick pleated MERV 13.

B. Side access housings shall have PVC air seals. All housings shall have hinged and latched access doors and slide-in racks for filters. Housings shall be double wall with solid liner and 2” insulation constructed the same as the air handling unit casings.

C. For each pre-filter bank, each after-filter bank, and each exhaust filter provide one magnehelic gauge with static pressure tips, shut off and vent cocks, range 0 to 3" WG.

D. Turn system over to Owner with clean filters. Provide two (2) complete sets of spare filters for each AHU/RTU system.

2.13 IN-LINE CENTRIFUGAL FANS:

A. AMCA approved air and sound rated direct (or) belt driven fans (as scheduled), complete with V-belt drives sized for 50% overload, self aligning grease lubricated ball bearings, adjustable pitch motor pulleys, adjustable motor bases and statically and dynamically balanced backward curved blade wheels, all enclosed in a galvanized steel housing with inlet bell and outlet duct collars. (Fan wheel and motor assembly shall be hinged for access.)

B. Fans shall be Greenheck type SQ, Carnes, Peerless, Acme, Penn or Loren Cook.

2.14 CEILING EXHAUST FANS:

A. AMCA rated direct driven centrifugal fans designed for ceiling mounting, complete with removable white aluminum, ceiling grille insulated housing, fan speed controllers, rubber-in-shear isolators, disconnect switch, and integral back draft damper. Max. noise level: 5 sones.

B. Fans: Greenheck SP, Acme, Penn or Loren Cook.

2.15 ELECTRIC WALL HEATERS:

A. UL listed recessed convection heaters with finned sheathed heating elements, resiliently mounted direct driven propeller fan with motor heat shield, concealed thermostat, concealed on-off switch, high limit controls, and junction box for connecting power wiring.

B. Cabinets: 16 gauge steel, with pencil proof welded steel bargrilles (bars 1/16" x 3/8" minimum). Equip cabinet with adjustable recessing frame. Finish: Baked enamel, over bonderizing. Architect will choose color from manufacturer's standard selections.

C. Electric wall heaters: 2 KW and larger, Markel 3400 series, less than 2 KW, Markel Series 3120, Erincraft AWH or equal.

2.16 ELECTRIC DUCT HEATERS:

A. Slide-in heaters with all sheet metal parts inside duct aluminized or galvanized steel, listed in the Underwriters Laboratories, Inc. Electrical Appliance & Utilization Equipment List.

B. Heaters shall have ceramic supported nichrome wire elements, flanged mounting plate, control box and 1/2" insulation between mounting plate and control box. Provide spacers at terminal end of heater so that internal duct insulation will not cause hot spots. Provide general purpose control boxes for indoor heaters and weather-tight control boxes for heaters located outdoors. (Connections between control box and duct shall be airtight under 2"WG static pressure.)

C. Control box shall contain non-fused disconnect switch, fuse blocks and fuses for each phase, 3 pole contactors for 3 phase heaters and 2 pole contactors for single phase heaters other than 277 and 120 volt heaters. (Contactors shall be designed for quiet operation.) Contactors shall be factory wired to terminal strips.

D. Controls: SCR modulating control with factory wired automatic high limit control, air flow switch, and a supplementary independent thermal device to disconnect all power circuits in case automatic high limit fails, factory supplied control circuit transformers suitable for 24 volt control, factory wired to terminal blocks in control box.

E. Provide staging as shown.

F. Provide camlocked duct access doors at electric heaters.

2.17 DEDICATED OUTSIDE AIR ENERGY RECOVERY UNITS (ENTHALPIC CORE):

A. Units shall be packaged energy recovery ventilators. Units shall have the ability to transfer sensible and latent energy at an effective rate of not less than 75%. Units shall be horizontal flow. Units shall be capable of operating at outdoor ambient temperatures up to 130ºF and down to 5ºF without the need for a frost control accessory. Units shall not require a condensate drain. Units shall be factory assembled, fully wired and tested prior to shipment. Wiring shall require only a single point power connection to the service disconnect and interconnection of low voltage control wires from the unit to a remote control device. Units shall be shipped with complete installation, operating and maintenance instructions. Units shall be U.L. listed.

B. Units shall contain an integral enthalpic core heat exchanger constructed of aluminum and polymer sheets.

C. All components shall be contained within a 16 or 18 gauge galvanneal steel cabinet finished with a polyester powdercoat oven baked enamel. All components shall be readily accessed through removable supply and exhaust access panels equipped with handles. Internal cabinet components shall be formed galvanized steel and shall provide structural support to side and top panels. Unit shall be fitted with lifting straps attached to four corners. All necessary cabinet and internal partitions shall be fully insulated with 1" rigid insulating board to prevent migration of moisture and provide a smooth aluminum foil surface to avoid bacterial growth and facilitate cleaning. Units shall have horizontal discharge and intake openings.

D. Supply and exhaust fans shall be direct drive backward inclined fans with ball bearing support collars. Fan motors shall be continuous duty, resilient mount, ball bearing construction with automatic thermal overload protection and class B insulation. Provide preprogrammed variable frequency drives for each fan.

E. Filters shall be MERV 13 pleated type, 2" thick. Provide filters for both outside air and exhaust air streams. Provide clean filters at final and one complete set for Owner’s first filter change.

F. Provide all controls, remote temperature and humidity controller, including motor starters, disconnect switch, fuses and terminal strips.

G. Sequence of Operation:

1. Occupancy:

a. The controller shall enable occupancy via BAS communication signal.

b. The controller shall perform the following functions in the occupied mode:

1) Open the outdoor air damper and exhaust air damper.

2) Enable the supply fan upon closure of the outdoor air damper end switch.

3) Enable the exhaust fan 30 seconds after closure of the supply fan pressure switch.

c. The controller shall disable occupancy via BAS communication signal.

d. The controller shall perform the following functions after occupancy is disabled.

1) Cooling, dehumidification, or heating shall be disabled.

2) After 30 seconds (adj.) the supply fan shall be disabled.

3) Outdoor air damper shall be de-energized and fail closed.

4) Exhaust air damper shall be de-energized and fail open.

2. Night Setback (No Occupancy):

a. Unit shall enable night setback under any one of the following conditions.

1) Relative humidity in the space is greater than 55% (adj.) OR dew point in the space is greater than 53°F (adj.).

2) Space temperature is greater than 80°F (adj.).

3) Space temperature is less than 60°F (adj.).

b. The controller shall perform the following functions in the night setback.

1) Supply fan shall enable.

2) Temperature and humidity control sequence shall enable.

c. The controller shall disable night setback under any one of the following conditions.

1) Space conditions are satisfied.

2) Internal time clock in microprocessor controller determines unoccupied mode.

3) Dry contact for occupied mode is closed.

3. Temperature Control:

   a. The controller shall enable the temperature control sequence when any of the following conditions are met.

      1) Occupancy mode.

      2) Night setback mode enabled.

   b. The supply air temperature setpoint shall be determined by the following inputs. Space temperature and humidity control with supply air reset or PID loop driven by user-defined space temperature setpoint within the supply minimum and maximum set points.

   c. The controller shall enable the following modes of operation in order to maintain the supply air temperature setpoint.

      1) Heating.

      2) Energy recovery.

      3) Cooling.

   d. Heating:

      1) The controller shall enable heating under the following condition. Temperature control PID loop determines heating required due to the difference between the supply air temperature and supply air temperature setpoint.

   e. Cooling:

      1) The controller shall enable cooling under the following conditions. (a). Temperature control PID loop determines cooling required due to the difference between the supply air temperature and supply air temperature setpoint.

4. Dehumidification:

   a. The controller shall enable the dehumidification control sequence when either of the following conditions is met. (Space temperature and humidity control with supply air reset) Outdoor dew point is greater than the outdoor air dew point setpoint AND the outdoor air temperature is greater than the supply air temperature setpoint OR the space relative humidity is greater than the space relative humidity setpoint AND the space dew point is above 45°F.

   b. The controller shall perform the following functions in the dehumidification mode.

      1) Modulate cooling capacity to maintain the coil leaving air temperature setpoint

      2) Modulate hot gas reheat valve to maintain the supply air temperature setpoint.

5. Cooling & Refrigeration – Air Cooled Packaged Direct Expansion:

   a. In cooling mode the controller shall perform the following functions.

      1) Enable the Digital Scroll ™ compressor and modulate capacity to maintain supply air temperature setpoint.

2) If the Digital Scroll™ compressor is not able to maintain the supply air temperature, additional fixed stages of capacity shall be enabled and the Digital Scroll™ shall continue to modulate to maintain the supply air temperature setpoint.

3) If the combination of multiple compressors provided lowers the supply air temperature below its setpoint, the controller shall disable one or more fixed stages of capacity.

b. In dehumidification mode the controller shall perform he following functions.

1) Enable a fixed stage of capacity to maintain or exceed the evaporator coil leaving air temperature setpoint.

2) Modulate the hot gas reheat valve to maintain the supply air temperature setpoint.

3) Enable an additional fixed stage of capacity to maintain or exceed the evaporator coil leaving air temperature setpoint.

4) Enable the Digital Scroll™ compressor to maintain the evaporator coil leaving air temperature setpoint.

c. To maintain a consistent condensing temperature in cooling and dehumidification mode, the controller shall enable and modulate all condensing fans with EC motors at the same speed to maintain a condensing temperature of 110°F.

6. Heating – Electric:

a. In heating mode the unit controller shall perform the following actions.

1) Enable electric heat.

2) Modulate capacity to maintain the supply air temperature setpoint.

H. Units shall be Valent, Greenheck or approved equal.

2.18 WATER SPECIALTIES:

A. Install ASME rated pressure relief valves as noted, providing full size drain lines to within 1 ft. of floor. Relief valves: Watts, McDonnell & Miller, or equal.

B. Install 1/2" IPS x 75 psig WP float type automatic air vents in water lines as shown and/or required to prevent air binding. Run 3/8” OD line to outdoors or nearest floor drain or AC system drain line from each vent. Install a 1/2" ball valve ahead of each air vent. Vents shall be Armstrong, or equal.

C. Strainers: 125 psig WP, pot or angle type as shown. Strainers 2" and smaller: bronze or iron bodies with screwed connections; strainers 2-1/2" and larger: iron bodies and flanged connections. Screens: bronze, monel metal or stainless steel with perforations as follows:

Strainer Size	Perforation Size
3/4" to 2" inclusive	1/32"
2-1/2" to 6" inclusive	1/16"
8" to 12"inclusive	1/8"
Over 12"	1/4"

The free area of each screen shall be not less than three times the area of the strainer inlet pipe. Equip each strainer with 1/2" valved drain, and unless the strainer design is devoid of air pockets, a 1/4" air vent cock.

D. Compression and expansion tanks: black steel (bladder) tanks ASME stamped for 125 psig WP. Provide tappings and specialties as shown. (Initial air charge: as required to provide 10 psig fill pressure at top of system.)

E. Line mounted air separators: tangential separators with tappings shown, without strainers. Separators shall be Bell & Gossett.

F. Install float type water feeders on expansion tanks as shown. Feeders: McDonnell & Miller #25.

G. Install backflow preventers equal to Watts 900 in all (potable) city water connections to HVAC water systems.

H. Install air control fittings equal to Bell & Gosset "Airtrol", in all compression tanks and boilers as shown.

I. Install drain valve with hose connection and air venting provision on each compression tank.

J. Flow control valves: weighted check valves with provision for holding valve open, B&G.

K. Install combination flow control and stop valves equal to B&G "triple duty" valves where shown.

L. Install cast iron suction diffusers with integral strainers, flanged connections, flanged covers and gauge, vent, and drain tappings in pump suctions as shown. Main strainer screens: as specified for strainers, above. Remove start-up screens after system has been flushed.

M. Divertor fittings: B&G monoflo fittings, or equal.

N. Pressure reducing valves for make up water connections 125 psig WP, iron, bronze trim, set point range as required to provide 10 psig fill pressure at top of system, B&G or equal.

O. Install gauge glass sets with valves, drain cock, and protector rods where shown. Do not install gauge glasses on closed compression tanks.

P. Calibrated balancing valves ("Circuit Setter"): 125 psig WP, 2" and smaller bronze, screwed; 2-1/2" and larger IBBM, flanged plug valves. All with indicator for angular position of valve, meter connections with positive shut-off valves and internal seals to prevent leakage around stem. For each valve provide a flow vs. differential pressure vs. angular position calibration chart and pre-formed foam insulation suitable for temperatures from 35 to 250F. Armstrong, B&G, Illinois, Taco or equal.

Q. Flow meters: 150 psig WP venturi flow meters, bronze, screwed in sizes 2" and smaller; steel, butt welded in sizes 2-1/2" and larger, 2% accuracy, maximum line pressure drop 1.0 ft. water. Provide quick connect gauge valves for each venturi meter. For entire job provide one portable cased differential pressure meter with shut-off and vent valves and 40 feet of 150 psig WP hose, together with a calibration curve for each meter. Armstrong, Presco.

2.19 UNDERGROUND INSULATED PIPING SYSTEM (CHILLED WATER LINES)

A. Furnish and install underground, insulated piping as shown. Provide single pipe installed within a prefabricated PVC or FRP conduit casing. Jacketing material: High impact, seamless polyvinylchloride (PVC) Class 12454-B compound conforming to ASTM D1784, Type 1, Grade 1 or filament wound polyester resin/fiberglass reinforced composite (FRP). Minimum jacket thickness 120 mils (PVC) or 85 mils (FRP). Carrier pipe shall be schedule 40 steel, ASTM A-53, Grade B with beveled ends for welding. Piping system shall be rated for minimum 250 ˚F.

B. The unloading, handling and installation of the underground-insulated piping system shall be in strict accordance with the manufacturer's recommendations. Before installation, a factory-trained representative of the pipe manufacturer shall examine the pipe for damage. All damaged piping shall be repaired in accordance with manufacturer's recommendations or discarded. A qualified, factory-trained representative of the piping manufacturer shall be present during all critical periods of the installation and testing of the piping system, and shall furnish a certificate upon completion of the installation indicating that the system was installed in accordance with the manufacturer's recommendations. The factory representative shall provide training to the contractor for installation of joints, fittings, etc. and shall supervise the installation of all pipe and jacket joints.

C. Hydrostatically test all piping in the field under a pressure of 250 psig or twice the working pressure, whichever is greater, and hammer test all piping joints. All pressure testing shall be conducted prior to any joint insulation in the presence of the owner's representative. If any joints are covered prior to observation of testing by the owner's representative, and his submission of a written authorization to proceed, the joints shall be uncovered and the system shall be retested. Give 24 hours prior notice to architect prior to testing.

D. Piping shall be insulated with two component Polyurethane Foam, none shrinking, 3.0 lbs/cubic foot density, 0.140 BTU-inch/hour-˚F-ft², closed cell content of 90-95% in conformance with MIL-1-24172 and ASTM C-591 completely filling the annular space between carrier pipe and jacketing. Minimum insulation thickness shall be 1.5 inches. Carrier pipe shall be concentric to casing pipe within ¼" at the casing center point and within 1/16" at the end seals. After welding and testing, all joints shall be insulated and sealed in accordance with manufacturer's recommendations.

E. All fittings including elbows, expansion loops, anchor plates, and oversized jacketing for expansion shall be factory fabricated, insulated and jacketed. All expansion capability required for the system shall be provided in expansion loops or expansion elbows. Only straight pipe joints shall be field fabricated and insulated. Submit piping layout with routing, expansion loops, expansion elbows, anchors, thrust blocks, etc. as recommended by the piping manufacturer. Submit details of all factory fabricated fittings, expansion elbows, and expansion loops. All fittings shall be of the same material as the straight pipe. Provide concrete thrust blocks at piping anchors as recommended by the manufacturer.

F. Provide rubber end seals tight fitting to carrier pipe for each section of pipe and fittings. Rubber end seals shall be high temperature heat resistant Ethylene Propylene Diene Monomer (EPDM). Provide jacket end caps where piping system terminates underground and PVC insulation caps where piping terminates in mechanical rooms. Painted mastic end seals are not acceptable.

G. Furnish and install a concrete anchor block poured around each steel anchor plate in accordance with details and manufacturer's recommendations. The anchor plates shall be 1/2" thick steel plates welded to the carrier pipe and sealed to the pipe jacketing in accordance with manufacturer's recommendations. Submit anchor plate details.

H. Base of trench shall be of clean earth, sand, or limestone screening to provide a 4" thick bed properly hand tamped. Backfill shall be clean earth, sand, or limestone screening completely enveloping piping on both sides and top to a minimum thickness of 18". All backfill shall be carefully hand tamped in 6" layers until 18" has been deposited over top of bed and placement of piping prior to beginning backfilling and first 6" thick hand tamped backfill layer. If the owner's representative does not observe the pipe bed or backfill and submit a written authorization to proceed, then all backfill shall be removed and reinstalled in accordance with the above methods. Give 24 hours prior notice to Architect prior to required observation by owner's representative.

I. The underground piping system shall be Thermal Piping System. For consideration of other manufacturers, submit complete manufacturer's product data and experience of local representative.

END OF SECTION

SECTION 23 6000

AIR DISTRIBUTION

PART 1 - GENERAL

1.1 SCOPE:

A. Section 23 0500 – "General Provisions – HVAC" shall apply to and become part of this Section.

1.2 SHOP DRAWINGS:

A. See Section 23 0500 – "General Provisions – HVAC".

B. Ductwork Shop Drawings shall include details of duct construction: seams, joints, gauges, reinforcing, elevations, and hanger details for each pressure class and size range together with details of turning vanes, branch connections, dampers and access doors. Include access door locations and sizes. Identify on the shop drawings duct sections as they will be identified for fabrication and installation. Provide section drawings of locations where ducts cross or demonstrate with elevations that ducts will fit.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Air terminal submittal data shall include, for each terminal, both radiated and discharge sound power in DB re 10 to the minus 12 watts in octave bands 2 through 7. All air terminal controls shall be installed in a unit mounted control panel and shall be UL listed as an assembly.

2.2 VARIABLE AND CONSTANT VOLUME TERMINAL BOXES:

A. Variable volume units consisting in general of a single duct attenuating box with automatic volume regulator. Where shown, provide electric heating coil. Maximum air pressure drop through box, reheat coil and attenuator where required shall not exceed 0.5" WG. Air terminal boxes shall be ARI certified and UL listed as an assembly. Electric heaters shall comply with Section 235000 "Electric Duct Heater".

B. Discharge sound power levels referenced to 10 to the minus 12 watt in second through seventh octave bands, respectively, shall not exceed the following for boxes operating with 1" static pressure difference. Boxes up to 300 CFM: 67 DB, 62, 50, 49, 45, 40. Boxes over 300 CFM: 76DB, 69, 67, 62, 58, 52. Provide rectangular sound absorbers if required to meet above noise criteria. (See "Sound Absorbers", below.) Locate sound absorbers at least 5 inlet diameters downstream from boxes.

C. Radiated sound power for boxes operated with 1" static pressure difference shall not exceed 60 DB re 10 to the minus 12 watt in the second octave band (125 cps).

D. Attenuating box shall be constructed of G90 galvanized steel sufficiently heavy to prevent oil canning and fluttering but not lighter than SMACNA gauge for 2" pressure class duct of same dimensions as box. Box shall be lined with 1/2" thick glass fiber sound insulation complying with fire hazard classification specified for duct insulation. No insulation edges shall be exposed in box. Each box shall be equipped with an access door for access to coil and volume regulator.

E. Coils shall comply with the requirements for Coils, Section "Heating and Air Conditioning Equipment and Specialties". Coil casings, return bends and headers shall be equipped with sheet metal covers insulated with 3/4" foamed plastic insulation to prevent sweating. See insulation section for foam plastic insulation specification.

F. Box controls shall provide pressure independent operation and velocity sensors shall be of multiple point averaging type, unaffected by inlet conditions. (If box manufacturer requires straight duct on box inlet, such straight duct shall be furnished with the box.) All box controls except room thermostat and water coil valve shall be factory installed and shall be calibrated by the box manufacturer. Controls shall be by the control manufacturer (except velocity sensor and volume dampers shall be furnished by the terminal manufacturer), and shipped to the terminal manufacturer for installation and calibration. Controls shall be Direct Digital Control as specified. Pressure taps and a calibration curve or similar method of field measuring box air rate shall be provided for each box. A photostat of the box control diagram shall be cemented to each box. Permanently mount all relays and pressure switches on box and provide control panel with cover for all controls.

G. Provide single point power connection for all components, electric heater fusing and auxiliary protection, and disconnect switch. Provide 24 volt control power transformer as required for single point power connection.

H. Box control schemes shall be as shown on drawings.

I. Boxes shall be Enviro-Tec, Price, Titus, or Trane.

2.3 GRILLES, REGISTERS AND DIFFUSERS:

A. General: Air devices may be Price, Titus, Krueger, Nailor, or approved equal. Titus part numbers are given for reference. Coordinate border and frame types for air devices with ceiling types as shown on Architectural Reflected Ceiling Plan.

B. Rectangular Louver Face Diffusers One-, Two-, Three-, Four-Way or Corner Throw (LD or CD): Fixed pattern louver face diffusers, all aluminum with white enamel finish, removable cores latched in place, opposed blade dampers, adjustable multiblade scoops, #TDC,-AA.

C. Curved Blade Diffusers, One-, Two-, Three-, Four-Way Throw (CBD-l, -2, -3, -4): All aluminum adjustable curved blade diffusers with plaster frames, opposed blade dampers and multiblade scoops, white enamel finish #250-AA.

D. Round Ceiling Diffusers (CD): Fixed pattern louver face diffusers, all aluminum with white enamel finish, removable cores latched in place, opposed blade dampers, adjustable multiblade scoops, #TMR,-AA.

E. Linear Diffuser/Boot: Fixed pattern extruded aluminum 2-way throw diffuser designed for variable volume use, mounted on outlet of galvanized steel boot with 1/2" internal insulation, and round side inlet collar with damper. Diffuser/Boot shall be designed to lay into ceiling grid and be supported by grid. Provide all necessary mounting clips and accessories. Boot insulation shall comply with the requirements for duct insulation, internal. Diffuser finish: off white enamel, #MLF.

F. Supply Registers (SR): Adjustable vertical face bars, adjustable horizontal rear bars, opposed blade dampers, plaster frames, adjustable multiblade scoops, all aluminum with prime coat finish: #272.

G. Drum Louvers (DL): Adjustable vertical blades and rotating drum with optional opposed blade damper with screwdriver operator accessible through discharge of DL. All aluminum finish with prime coat.

H. Wall Return Registers (WRR): All aluminum, aluminum lacquer finish, horizontal bars fixed at about 35° angle, plaster frames, opposed blade damper #350. (Wall Return Grilles {WRG} Delete opposed blade damper).

I. Wall Exhaust Registers (WER): Same as wall return registers.

J. Ceiling Return Registers (R): All aluminum, 1/2" x 1/2" x 1/2" cube core, plaster frame, opposed blade dampers, white enamel finish #50F. Omit dampers for registers not attached to return ductwork.

K. Ceiling Exhaust Registers (E) and Ceiling Transfer Registers (T): Same as Ceiling Return Registers.

2.4 SHEET METAL SPECIALTIES:

A. Make rectangular take-offs in low pressure supply, return, and exhaust ducts using 45° entry tap (SMACNA Duct Construction Standards “Branch Connections” figure #2-6) with manual damper with end bearings and locking quadrant in branch. Saw-mark ends of damper rods parallel to blades. End bearings and quadrants shall have air tight duct connections and shaft seals: Duro-Dyne or equal.

B. Manual balancing dampers: comply with SMACNA HVAC Duct Construction Standards, figure 2-12 and 2-13. Equip all dampers with locking quadrants and end bearings. Saw-mark ends of damper rods parallel to blades. End bearings and quadrants shall have air tight duct connections and shaft seals, Duro-Dyne or equal.

C. When Damper quadrants are located other than above lay-in ceilings.

1. Substitute Young number 315 or 270-896C adjustable cover concealed regulators or Ventlock #677 regulators and an additional end bearing for the quadrant (regulator covers shall be white). Provide all cable, gears, joints, rods, etc. as required to place the regulator in the ceiling within 6 feet horizontal of the damper, as directed by the Architect.

2. Provide an access door for access to the quadrant (See "Access Doors", hereinafter).

D. Provide "Stand-offs" (hat sections) for damper quadrants, controls, etc., on externally insulated ducts. "Stand-offs" are required at quadrants on spin-in dampers.

E. Branch duct connections for connecting round low pressure branches to rectangular low pressure trunks: galvanized steel spin-in or side takeoff fittings with integral dampers, collars, similar and equal to Flexmaster, Series FLD or STOD for sheet metal trunks and Series DBD for fibrous trunks with stand-offs. Provide integral dampers with 2” insulation build-out, shaft, U-bolt, nylon bushings, locking quadrant and handle. Gauges: as required for pressure class. (26 gauge minimum.)

F. Branch duct connections for connecting round medium pressure duct to rectangular medium pressure duct: galvanized steel bellmouth fitting with neoprene gasket and pre-drilled mounting holes equal to Buckley Air-Tite. Gauges as required for pressure class (24 gauge minimum). Flexmaster STO or approved equal may be substituted at contractor’s option (24 gauge minimum). Branch duct connections for connecting round medium pressure duct to round or flat oval medium pressure duct: galvanized steel conical saddle or flanged fitting equal to United. Gauges as required for pressure class (22 gauge minimum).

2.5 FLEXIBLE DUCT CONNECTIONS:

A. Install Neoprene coated glass cloth flexible connections at all duct connections to all fans, all AC Units and all powered induction units. Install braided copper grounding straps across two sides of the connection.

B. Install flexible connections in all ducts at building expansion joints.

2.6 DUCTWORK - GENERAL:

A. Unless otherwise shown or specified construct ducts of galvanized steel sheet metal using gauges and recommended details as contained in the current edition of the SMACNA HVAC Duct Construction Standards. Ductwork shall include supply air, exhaust air, return air, and outdoor air ducts, together with all necessary fittings, splitters, dampers, quadrants, flexible connections, sleeves, hangers, support, braces, etc. Hang and install ducts in a neat and workmanship manner with adequate bracing and cross breaking to prevent breathing, rattling, and vibration. **DO NOT USE SNAP-LOCK SEAMS**.

B. Install Duro-Dyne locking quadrants and Duro-Dyne end bearings on all splitters and manual volume dampers located above accessible ceiling and Young #315 regulator, and Duro-Dyne end bearings elsewhere. Provide stand-offs for quadrants on externally insulated ducts. (Refer also to “Sheet Metal Specialties.”)

C. Duct dimensions are **net dimensions inside insulation**. Determine gauges by actual duct size.

D. All duct turns (except as noted below for 90 degree turns) shall be radiused with a centerline radius of 1.5 times the duct width in the plane of the turn. At the contractor’s option, 90 degree turns may be square throat elbows vaned to provide a dynamic loss coefficient (“C”) not greater than 0.2 or shall be radiused. Do not use “push on” vane runners. Duct turns less than 20 degrees may be mitered. Do not use off-sets that reduce the cross-sectional area of the duct.

E. Duct Sealing: Seal duct seams and joints after assembly as noted below. Seal entire circumference of all branch duct connections, tapping collars and spin-ins. Seal ducts using mastic sealant equal to solvent based United Duct Sealer.

1. Class A Seal: Seal all joints and seams and leak test at pressure specified. Leakage cfm per 100 sq. ft. duct surface area shall not exceed 8 times the square root of the test pressure in inches of water and no leaks shall be audible.

2. Class B Seal: Seal entire circumference of all transverse joints, seal all longitudinal joints.

3. Class C Seal: Seal entire circumference of all transverse joints.

4. Class D Seal: Seal corners of transverse joints.

2.7 DUCTWORK - MEDIUM PRESSURE, RECTANGULAR:

A. Ductwork medium pressure, rectangular shall include all concealed and exposed medium pressure supply duct.

B. Provide galvanized steel sheet metal ducts of sizes shown on plans, and construct gauges and recommended detail for 6" pressure class as contained in current edition of the SMACNA Duct Construction Standards. **DO NOT USE SNAP-LOCK SEAMS.** Use reinforcement noted for the longest side on all sides of the duct and bolt together at corners with minimum 5/16” diameter bolts. Do not penetrate duct at reinforcement or hangers.

C. Rectangular plenums at air handling unit discharge for connections of flat oval supply ductwork or rectangular return ductwork shall be factory insulated galvanized steel consisting of an 18 ga. outer shell, 1" fiberglass insulation, and 24 gauge perforated steel liner with mylar film between insulation and perforated liner. United Rectangular K-27, Eastern Sheet Metal or approved equal.

D. Provide hangers for medium pressure rectangular ducts consisting of a P2000 Unistrut trapeze and 3/8" diameter rods. Do not penetrate the ductwork with screws at the hangers.

E. Seal all ducts to SMACNA Class (A) classification and pressure leak test at 6" WG.

2.8 DUCTWORK – LOW PRESSURE INSULATED ROUND DOUBLE WALL:

A. Round insulated double wall ductwork includes all round exposed supply air ductwork where indicated on plans.

B. Ductwork: Factory fabricated galvanized steel round spiral lock seam ducts of 26-gage for ducts up to 8” in diameter, 24 gauge for ducts from 9” to 22”, and 22-gauge for ducts 24” through 36” in diameter. Lock seams shall be spaced on not more than 3” centers for ducts up to 5” in diameter, 6” centers for ducts from 6” through 10”, and 8” centers for ducts 12” and over in diameter.

C. Fabricate fittings by continuous brazing or electric welding. Thickness of metal for round fittings: as specified for longitudinal seam ducts but not less than 22 gauge. Elbows shall have centerline radius of 1.5 diameters, 5 piece construction over 8” diameter, die stamped 8” and smaller. 90-degree take-offs shall be made with conical tees. Make connections to plenums with bellmouths.

D. Make transverse joints using beaded slip couplings, sealing compound equal to United “Duct Seal”, and sheet metal screws.

E. Seal all concealed ducts to SMACNA Class (C) classification. All exposed round shall not be sealed.

F. Hang ducts using 1” x 12-gauge straps at transverse joints but not more than 8’-0” apart. Strap shall completely encircle duct and shall be secured to construction with powder driven studs. Do not penetrate the ductwork with screws at the hangers.

G. Ductwork shall be factory insulated consisting of a spiral lockseam outer shell, 1” thick fiberglass (3 pcf) insulation and an interior perforated galvanized steel liner. Outer shell shall have “paint grip” finish to accept epoxy paint finish. No adhesive labels shall be placed on the exposed surface of exposed ductwork.

H. Duct and fittings shall be United McGill Airflow, Semco, Spiral Systems, Spiral Pipe of Texas or Eastern Sheet Metal.

2.9 DUCTWORK - MEDIUM PRESSURE ROUND DOUBLE WALL:

A. Medium pressure round double wall ductwork includes all round ducts between AC Unit discharges and terminal units.

B. Ductwork: Factory fabricated and insulated galvanized steel round spiral lock seam ducts with outer shell, 1” thick fiberglass insulation inside shell, interior perforated steel liner with mylar film between insulation and liner. Duct gauges shall be 26-gauge for ducts up to 8" in diameter, 24 gauge for ducts from 9" to 22", and 22-gauge for ducts 24" through 36" in diameter and 20 gauge for ducts over 36" in diameter. Lock seams shall be spaced on not more than 3" centers for ducts up to 5" in diameter, 6" centers for ducts from 6" through 10", and 8" centers for ducts 12" and over in diameter. Interior perforated steel liner shall be minimum 24 gauge.

C. Fabricate fittings by continuous brazing or continuous electric welding. Thickness of metal for round fittings: 20-gauge for ducts up to 36" in diameter, 18-gauge for 37" to 50", and 16-gauge for ducts over 51" in diameter.

D. Elbows shall have centerline radius of 1.5 diameters, 5 piece construction over 8" diameter, die stamped 8" and smaller. 90-degree take-offs shall be made with conical tees. Make connections to plenums with bellmouths. Fittings shall have insulation and liner same as ductwork noted above.

E. Make transverse joints using beaded slip couplings, sealing compound equal to solvent based United "Duct Seal", and sheet metal screws.

F. Seal all ducts to SMACNA Class (A) classification and pressure and leak test ducts at 1-1/2 times pressure class, 6" WG.

G. Hang ducts using 1" x 12-gauge straps at transverse joints but not more than 8'-0" apart. Straps shall completely encircle duct and shall be secured to construction with powder driven studs. Do not penetrate ductwork at hangers.

H. Secure vertical ducts at floors using riser clamps.

2.10 DUCTWORK - MEDIUM PRESSURE RECTANGULAR DOUBLE WALL:

A. Medium pressure rectangular double wall ductwork shall include all double wall ductwork between fan discharges and terminal units where indicated on plans.

B. Rectangular ductwork: Factory fabricated and insulated galvanized steel ducts with Pittsburgh lock seam outer shell, 1” thick fiberglass insulation inside the outer shell and interior perforated steel 24 gauge liner with mylar film between insulation and perforated liner. The outer shell shall be 24 gauge up through 24" maximum width, 22 gauge for 25 to 48", 20 gauge from 49 to 70" and 18 gauge over 70". Interior perforated steel liner shall be minimum 24 gauge.

C. Fabricate fittings by continuous brazing or electric continuous welding using 20 gauge up to 36" maximum width, 18 gauge 37" to 50" and 16 gauge over 50". Elbows shall have centerline radius equal to 1.5 times width in plane of bend. Make 90` take-offs with conical taps.

D. Make transverse joints using Ductmate (or TDC) joints and United Duct Sealer. Reinforce ducts to limit duct wall deflection to 0.7" at 8" WGSP but as a minimum reinforce the long side of the rectangular ductwork, equal to the reinforcement specified for medium pressure rectangular ductwork. Do not penetrate ductwork at hangers or reinforcement.

E. Joint sealing and testing: Seal all ducts to Class “A” and pressure and leak test at 6” WG pressure class.

F. Hangers: Provide hangers for ducts consisting of a P2000 Unistrut trapeze and 3/8" diameter rods. Do not penetrate the ductwork with screws at the hangers.

G. Duct and fittings shall be United McGill Airflow, Sheet Metal Connectors, Inc. or approved equal.

2.11 DUCTWORK - LOW PRESSURE RECTANGULAR DOUBLE WALL:

A. Low pressure rectangular double wall ductwork shall include all double wall ductwork where indicated on plans.

B. Rectangular ductwork: Factory fabricated and insulated galvanized steel ducts with Pittsburgh lock seam outer shell, 1" thick fiberglass insulation inside the outer shell and interior perforated steel 24 gauge liner with mylar film between insulation and perforated liner. The outer shell shall be 24 gauge up through 24" maximum width, 22 gauge for 25 to 48", 20 gauge from 49 to 70". Interior perforated steel liner shall be minimum 24 gauge.

C. Fabricate fittings by continuous brazing or electric continuous welding using 22 gauge up to 36" maximum width, 20 gauge 37" to 50" and 18 gauge over 50". Elbows shall have centerline radius equal to 1.5 times width in plane of bend. Make 90` take-offs with conical taps.

D. Make transverse joints using Ductmate (or TDC) joints and United Duct Sealer. Reinforce ducts to limit duct wall deflection to 0.7" at 4" WGSP but as a minimum reinforce the long side of the ductwork, equal to the reinforcement specified for low pressure rectangular ductwork. Do not penetrate ductwork at hangers or reinforcement.

E. Joint sealing and testing: Seal all ducts to Class "C" and pressure and leak test at 2" WG pressure class. All exposed duct shall not be sealed on exterior.

F. Hangers: Provide hangers for ducts consisting of a P2000 Unistrut trapeze and 3/8" diameter rods. Do not penetrate the ductwork with screws at the hangers.

G. Duct and fittings shall be United McGill Airflow, Sheet Metal Connectors, Inc. or approved equal.

2.12 DUCTWORK - LOW PRESSURE:

A. Ductwork, Low Pressure, shall include: All return, outside air, and exhaust in Mechanical Room and concealed.

B. Construct ducts in accordance with SMACNA Duct Construction Standards for pressure and seal classes noted below. Do not use snap-lock seam.

C. Pressure and Seal Classes: 1" Pressure Class, Seal Class "C".

D. Hang ducts using 1"x12-guage galvanized straps at transverse joints but not greater than 8 ft. apart.

E. All exposed ductwork shall be provided with "paint grip" finish to accept epoxy paint finish. No adhesive labels shall be placed on the exposed surface of exposed ductwork.

F. Provide galvanized sheet steel metal ducts of sizes shown on plans, construct, hang, support and reinforce in accordance with 2" Pressure Class as contained in the current edition of the SMACNA Duct Construction Standards. Use reinforcement noted for the longest side on all sides of the duct and bolt together at corners with minimum 5/16" diameter bolts. Do not penetrate duct at reinforcement with screws. **DO NOT USE SNAP-LOCK SEAMS.**

2.13 DUCTWORK LOW PRESSURE ROUND:

A. Low pressure round ductwork includes all round supply, return, outside air, and exhaust ductwork except as specified medium pressure round ductwork.

B. Ductwork: Factory fabricated single-wall galvanized steel round spiral lock seam ducts of 28 gauge for ducts up to 14" in diameter, 26 gauge for ducts from 15" to 26" in diameter, 24 gauge for ducts 27" to 36" in diameter, and 22 gauge for ducts over 36" in diameter.

C. Fabricate fittings by continuous brazing or electric welding. Thickness of metal for round fittings: 26 gauge for fittings up to 14" in diameter, 24 gauge for fittings 15" to 26" in diameter, 22 gauge for all fittings over 26" in diameter. Elbows shall have a center-line radius of 1.5 diameters, 5 piece construction. Take-offs shall be 45 degree laterals. Splitters (tees) shall be reducing Y-Branch with dampers.

D. Make transverse joints using beaded slip couplings, sealing compound equal to solvent based United Duct Seal and sheet metal screws.

E. Provide hanger straps per SMACNA table no more than 8 ft. apart. Straps shall encircle duct. Do not penetrate ductwork at hangers.

F. No adhesive labels shall be placed on the exposed surface of exposed ductwork.

G. Ductwork and fittings shall be United McGill Airflow, Semco, Spiral Systems, Spiral Pipe of Texas or Eastern Sheet Metal round duct and fittings, 2" WG standard.

2.14 FLEXIBLE DUCTS:

A. Flexible duct connectors: 2 element spiral construction composed of galvanized steel supporting spiral and coated woven textile fabric with metal or mineral base, UL listed as Class I Air Duct and Connector (UL 181).

B. Flexible connectors shall not exceed 5 feet in length and turns shall not exceed 20 degrees with maximum of two turns.

C. Make connections between flexible ducts and other equipment using galvanized steel draw bands with plated screws and buckles and United Duct seal for high and medium pressure ducts and nylon draw bands for low pressure ducts.

D. Factory insulate cold flexible ducts using insulation equivalent to that specified for cold ducts minimum R6 rating and provide continuous vapor barrier at connections to other ducts and equipment. If located within attic space provide minimum R-8 rating.

E. Hang ducts in accordance with manufacturer's instructions.

F. Flexible ducts: Thermaflex M-KC, EverClean, or Flexmaster Type 4M.

2.15 DUCTWORK LOCATED OUTDOORS:

A. Construct outdoor ducts as specified for the respective ducts, above. Seal all joints and seams weather tight using glass cloth tape and carbolastic or United Duct Sealer.

2.16 WEATHER LOUVERS:

A. Louvers shall be AMCA certified 6" thick extruded aluminum drainable stationary louvers with minimum 0.08” thick blades and frame and minimum 50% free area nominal. Equip with 1/2" mesh aluminum birdscreen on inside of louver. Color to be selected by Architect. Finish to be manufacturer’s Kynar 500 Fluoropolymer coating conforming to AAMA 605.2. Provide samples of color and finish to Architect for approval. Air pressure drop shall not exceed 0.15” WG at maximum air velocity of 850 FPM through free area. Water penetration shall not exceed 0.01 ounces per SF of free area.

B. Louvers shall be Ruskin ELF6375DX or equivalent by Greenheck, or approved equal.

2.17 AUTOMATIC DAMPERS:

A. Provide and install automatic dampers as shown on plans, scheduled, or as required. Coordinate size, quantity and locations of automatic dampers with automatic control work as required. Dampers shall be factory fabricated with extruded aluminum blades and frames.

B. Damper frames shall be 5" x 1" x .125" (minimum thickness) extruded aluminum hat channel with hat shaped mounting flanges on both sides of the frame. Each corner shall be reinforced with two die formed internal braces and machine staked for maximum rigidity or integral overlapping gusset reinforcements in each corner to assure square corners and provide maximum resistance to racking.

C. Damper blades shall be airfoil type extruded aluminum with metal blade to metal blade overlap. Each blade shall be maximum 6" depth with integral structural reinforcing tube running full length. Minimum thickness of blade shall be 0.070". Each blade shall be symmetrical relative to its axle pivot point, presenting identical performance characteristics with air flowing in either direction through the damper. Provide symmetrical blades of varying size as required to completely fill the damper opening. Blade orientation is horizontal. Blade operation is parallel or opposed. Blades shall be contained within the damper frame.

D. Blade edge seals shall be flexible and suitable for -72°F to +275°F mechanically locked in extruded blade slots yet easily replaceable in field. Jamb seals shall be flexible stainless steel, compression type to prevent leakage between the end of the blade and the damper frame. Use of blade end to overlap the frame for jamb seal is not acceptable. Adhesive or clip-on type blade or jamb seals are not acceptable.

E. Bearings shall be non-corrosive molded synthetic. Axles shall be 1/2" plated steel hexagonal shaped and to provide positive locking connection to blade. Linkage shall be concealed out of airstream, within frame to reduce pressure drop, noise and maintenance.

F. Provide and install Electric, 24 or 120V AC, spring return, 2-position or modulating damper actuator(s) as specified in controls specification sections or as indicated on drawings. Actuator(s) shall be sized as required to sufficiently open/close dampers under operating conditions. Multiple actuators shall be provided as required.

G. Install dampers in accordance with manufacturer's installation instructions and requirements. Install dampers square and free from racking.

H. Dampers must be accessible to allow inspection, adjustment, and replacement of components. Provide and install access doors as specified and required.

I. Provide and install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Attach multiple damper section assemblies together in accordance with manufacturer's instructions. Install support mullions as reinforcement between assemblies as required.

J. Submittal shall include leakage, maximum airflow and maximum pressure ratings based on AMCA Publication 500. Damper shall be tested and licensed in accordance with AMCA 511 for Air Performance and Air Leakage. Damper shall meet the leakage requirements of the International Energy Conservation Code by leaking less than 3 cfm/sq. ft. at 1" of static pressure and shall be AMCA licensed as Class 1A.

K. Saw-mark ends of damper rods parallel to blades.

L. Rectangular dampers shall be Ruskin Model CD50, Greenheck VCD-43, or preapproved equivalent.

M. Round dampers shall be Ruskin Model CDRS25, Greenheck VCDR-53, or preapproved equivalent.

2.18 FIRE DAMPERS:

A. Provide and install UL labeled 1-1/2 hour fire dampers in make-up air connections at kitchen hoods, wherever sheet metal ducts pass through chase walls, floors outside fire chases, and elsewhere as shown or required by local code. See Architectural plans for fire ratings of walls. All fire dampers required may not be shown on mechanical plans.

1. Fire dampers shall be "venetian blind" dampers. Unless otherwise shown folded blades and frames shall not obstruct air stream. Provide type C fire damper in all medium and high pressure supply ducts. Dampers in floors shall be spring loaded.

2. Provide factory fabricated steel wall (floor) sleeve 3" longer than wall thickness for each fire damper and install sleeve using bolts and angles as detailed in Plate #1 of SMACNA "Fire Damper Guide."

B. Install Ceiling Fire Dampers as shown in Detail "A", Plate #5 of SMACNA "Fire Damper Guide" at ceiling penetrations where required by local code.

C. Install access door in medium pressure ducts downstream from each fire damper. Install access door in low pressure ducts at each fire damper. Install wall or ceiling access door for access to fire dampers not accessible through lift-out ceilings. See ACCESS DOORS, below.

D. Provide and install UL Labeled three hour fire dampers where sheet metal ducts pierce fire walls. Fire dampers shall have folded interlocking blades that do not obstruct the duct. Install in factory fabricated sleeve 3" longer than wall thickness in accordance with SMACNA "Fire Damper Guide" Plate #1. Air Balance Inc. Model 319BL or equal.

2.19 STATIC PRESSURE MEASUREMENT STATIONS:

A. Coordinate size, quantity and location of static pressure measuring stations with requirements of automatic control work.

B. Fixed static pressure rakes together with air straightening devices all factory mounted in galvanized steel housings not lighter than 20 gauge.

C. For each static pressure measurement station provide static pressure calibrated magnehelic gauge.

D. Maximum static pressure drop at 1000 fpm face velocity 0.04" WG.

E. Install an access door in duct immediately upstream from static pressure measuring stations.

F. Static pressure measurement stations shall be Air Monitor, EBTRON or equal.

2.20 ACCESS DOORS:

A. Access doors in apparatus casings are specified under APPARATUS CASINGS.

B. Access doors in low pressure ducts: galvanized steel frame flange mounted permanently secured to duct with a hinged gasketed access port held in place with thumb operated latches. Doors in insulated ducts: double thickness with insulation. Doors in non-insulated ducts: a single thickness. Size doors to permit removal of equipment or maintenance. Minimum 18” x 18” in ducts 20” or greater. Minimum 12” x 12” in ducts 14” to

18” and minimum 8” x 12” in ducts 10” to 12”. If duct is less than 10”, enlarge duct at access door (and fire damper, if applicable) to allow minimum 8” x 12” access door. Kees “FH” series standard pressure flanged mount. Install for flush interior on double wall doors.

C. Access doors in medium pressure supply ducts: Factory fabricated combination view/access/vacuum-relief doors consisting of a galvanized steel frame welded to duct with double wall inwardly-opening transparent plastic door. Latches shall secure plastic door to frame but release door into duct to act as a vacuum breaker. Attach a retaining chain to frame and door for doors without hinges. Door size (minimum) 8 x 12 for round ducts up to 12" diameter, and oval or rectangular ducts up to 16" maximum side; 12 x 12 for round ducts 13" to 18" and oval or rectangular ducts 17" to 24" maximum side and 14" x 20" for larger ducts. Doors shall be tight under 10" WC pressure and shall pop open under 6" WC vacuum. Kees FIN-H high pressure flanged mount on rectangular ductwork or flat side of flat-oval ductwork. Kees ADH-HP for round ductwork or round side of flat-oval ductwork.

D. Mark access points in lift-out ceilings with colored vinyl stick-on discs. Locate discs on grid adjacent to point of access and coordinate location of access doors in non-accessible ceiling with General Contractor.

END OF SECTION

SECTION 23 7000

HVAC TESTING AND BALANCING

PART 1 - GENERAL

A. Provisions of Section 23 0500 - "General Provisions - HVAC" shall apply to and become a part of this section.

B. The HVAC testing and balancing work specified in this section shall be done by an Associated Air Balance Council (AABC) member or by a National Environmental Balancing Bureau (NEBB) member (and an AABC "National Project Performance Guarantee" shall be provided for the project). The Testing and Balancing Agency's (TABA) project manager shall be an AABC certified or NEBB certified testing and balancing engineer and be responsible for supervision of and certification of the work herein specified.

C. The Testing and Balancing agency will be employed by the mechanical contractor.

D. The balancing agency shall submit records of experience in the field of air and hydronic system balancing or any other data as requested by the Architect and Engineer. The supervisory personnel for the firm shall have at least five (5) years' experience, and all the employees used in this project shall be qualified technicians in this specific field.

E. The balancing agency shall furnish all necessary calibrated instrumentation to adequately perform the specified services. An inventory of all instruments and devices in possession of the balancing agency may be required by the Owner, Architect and Engineer to determine the balancing agency's performance capability.

1.2 SCOPE:

A. All air and water balance work shall be done in accordance with the AABC National Standards for Testing and Balancing Heating & Air Conditioning Systems (AABC National Standards), or NEBB National Standards edition in force at time of bidding. If these specifications set forth more stringent requirements than the AABC National Standards, these specifications shall prevail.

1.3 DOCUMENTS:

A. The architect will provide the balancing agency one copy of each of the following documents:

1. Project drawings and specifications.
2. Approved construction revisions pertaining to the HVAC systems.
3. Approved submittal data on HVAC equipment and systems to be installed under Division 23.
4. Approved HVAC shop drawings.
5. Approved HVAC wiring diagrams, control diagrams and equipment brochures, as appropriate.

1.4 COORDINATION:

A. The TABA shall perform its services in close coordination with the work specified in Division 23.

B. The plans and specifications indicate meters, valves, dampers, etc. for the purpose of adjusting the HVAC systems to obtain optimum operating conditions. In the event that any of meters, valves, dampers, etc. have been installed in a manner which will not permit their being used for their intended purpose, TABA shall so notify the Mechanical Contractor so that the above items may be correctly installed as specified in the other sections of Division 23.

C. Work included in this section shall not be started until the systems involved meet the following conditions:

1. Air Distribution Systems

a. Systems have been completed (including sealing and/or leak testing where specified) with all components properly installed and ready for operation, fans are rotating correctly, motor starters have correct overload elements, variable speed drives have been put into operation and clean filters (of the type required for finished system) have been installed.

b. All dampers, including automatic dampers, are operating smoothly and without binding and that the automatic dampers close tightly and open wide without binding.

c. The spare sheaves as specified in Section 230500, General Provisions - HVAC under Tests, Cleaning and Adjustments are on site.

2. Water Circulating Systems:

a. Systems have been completed, including leak testing and cleaning and until systems have been refilled, pumps are rotating correctly, correct overload elements have been installed in pump motor starters (variable speed drives have been put into operation) and strainers have been cleaned and baskets used for the ultimate installation have been installed.

b. Compression tanks have been installed and correct system pressure is being maintained, all air vents have been installed and system has been vented and is free from air.

3. Automatic Control System:

a. Systems have been completed and are operating as designed.

1) Installation is complete, all instruments (including room thermostats) have been field calibrated and operate correctly, and are set for design operating conditions.

2) TABA personnel have been instructed in the proper use of and in changing set points of the various controllers including via computer or keypad if required.

1.5 NOTIFICATION FOR TESTING & BALANCING WORK TO BEGIN:

A. When the above conditions have been met, the Mechanical Contractor shall notify the TABA in writing that the system(s) are ready for Testing and Balancing.

B. When the TABA has been notified that the systems are ready for testing and balancing, the TABA shall inspect the various systems involved and notify Mechanical Contractor of any condition which may impede the TAB work (missing dampers, valves, incomplete control or electrical work, etc.).

C. When the deficiencies noted above have been corrected, Mechanical Contractor shall again notify TABA that the system(s) are ready for testing and balancing.

1.6 INSPECTIONS:

A. During construction the TABA shall inspect the installation of the piping systems, sheet metal work, control system and mechanical equipment.

B. The inspections should be made when 60% of the ductwork has been installed and when 90% of the equipment has been installed.

C. The TABA shall submit a brief written report of each inspection to the Owner, Architect and Engineer.

1.7 TESTING AND BALANCING PROCEDURES:

A. All testing and balancing work shall be done in accordance with the AABC National Standards.

B. Air Systems:

1. Fan Speed: Test and adjust fan RPM to achieve design CFM requirements.

2. Current and Voltage: Measure and record motor current and voltage of each fan.

3. Pitot-tube Traverse: Perform a Pitot-tube traverse of main supply and return ducts to obtain total CFM. If a Pitot-tube traverse is not practical, the summation of the outlets or inlets may be used. An explanation why a traverse was not made must appear on the appropriate data sheet.

4. Outside Air: Test and adjust system minimum outside air by Pitot-tube traverse. If a Pitot-tube traverse is not practical, the percentage of outside air may be determined by calculations from the return air, outside air, and discharge air temperatures with heating and cooling coil valves shut. Make allowances for heat of compression and motor heat where applicable.

5. Static Pressure: Test and record system static pressures, including suction and discharge static pressure of each fan.

6. Air Temperature: Take wet-bulb and dry-bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil.

7. Zone Ducts: Adjust zone ducts to within design CFM requirements. At least one zone balancing damper shall be completely open.

8. Main Ducts: Adjust main ducts to within design CFM requirements and traverse for total CFM quantities.

9. Branch Ducts: Adjust branch ducts to within design CFM requirements. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.

10. Tolerances: Test and balance each diffuser, grille and register to within -5% and +10% of design requirements.

11. Identification: Identify the location and area of each grille, diffuser, register, and terminal box. This information shall be recorded on air outlet data sheets.

12. Description: Record the size, type and manufacturer of each diffuser, grille and register on air outlet data sheets.

13. Terminal Boxes: Set volume regulators on all terminal boxes to meet design maximum and minimum CFM requirements. All associated temperature controls shall be checked for proper operation and calibration. If the terminal boxes have separate settings for heating and cooling CFM, the CFM quantities for each shall be recorded on air outlet data sheets. All diffusers connected to the terminal box shall be read in the heating and cooling modes and their readings recorded on air outlet data sheets.

14. Minimizing Drafts: Set grille bars for throws, diffusers for patterns and adjust all diffusers, grilles, and registers to minimize drafts in all areas.

C. Water Circulating System Procedures:

1. The various water circulating systems shall be filled, purged of air and put into operation by the contractor before hydronic balancing is begun.

2. The flow of water through all coils shall be adjusted by manipulating balancing valves until the rated pressure drop through the coil or metering device is obtained.

3. Water Treatment: Examine the water in the system and determine if the water has been treated and cleaned. If it has not, request the contractor to clean and treat the water.

4. Strainers: Request that the contractor clean all strainers.

5. Air Vents: Check all air vents at the high points of the water system and determine if they are installed and operating.

6. Valves: Set all balancing valves and automatic temperature control bypass valves to the full-open position for balancing. For three-way valves, the rated pressure drop shall first be adjusted with the three-way valve set so that all water flows through the coil. The bypass balancing valve shall then be adjusted on each coil until equal pressure drop between supply and return connections is obtained, with the three-way valve set to bypass the coil.

7. Pumps: Adjust circulating pumps to meet design GPM requirements. Check pumps for proper operation. Pumps shall be free of vibration and cavitation. Measure and record operating current and voltage.

8. Tolerances: Proceed to balance all chilled-water and hot-water coils within 10 percent of design requirements.

9. Marking: Mark all settings and record all data after completing the flow readings and coil adjustments.

10. Thermal Performance: If the cooling tower performance has not been certified by the Cooling Tower Institute (CTI) in accordance with CTI Certification Standard STD-201, a field acceptance test shall be conducted within the warranty period in accordance with CTI Acceptance Test Code ATC-105 by a certified agency of the Associated Air Balance Council.**

D. Verification of Temperature Control:

1. Verify that all control components are installed in accordance with project requirements and are functional, including all electrical interlocks, damper sequences, air and water reset, and fire and freeze stats.

2. Verify that all controlling instruments are calibrated and set for design operating conditions.

3. Verify the accuracy of the final settings by taking temperature readings. The readings shall be in a typical conditioned space for each separately controlled zone.

1.8 TEST AND BALANCE REPORT:

A. The test and balance report shall be complete with logs, data, and records as required herein. All logs, data, and records shall be typed on white bond paper and bound. The report shall be certified accurate and complete by the balancing agency's certified test and balance engineer. Any drawings submitted must be to a scale of 1/8" per foot or larger.

B. Six (6) copies or PDF electronic file of the test and balance report are required and shall be submitted to the Architect and Engineer.

C. The report shall contain the following general data in a format selected by the balancing agency:

1. Project Number
2. Contract number
3. Project title
4. Project location
5. Project architect
6. Project mechanical engineer
7. Test and balance agency
8. Test and balance engineer
9. General contractor
10. Mechanical subcontractor
11. Dates tests were performed
12. Certification

D. The test and balance report shall be recorded on report forms conforming to the recommended forms in the AABC or NEBB National Standards. At a minimum, the report shall include:

1. Preface: A general discussion of the system, any abnormalities and problems encountered.
2. Instrumentation List: The list of instruments including type, model, manufacturer, serial number and calibration dates.
3. System Identification: In each report, the VAV boxes, zones, supply, return, and exhaust openings, and traverse points shall be numbered and/or lettered to correspond to the numbers and letters used on the report data sheets.
4. Air handling equipment test report forms: Record the following on each air-handling equipment test form:
    a. Manufacturer, model number and serial number
    b. All design and manufacturer-rated data

c. Total actual CFM by traverse if practical. If not practical, the sum of the outlets may be used, or a combination of these procedures. For specific systems, such as ones with diversity, see the AABC *National Standards.*

d. Suction and discharge static pressure of each fan, as applicable.

e. Outside air, return air and total CFM.

f. Actual operating current, voltage and brake horsepower of each fan motor.

g. Final RPM of each fan.

h. Fan and motor sheave manufacturer, model, size, number of grooves and center distance.

i. Belt size and quantity.

j. Static pressure controls' final operating set points.

5. Pump Test Forms: Submit pump curve showing design-, operating-, and no-flow points of operation. Also, record the following items on each pump test form:

a. Manufacturer, size and serial number.

b. All design and manufacturer's rated data.

c. Pump operating suction and discharge pressure and final total dynamic head.

d. No flow (pump discharge valve closed) suction and discharge pressure and corresponding total dynamic head. This procedure is to determine actual impeller size.

e. Rated and actual operating current, voltage, and brake horsepower of each pump motor.

6. Chiller Test Forms: Record the following items for each chiller:

a. Manufacturer, model number and serial number.

b. All design and manufacturers' rated data.

c. Rated and actual pressure drop across evaporators and condensers and related GPM.

d. Entering and leaving water temperatures.

e. Rated and actual operating current and voltage.

7. Heat exchanger test forms: Record the following items on each heat exchanger test form:

a. Manufacturer and model number.

b. All design and manufacturers' rated data.

c. Service and location.

d. Actual pressure drop and related GPM or steam pressure, primary side.

e. Actual pressure drop and related GPM, secondary side.

f. Primary side entering and leaving temperatures.

g. Secondary side entering and leaving temperatures.

h. Temperature control setting.

8. Heating and cooling-coil test forms: Record the following items on each test form:

a. Manufacturer.

b. All design and manufacturers' rated data.

c. Rated and actual water pressure drop through each coil and related GPM.

d. Rated and actual static pressure drop across each coil.

e. Entering and leaving water temperatures.

f. Wet-bulb and dry-bulb temperatures entering and leaving each cooling coil; dry-bulb temperatures entering and leaving each heating coil.

9. Electric Heating Coil/Duct Heater test forms: Test and record the following on each electric-heating-coil test form:

a. Manufacturer and model number.

b. All design and manufacturer rated data.

c. Actual operating current and voltage.

d. Coil location and identification number.

10. Boiler test forms: Record the following items on each boiler test form:

a. Manufacturer and model number.

b. All design and manufacturers' rated data.

c. Service and location.

d. Actual pressure drop and related GPM.

e. Entering and leaving temperatures.

f. Temperature control setting.

11. Test and balance drawings: Include the following:

a. Terminal Units: Indicate mark, design maximum airflow, actual maximum airflow, minimum design airflow and minimum actual airflow.

b. All air devices: Indicate terminal unit as air handler served from design airflow, actual airflow, neck size and air device type.

c. Air Handlers: Indicate mark, design supply airflow, actual supply airflow, design return airflow, actual return airflow, outside air design airflow and outside air actual airflow.

d. Fans: Indicate mark, design airflow and actual airflow.

1.9 FINAL ACCEPTANCE:

A. Before Certificate of Final Payment is issued the TABA shall recheck, in the presence of the Owner's representative, Architect and Engineer, specific and random selections of data recorded in the certified test and balance report.

B. Points and areas for recheck shall be selected by the Engineer.

C. Measurements and test procedures shall be the same as the original test and balance.

D. Selections for recheck, specific plus random, shall not normally exceed 15 percent of the total number tabulated in the report, except where special air systems require a complete recheck for safety reasons.

E. If random tests demonstrate a measured flow deviation of 10 percent or more from that recorded in the certified test and balance report, the report shall automatically be rejected. In the event the report is rejected, all systems shall be readjusted and tested, new data recorded, a new certified test and balance report submitted, and a new inspection test made, all at no additional cost to the Owner.

END OF SECTION

SECTION 23 8000

CONVENTIONAL AUTOMATIC CONTROLS

PART 1 - GENERAL

1.1 SCOPE:

A. Section 23 0500 – "General Provisions – HVAC" shall apply to and become part of this Section.

1.2 CONTROL SYSTEMS:

A. Furnish and install complete and ready for operation with control sequences specified below.

B. Products of a manufacturer maintaining complete service and parts facilities in Alabama continuously for the last three years: Honeywell, Johnson, Trane, Carrier or Siemens.

C. Control equipment, except for items comprising an integral part of the water or refrigeration piping, shall be installed by trained mechanics employed by the control manufacturer.

D. Include the services of a full time control technician for calibrating and adjusting controls for the first 5 working days after Owner has occupied building.

E. Before installation, submit for approval 5 copies of complete power and control wiring and piping diagrams and list of control panel locations by room name and number. Hang a photostatic copy of the "as built" diagram, framed behind glass, in each equipment room. Provide one set of reproducible sepias of "as built" control diagrams at completion of project for the Owner's use.

F. Provide permanent nameplates for control switches and motor starters. Nameplates: engraved laminated plastic with letters legible under normal operating conditions. (Black on white).

G. Permanently identify control devices other than room thermostats, so they may be identified on control diagrams. Provide engraved plastic nameplates for items mounted outside of or on faces of panels. Mark other instruments with indelible ink.

1.3 CONTROL WIRING:

A. Include all control and interlock wiring and power wiring for control panel in this Section. Install all control and interlock wiring in EMT. EMT and EMT fittings shall comply with the provisions of Electrical Work. **Plenum-rated communication wiring shall be allowed in lieu of conduit only when installed concealed above accessible ceilings (such as above lay-in ceilings) and shall be supported by cable tray or j-hooks on intervals not to exceed 5'-0" on center in accordance with Division 26 Specifications.**

B. Waterproof and firestop all conduit floor penetrations. Firestop conduit penetrations of fire rated walls and partitions.

C. Wire all devices individually to terminal strips in control panels.

D. Furnish necessary relays and auxiliary contactors and other accessories required. Provide interlock relays per N.E.C. Coordinate start-stop stations, auxiliary contacts, etc., with supplier of Starters and Motor Control Centers specified in Electrical Work.

1.4 CONTROL DEVICES:

A. Room Thermostats: 7-day programmable thermostat with LCD Touch Screen display. ± 1.4˚F temperature accuracy from 50˚F to 90˚F, ± 3% RH humidity accuracy from 20% RH to 80 % RH. Thermostat Covers: High Impact Ligature Resistant Universal Wall Cover TM260 (besafepro.com). Mount at 4'-0" above finished floor in accordance with ADA. Provide remote sensors where specified.

B. Remote Bulb Thermostats and Temperature Transmitters: Unless otherwise shown use averaging elements not less than 8 feet long for duct or casing cross sections up to 24 square feet face area and elements not less than 17 feet long for sections over 24 square feet face area.

C. Thermometers: pipe line thermometers are specified in another Section. Install dial thermometers in ducts where shown on control diagrams, providing averaging bulbs where shown.

D. Control Valves:

1. 125 psig WP with plug and disc inner valve to insure modulation of flow where required. Valves 2" and smaller: all brass screwed or flared. Valves 2-1/2" and larger: flanged iron bodies and brass trim. Equip all valves with operators of sufficient power to insure tightness against pressure. Control valves operating with inlet steam pressure greater than 15 psig shall have stainless steel trim and renewable seats.

2. Control valves shall be sized by the manufacturer of the control valve, based on actual capacity of equipment to be installed, and according to American National Standards Institute/Instrument Society of American Standard S75.01, "Control Valve Sizing Equations." Sizing data shall be submitted to Architect for review and acceptance.

3. Control valves shall shut tight against 50 psig differential pressure.

E. Freezestats: manual reset, pneumatic not permitted. Locate freezestat bulbs between preheat and chilled water coils in units with chilled water coils and downstream from DX coils in units with DX coils.

F. Firestats: single pole double throw, electric, manual reset, pneumatic not permitted. Firestats shown to be connected to the fire alarm system: compatible with fire alarm system, furnished and installed under Controls, wired under Electrical work.

G. Smoke detectors shall be ionization detectors which detect products of combustion. Furnish, wire, and install smoke detectors under this Section. Provide smoke detectors compatible with fire alarm system specified under electrical Work and equip them with contacts for connection to fire alarm system.

H. Flow Switches: vaporproof enclosures, McDonnell & Miller. Pneumatic not permitted.

I. Valve & Damper Operators: of sufficient power to close/open valves & dampers under operating conditions. Electric valve & damper motors shall have oil immersed gear trains & spring return to normal position.

J. Wells: install pipe line mounted control and indicating devices in stainless steel or brass thermometer wells.

K. Capillary Supports: securely support all duct-mounted and casing-mounted thermostat capillaries using factory fabricated copper bulb supports.

L. Provide stand-offs for control devices mounted on externally insulated ducts and equipment.

M. Anchor all items mounted on gypsum board (dry-wall) using toggle bolts or moly bolts, not expansion shields.

N. Pressure Gauges:

1. Provide 1-1/2" dial branch pressure gauges as close as possible to each valve and damper operator (use 1" gauges on air terminal dampers). Provide 1" minimum dial gauges on each port of each instrument, including receiver-controllers, transmitters, P.E. switches, etc. Provide 1" minimum dial gauge on each air terminal damper operator.

O. Automatic Dampers:

1. Automatic dampers are specified in Section "Air Distribution".

P. Air Flow Control Systems:

1. General: Each air flow control system shall consist in general of two or more air flow measuring stations together with a microprocessor based tracking controller.

2. Air Flow measurement stations are specified in Section "Air Distribution".

3. Tracking controller shall sense velocity pressure at each air flow measurement station and employ temperature compensated DP transmitters with spans of 0 to 1" (supply) and 0 to 0.25" (return) and accuracy not less than 2% of span. Controller shall maintain difference between supply air rate and return air rate by modulating (inlet vanes or variable speed drive). Provide necessary E-P transducers.

4. Tracking controller shall maintain difference between supply and return air rates within 3% of design value at all flow rates.

5. In addition, tracking controller shall act as a static pressure controller (using separate static pressure sensing station(s) similar to the air flow measurement station) and shall modulate supply fan (inlet vanes) (outlet damper) (variable speed drive) to maintain constant supply duct static pressure.

6. Tracking controller shall have enclosure similar to those specified for local control panels with CFM calibrated magnehelic gauges on its face (one gauge for each air flow and static pressure measurement station), "Disconnect switches" for zeroing gauges without affecting controls, and 2" minimum dial branch pressure gauges for main air and branch air. All panel mounted items shall have engraved plastic nameplates.

Q. Static Pressure Measuring Stations:

1. Static Pressure Measuring Stations are specified in Section "Air Distribution".

1.5 CONTROL PANELS:

A. Local Control Panels: construct of galvanized steel with baked enamel finish or aluminum-plywood-aluminum fronts and backs and extruded tops, bottoms, and ends. All panels shall have piano hinges and key locking latches (key panels alike). Permanently label instruments located in panels consistent with labeling on control diagram. Cement photostat of approved diagram inside each panel cover. (Include Local-Remote switching for control point adjusters on face of each panel.)

B. Bottom of control panels shall be located not less than 2-1/2 feet above floor and top not more than 6 feet above the floor.

PART 2 - CONTROL SEQUENCES:

2.1 GENERAL:

A. Control diagrams on drawings are intended to indicate, in general, control arrangements. Provide all instruments, relays, operators, switches, etc. required to accomplish control sequences whether or not such devices are actually shown on control diagrams.

B. As shown on drawings.

END OF SECTION

SECTION 23 8100

DIRECT DIGITAL CONTROL (DDC)

PART 1 - GENERAL

1.1 PROVISIONS OF DIVISION 23:

A. Section 230500 - "General Provisions, HVAC" shall apply to and become part of this Section.

1.2 PROVISIONS OF DIVISION 26:

A. "General Provisions, Electrical" shall apply to this Section.

1.3 SYSTEM DESCRIPTION:

A. Provide a Trane Summit automatic control system to match existing BAS consisting of one or more distributed direct digital control processors (DCP) with provisions for bus connection to a central computer. DCP's shall be microprocessor based and strategically located at data concentration points or in close proximity to the end devices to be monitored and/or controlled. The DCP's shall include stand alone capability of direct digital control with integrated energy management programs including duty cycling, demand, optimum start and analog load reset.

B. The central computer (CC) shall include an operator's console with display, keyboard and printer. Central software shall include historical data storage, logging and retrieval, upline and downline loading of stored DCP programs, CC and DCP programming software, data logging of analog and digital values and color dynamic graphic software (mouse driven). Alarms and logical groups shall have alphanumeric points and group descriptors.

C. Provide all sensors, actuators, transducers, DCP's and other equipment to meet functional description.

D. Products of a manufacturer maintaining complete service and parts facilities in Alabama continuously for the last three years.

E. Control equipment, except for items comprising an integral part of the water or refrigeration piping, shall be installed by trained mechanics employed by the control manufacturer.

F. Use standard components, regularly manufactured and not custom designed for project. Use systems and components proven in use.

G. System shall be modular, permitting expansion by adding hardware and software without changes in communication or processing equipment.

1.4 WORK REQUIRED:

A. All engineering design, labor, materials, equipment and services necessary for and reasonably incidental to proper completion of control work as shown or herein specified (excepting only work or materials specified or noted as being done or furnished by others), consisting in general of the following, complete and ready for operation.

1. Central Control (CC)
2. Distributed Control Panels (DCP)
3. Software packages
4. Remote control, alarm and sensing devices
5. Fire alarm system interconnects
6. Complete wiring network interconnecting all parts of the system
7. Instruction of Owner's operating personnel
8. Service contract

1.5 SUBMITTALS:

A. Within 30 days of notice to proceed and prior to installation of any equipment, the control contractor shall provide 6 copies of submittals for approval. Submittals shall include:

1. A complete system block diagram showing all computers, peripherals, power connections and source, plan of equipment in main control room, trunk wiring links, DCP's and location, and a listing of all points and systems connected to each DCP.
2. Complete operating sequences for all programs provided for HVAC equipment.
3. Specification data sheets for each piece of central and remote hardware, for software application package and for central programs and system services software.
4. Proposed site-unique menu tree showing the English descriptor proposed for each logical system and the English description of each logical data point within each system.
5. Menu map of all definition process menu paths showing all elements of menu prompts specified for system definition and user applications.
6. Samples of all specified reports, logs, and printouts showing compliance with all requirements for English code-free outputs.
7. Location of all control panels by room name and number.
8. Thirty days after approval of all above submittal data, submit typed copies of all system control sequences.

1.6 ACCEPTANCE PROCEDURES:

A. Upon completion, the contractor shall conduct a complete functional test of the system for the owner, architect, and engineer. Contractor shall simulate power failure recovery, and stand alone operation capability on communication loss with Central Control.

B. Provide 3 full sets of as-built drawings, complete operating manuals and hardware and software documentation.

1.7 WARRANTY SERVICE:

A. All components, software, parts and assemblies supplied by the manufacturer shall be guaranteed against defects in materials and workmanship for one year from acceptance date.

B. Labor to trouble shoot, repair or replace system components shall be furnished at no charge to the owner during the warranty period.

1.8 MAINTENANCE:

A. The DDC manufacturer shall have a local branch office within 100 miles of the installation staffed with trained, full-time employees capable of performing testing, inspection, repair and maintenance services for the life of the system.

B. The mean time to repair once the DDC manufacturer's service representative is at the job site with the required parts shall not exceed two hours.

1.9 SYSTEM COMMISSIONING:

A. The Contractor shall completely checkout, calibrate and test all hardware and software to insure that the system performs in accordance with the approved sequences of operation submitted.

B. Include the services of a full time control technician for calibrating and adjusting controls for the first 10 working days after Owner has occupied building.

C. Provide assistance to the Test and Balance Contractor during his review and testing of the Control Systems.

1.10 OPERATOR TRAINING:

A. Contractor shall provide a minimum of two full day's instruction for the owner's operating personnel on system operation and routine maintenance procedures. The control manufacturer shall also provide four additional days of on-site instruction and assistance to the owner during the warranty period on a call basis. The owner shall schedule these days at least one week in advance and for intervals of no less than eight hours at a time. The four days is exclusive of necessary travel time. These sessions shall encompass all areas of the system as requested by the owner including troubleshooting, diagnostics and all levels of operation and software definition.

PART 2 - EQUIPMENT

2.1 GENERAL:

A. System components requiring line voltage inputs shall be designed and tested to operate satisfactorily and without damage at 10% above and 15% below nominal rated input voltage.

B. All transmission bus connected devices shall be such that loss of any single device shall not disrupt or interfere with communication to other devices on the bus. Loss of communication with the central control and command station shall not cause any DCP to halt operation or to cease to perform its intended function (i.e., each DCP shall continue to operate on a stand alone basis).

C. After power failure and upon a power restoration, the system shall provide automatic sequential restart of equipment based on current program time and program requirements without operator intervention.

2.2 CENTRAL CONTROL:

A. Central control shall include a computer, monitor, wireless keyboard and mouse, printer and software.

B. Computer shall be PC compatible with not less than 160 gigabyte hard drive, 3-1/2"-1.44 megabyte floppies, 48X 16XDVD+/-RW/48X CDROM, 1 GB DDR RAM, 2.0 GHZ microprocessor, 256 MB Video Card.

C. Monitor shall be 19” LCD color monitor with minimum 1280 x 1024 resolution.

D. Printer: 8-1/2” x 11” color laserjet.

E. Central control equipment shall be equipped with a power supply with filtered AC input, surge protection, battery backup and shall be installed on-site at a location directed by Owner.

2.3 DISTRIBUTED DIRECT DIGITAL CONTROL PROCESSORS (DCP'S):

A. To prevent a single-failure catastrophe, multiple direct digital controllers shall be provided. Failure of any single controller shall have no effect on other controllers.

B. Direct digital controllers shall be microprocessor-based with all hardware, software, and communications interfaces. DCP's shall be capable of stand-alone operation, and incorporation into larger systems. The controllers shall be either 16 bit, or multiple 8 bit microprocessors configured so that input-output processing and operator command processing may be offloaded separately from the control processing. If the DCP's use digital communication to remote "slave" gathering panels, all such communication circuits extending outside the DCP shall utilize dual (redundant) bus cabling, be supervised, and provided with an auto-failover feature.

C. The controller shall be factory mounted and wired in a steel enclosure complete with all relays, digital to analog converters, and terminal strips. Controllers shall be expandable to 15% points of each type (analog and digital input and output) in excess of those actually required for this project.

D. The controller shall operate within the following limits:

1. Temperature 33 to 122°F.

2. Humidity 0 to 95% RH (non-condensing)

3. Voltage 24 VAC + 10% to -15% 50 or 60 HZ.

E. The controllers shall withstand storage conditions as follows:

1. Temperature -4 to 176°F.

2. Humidity 0-95% RH (non-condensing)

F. Local Diagnostics and Programming:

1. Each DCP shall be equipped to provide local diagnostics and adjustments either through a built-in digital display and keyboard to show such information as time and date, analog variables, binary conditions, system operation modes, critical alarms and operator definable functions to allow the operator to analyze and adjust the system being controlled or through a portable hand held operator's terminal. Provide one operator's terminal.

2. Adjustments shall include but not be limited to proportional gain, integral rate, velocity and acceleration constants associated with incremental control and on/off values of two-position control.

3. The DCP shall be fully field programmable with the following built-in functions:

a. All closed loop control functions (P, PI, PID, incremental, floating, two-position, etc.)

b. All energy management functions

G. The system shall utilize PROM and RAM memory. All DDC algorithms and parameters shall be RAM based for ready access for modification and adjustment. RAM memory shall be provided with 100 hours battery backup minimum.

H. The controller software shall include a complete operating system, standard energy management application packages, standard control algorithm application packages, and an owner/user custom control and calculation application package complete with interpreter. Complete user documentation modules shall be provided.

I. DCP's shall be capable of being programmed to utilize stored default values for assured fail safe operation of critical processes. Default values shall be invoked upon sensor failure or if the primary value is normally provided by (the CC or) another DCP, or by loss of bus communication. Individual application software packages shall also be structured to assume a fail safe condition upon loss of input sensors. Loss of an input sensor shall result in output of a "sensor failed" message at (the central control and command station) (the DCP).

J. The operating system software shall be PROM resident and operate independently of any central computer. The operating system shall control communications between the central terminal and the controllers and I/0 modules, provide alarm monitoring and reporting, provide control application packages, and contain built-in diagnostic routines.

K. The controller shall have memory error checking. Upon detection of a memory error, the CPU shall correct the error or halt to prevent erroneous operation. All "halts" shall report as an alarm at the central control terminal.

L. After a power failure and upon a power restoration, the system shall provide automatic sequential restart of equipment based on current program time and program requirements without operator invention.

M. Controllers shall accept industrial platinum and resistance sensors. Each output point shall be provided with an L.E.D. which shall indicate status of digital outputs and value (via variable intensity) of analog outputs. Processor software shall allow for scaling and for calibration of sensor lead length variations to ensure display accuracies.

2.4 SOFTWARE:

A. Software shall include the following:

1. System access limitation with 3 levels of access (operation only; operation plus programming; operation, operation plus programming and assigning individual passwords and authorization levels).
2. Psychometric routines.
3. Alarm lockout.
4. Floating alarm limits.
5. Time delay start sequence.
6. Time of day.
7. Optimum start-stop.
8. Air economizer initiation.
9. Chiller plant optimization.
10. Communication with chilled water system controller (see "Water Chillers" Section 235000).
11. Air tracking.
12. DDC programs as required.
13. Event initiated programs.
14. DCP programming (from CC and DCP).
15. Data logging.
16. Status logging (all points).

2.5 TRANSMISSION NETWORK:

A. Communications between controllers shall have a system line capability of at least 3300 feet, or systems shall be equipped with modems.

B. Transmission line shall be electrically isolated from the DCP's and operator's terminal by optical couplers at each interface to prevent any voltages in the transmission lines from damaging any of the electronic circuits.

2.6 CONTROL WIRING:

A. Include all control and interlock wiring and power wiring for DCP's and control panel in this Section. Install in conduit in accordance with provisions of Electrical Work. **Plenum-rated communication wiring shall be allowed in lieu of conduit only when installed concealed above accessible ceilings (such as above lay-in ceilings) and shall be supported by cable tray or j-hooks on intervals not to exceed 5'-0" on center in accordance with Division 26 Specifications.**

B. Waterproof and firestop all conduit floor penetrations. Firestop conduit penetrations of fire rated walls and partitions.

C. Wire all devices individually to terminal strips in control panels.

D. Furnish necessary relays and auxiliary contacts and other accessories required. Provide interlock relays per N.E.C. Coordinate start-stop stations, auxiliary contacts, etc., with supplier of Starters and Motor Control Centers specified in Electrical Work.

2.7 CONTROL DEVICES:

A. Electronic Temperature Sensors: Temperature accuracy shall be as herein specified. Three (3) or four (4) wire shielded cable shall be utilized for all temperature sensing to reduce electrical noise.

1. Space Temperature sensors shall be RTD's, thermistors or solid state devices with a temperature range of 20 to 120 degrees F. The sensor shall be complete with a decorative cover and suitable for mounting at any angle over a standard electrical utility box.

2. Duct Temperature sensors shall be RTD devices or thermistors with an insertion measuring probe 18 inches long with a temperature range of 20 to 120 degrees F. The sensor shall include a utility box and gasket to prevent air leakage and vibration noise. For all mixed air and preheat air applications, install bendable averaging duct sensors with a minimum 12 foot long sensor element.

3. Liquid Immersion Temperature sensors shall be RTD or thermistor devices for all hot and chilled water temperature applications. The temperature range shall be 32 to 212 degrees F. Provide brass thermowells and install sensor probe with heat conductive grease. Probe and sensor head shall be removable without breaking fluid seal. Install sensors in top of pipe for horizontal runs and at a positive slope on vertical runs to prevent condensation from flowing to sensor head.

4. Outside Air Temperature sensor shall be an RTD, thermistors or solid state device mounted in the outdoors where air flow occurs. The temperature range shall be -20 to 180 degrees F. Provide a sun shield and weatherproof assembly for mounting to 1/2 inch rigid conduit.

B. Humidity Sensors: Space and return air relative humidity sensors shall be a wall or duct mounted devices that produce a linear output for the complete range of 0 to 100% RH. A thin film polymer sensing element shall respond quickly to humidity changes and shall be protected from contamination by a sintered filter. The sensor shall be factory calibrated with field periodic re-calibration capability. The room sensor shall have a decorative cover and mount to an electrical utility box. Accuracy of measurement shall be +2% for 0-80% RH at 68 degrees F, +3% for 80-100% RH.

C. Thermometers: Pipe line thermometers are specified in another section. Install dial thermometers in ducts where shown on control diagrams, providing averaging bulbs where shown.

D. Control Valves:

1. 125 psig WP with plug and disc inner valve to ensure modulation of flow where required. Valves 2" and smaller: all brass screwed or flared. Valves 2-1/2" and larger: flanged iron bodies and brass trim. Equip all valves with operators of sufficient power to ensure tightness against pressure. Control valves operating with inlet steam pressure greater than 15 psig shall have stainless steel trim and renewable seats.

2. Control valves shall be sized by the manufacturer of the control valve, based on actual capacity of equipment to be installed, and according to American National Standards Institute/Instrument Society of American Standard S75.01, "Control Valve Sizing Equations". Sizing data shall be submitted to Architect for review and acceptance.

3. Control valves shall shut tight against 50 psig differential or inlet pressure.

E. Freezestats: Manual reset, pneumatic not permitted. Locate freezestat bulbs between preheat and chilled water coils in units with chilled water coils and downstream from DX coils in units with DX coils.

F. Firestats: Single pole double throw, electric, manual reset, pneumatic not permitted. Firestats shown to be connected to the fire alarm system: compatible with fire alarm system, furnished and installed under Controls, wired under Electrical Work.

G. Flow Switches: Vaporproof enclosures, McDonnell & Miller. Pneumatic not permitted.

H. Valve & Damper Operators: Of sufficient power to close/open valves and dampers under operating conditions. Electric valve and damper motors shall have oil immersed gear trains and spring return to normal position. Valves shall close bubble tight at 100 psig.

1. Damper Operators: Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide proportional damper control with an input signal of 2 to 10 VDC. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall have a manual positioning mechanism and control direction of rotation switch accessible on its cover. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected for position feedback or master-slave applications. If required, 2 SPDT auxiliary switches shall be provided with one switch having the capability of being adjustable. Actuators with switches shall be constructed so an electrical ground connection is not required to meet agency listings. Actuators shall be UL listed and CSA certified, have a 2 year warranty, and be manufactured under ISO 9001 International Quality Control Standards.

2. Valve Operators (Small Valves): Actuators shall be fully modulating, floating (tri-state), two position, spring return, or 0-135 ohm slide wire as indicated in the control sequence. Fail safe where specified shall require either mechanical spring return, or battery back-up located near the building automation control panel for ease of maintenance. Capacitor type units within the individual actuators are not acceptable.

   Modulating valves shall be positive positioning, responding to a 2-10 VDC or 4-20 mA signal (with the addition of a 500 ohm resistor). There shall be a visual valve position indicator and an actuator generated 2-10 VDC valve position output signal for electronic feedback to the control panel. The actuator shall have the capability of adding auxiliary switches or feedback potentiometer if required. Powering shall be either by 24 VAC, 24 VDC, or 120 VAC, and power consumption shall not exceed 8 watts at 24 VAC. A 3 foot cable shall be provided for easy installation to an electrical junction box.

The actuator shall provide minimum torque required for proper valve close-off. The actuator shall be designed with a current limiting motor protection or shall have adjustable single pole double throw travel stop limit switches. A release button or handle on the motor shall be provided to allow for manual override, except when utilizing spring return actuators.

All valves shall have a minimum resolution of 250 to 1.

The actuators shall be UL listed. The manufacturer shall warranty the actuator/valve assemblies for a period of 2 years from date of installation not exceeding 30 months from date of original shipment.

3. Valve Operator (Large): Actuator shall be modulating, floating (tri-state), two position, spring return, or 0-135 ohm slide wire as indicated in the control sequence. Fail safe where specified, shall require either mechanical spring return, or battery back-up located near the building automation control panel for ease of maintenance. Note: Battery back-up or capacitor type units within the individual actuators are not acceptable.

   Modulating valves shall be positive positioning, responding to a 0-10 VDC or 4-20 mA signal (with the addition of a 500 ohm resistor). There shall be a visual valve position indictor and an actuator generated 2-10 VDC valve position output signal for electronic feedback to the control panel. The actuator shall have the capability of adding auxiliary switches or feedback potentiometers if required. Powering shall be either by 120 VAC, 24 VAC or 24 VDC, and power consumption shall not exceed 8 watts at 24 VAC. A three foot cable shall be provided for easy installation to an electrical junction box.

   The actuator shall provide the minimum torque required for proper valve close-off, with an approximate running time of 2 minutes for full stroke. The actuator shall have the capability of adding auxiliary switches or feedback potentiometers if required. Powering shall be either by 120 VAC, 24 VAC or 24 VDC, and power consumption shall not exceed 8 watts at 24 VAC. A three foot cable shall be provided for easy installation to an electrical junction box.

   The actuator shall provide the minimum torque required for proper valve close-off, with an approximate running time of 2 minutes for full stroke. The actuator shall be designed with current limiting motor protection. End of travel switches are not acceptable. A release button on the actuator shall be provided to allow for manual override, except when utilizing spring return actuators.

   All valves shall have a minimum resolution of 40 to 1.

   All actuators shall be UL listed. The manufacturer shall warranty all actuator/valve assemblies for a period of 2 years from date of installation not exceeding 30 months from date of original shipment.

I. Static pressure measurement stations shall be fixed static rakes together with air straightening devices, all factory mounted in galvanized steel housings not lighter than 20 gauge. Maximum static pressure drop through static pressure measurement station 0.04" WG at 1000 FPM face velocity. (Install an access door in duct immediately upstream from each air flow measuring station.)

J. Air flow measurement stations shall be fixed pitot-static rakes together with air straightening devices, all factory mounted in galvanized steel housings not lighter than 20 gauge. Maximum static pressure drop through air measurement station 0.04" WG at 1000 FPM face velocity. For each air flow measurement station provide a cfm calibrated panel mounted magnehelic gauge. (Install an access door in duct immediately upstream from each air flow measuring station.)

K. Velocity Pressure Transducers 0 to 5 volts DC, accuracy $\pm$ 2% full scale, return air range (0 to 0.25" WG), supply air range 0 to 0.5", Setra or equal.

L. Wells: install pipe line mounted control and indicating devices in stainless steel or brass thermometer wells.

M. Capillary Supports: securely support all duct-mounted and casing-mounted thermostat capillaries using factory fabricated copper bulb supports.

N. Provide stand-offs for control devices mounted on externally insulated ducts and equipment.

O. Anchor all items mounted on gypsum board (dry-wall) using toggle bolts or moly bolts, not expansion shields.

P. Pressure Gauges:

1. Provide 1-1/2" dial branch pressure gauges as close as possible to each valve and damper operator (use 1" gauges on air terminal dampers). Provide 1" minimum dial gauges on each port of each instrument, including receiver-controllers, transmitters, P.E. switches, etc. Provide 1" minimum dial gauge on each air terminal damper operator.

Q. Provide permanent nameplates for control switches and motor starters. Nameplates: engraved laminated plastic with letters legible under normal operating conditions. (White on black).

R. Permanently identify control devices, so they may be identified on control diagrams. Provide engraved plastic nameplates for items mounted outside of or on faces of panels. Mark other instruments with indelible ink. Mark room thermostats and room temperature sensors on inside of covers.

S. Automatic Dampers:

1. Automatic dampers shall have extruded aluminum air-foil blades and all linkages shall be located outside of the airstream. Such dampers shall have leakage rates not exceeding 1% of Maximum Design Flow at 4" WG pressure differential.

2. Saw-mark ends of damper rods parallel to blades.

T. Turbine Flow Meter: Insertion type flow meters, impedance sensing, non-magnetic, non-photoelectric, volumetric accuracy ± 2% of reading over middle 80% of operating range. Pressure drop maximum 1 psi at 1100 FPM in 1-1/2" pipe. Operating pressure 400 psi, maximum temperature 200°F continuous, supply voltage 24 VDC at 50mA. DC Linearity 0.1% of span, 0-10 V or 4-20mA output. Onicon incorporated or approved equal.

U. Flow Metering Station:

1. Flow metering station shall be continuous monitoring Balance Master "window seal" in-line flow station or approved equal.

2. Flow meter shall be non-invasive ultra sonic transit-time flow meter powered by 115/1/60. Isolated outputs shall be 4-20 Ma and 5 volt unfactored pulses proportioned to flow rate.

3. Flow meter shall be housed in a Nema 4X enclosure for wall mounting and shall be capable of reading flow velocity over a range of 1-30 ft./sec. with an accuracy of 1% of reading.

2.8 CONTROL DEVICE APPLICATIONS:

A. Pump Status: Current transformers.

B. Fan Status: Differential static pressure switches.

C. Level alarms: External float switches for closed vessels, open floats for open tanks.

PART 3 - CONTROL SEQUENCES:

3.1 GENERAL:

A. Control diagrams on drawings are intended to indicate, in general, control arrangements. Provide all instruments, relays, operators, switches, etc. required to accomplish control sequences whether or not such devices are actually shown on control diagrams.

B. As shown on drawings.

END OF SECTION

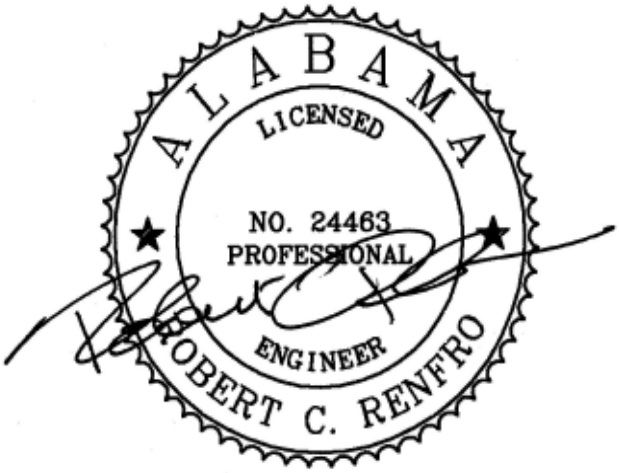
SECTION 260000

COVER - RCR

DIVISION 26/27/28

ELECTRICAL SPECIFICATIONS

PREPARED BY



11/06/2026

SECTION 260500

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

A. General Conditions:
1. The accompanying General Conditions (front-end specifications) shall apply to and form a part of this section.

B. General Requirements:
1. Carefully examine General Conditions, other specification sections, and other drawings (in addition to Electrical) in order to be fully acquainted with their effect on electrical work.
2. Do all work in compliance with all applicable codes, laws, and ordinances, the National Electrical Safety Code, the National Electrical Code (hereinafter referred to as "Code"), applicable energy codes, and the regulations of the local utility companies. Obtain and pay for any and all required permits, inspections, certificates of inspections and approval, and the like.
3. Cooperate with other trades and contractors at job. Perform work in such manner and at such times as not to delay work of other trades. Complete all work as soon as the structure and installations of equipment will permit. Patch, in a satisfactory manner and by the proper craft, any work damaged by electrical workmen.

C. Electrical Contractor Experience Requirements:
1. Electrical contracting firm shall be licensed as an electrical contractor in the state where work will be performed.

1.2 GENERAL SCOPE OF ELECTRICAL WORK (REFER TO DRAWINGS FOR OTHER SPECIFIC SCOPE ITEMS)

A. Furnish all labor and materials to complete electrical work as shown on drawings and/or herein specified.

B. Remove all existing electrical equipment and wiring made obsolete by this project and remove or relocate all electrical services located on or crossing through the project property, either above or below grade, which would obstruct the construction of the project or conflict in any manner with the completed project or any code pertaining thereto. Dispose of salvageable materials as directed by the Architect. Contractor shall schedule meeting to review scope of electrical demolition and to confirm scope and phasing of proposed demolition with the owner in the presence of the prime consultant prior to start of any electrical demolition.

C. Furnish and install complete power, telephone and other electrical services as shown on drawings and/or specified herein.

D. Pay all electrical utility company service charges (if any) in connection therewith, including permanent meter deposit. Meter deposits will be refunded to Contractor at time of Owner's acceptance.

E. Furnish and install complete power distribution system as shown on drawings and/or specified

herein.

F. Furnish and install medium voltage power distribution system components as shown on drawings and/or specified herein.

G. Furnish and install disconnect switches for motors as shown on drawings and/or specified herein.

H. Furnish and install complete electrical grounding systems as shown on drawings and/or specified herein.

I. Install and connect electrical equipment mentioned in Division 26/27/28 Specifications or noted in drawings, whether furnished by electrical contractor or by others.
   1. Where shown or specified, equipment furnished by others shall be installed and connected under this Contract.
   2. Where shown or specified, Contractor shall receive, unpack, check and assume custody of equipment furnished by Others. Contractor shall assume responsibility for care and safekeeping of this equipment, when delivered into his custody. He shall protect it from moisture, dust and damage during construction and until Owner acceptance of project.

J. Furnish and install complete electrical lighting systems as shown on drawings and/or specified herein.

K. Furnish and install all electrical items shown on drawings and/or herein specified, unless shown or specified otherwise.

L. Furnish and install complete controls & auxiliary systems as shown on drawings and/or specified herein.

M. Furnish and install complete telephone/data raceway (including all outlet boxes, face plates, conduit raceways, telephone backboards, terminal cabinets, etc.), wiring and devices system as shown on drawings and/or specified herein.

N. Furnish and install a complete Fire Alarm System as shown on drawings and/or specified herein.

O. Furnish and install a complete Access Control System as shown on drawings and/or specified herein.

P. Furnish and install CCTV System cameras as shown on drawings and specified on Sheet E0.01.

Q. Furnish and install Communications Equipment as shown on sheet E5.01.

R. Furnish and install a complete Surge Protection System as shown on drawings and/or specified herein.

S. Procure and pay for permits and certificates as required by local and state ordinances and fire underwriter's certificate of inspection.

T. Balance loads as equally as practicable on services, distribution feeders, circuits and buses. Provide typewritten directory for each panel.

U. Unless specifically indicated or required otherwise, terminate all circuitry/cabling provided within this contract at associated equipment/devices/etc. in accordance with all applicable codes, standards and supplier requirements, whether associated equipment/device/etc. is furnished within this contract or by others.

V. Complete field testing, adjustment & startup of all systems listed above as shown on drawings and/or specified herein.

PART 2 - PRODUCTS

2.1 APPROVED MATERIALS AND DEVICES

A. Where not otherwise specified, provide only new, standard, first-grade materials/systems throughout, conforming to standards established by Underwriter's Laboratories, Inc., and so marked or labeled, together with manufacturer's brand or trademark. All equipment/systems subject to approval of Architect before installation. All like items and associated equipment/systems shall be of one manufacturer.

B. To ensure proper coordination, it is intended that all electrical equipment and materials specified in Division 26/27/28 of these specifications and shown on the electrical drawings be furnished and installed by the electrical sub-contractor, for proper coordination. It will not be permissible for any of these items to be furnished directly by the general contractor.

C. To ensure commonality of spare parts, it is required that the electrical contractor provide the same brand for all circuit breakers, starters, power equipment, etc. provided under the following divisions of these specifications:
1. SECTION 260573: POWER DISTRIBUTION SYSTEM ELECTRICAL STUDIES
2. SECTION 262200: DRY TYPE TRANSFORMERS
3. SECTION 262413: SWITCHBOARDS
4. SECTION 262416: POWER PANELBOARDS - CIRCUIT BREAKER TYPE
5. SECTION 262417: LIGHTING PANELBOARDS
6. SECTION 262816: SAFETY SWITCHES AND FUSES

2.2 SUBMITTALS

A. All submittals to the design team shall be accompanied by a letter summarizing all proposed deviations from specified products or pre-approved substitutions. The absence of such a letter shall be understood to indicate that the contractor intends to meet all contract requirements, regardless of cut-sheets/data-sheets provided within the submittal.

B. Submit to Architect ten (10) days prior to bid date three (3) copies of any items and/or manufacturers which are proposed as substitutes for those specified.

C. Submit to Architect promptly after award of Contract and prior to purchasing, the number of copies required by the contract. All drawings of a specific item or system shall be made in one submittal, and within thirty (30) days after award of Contract. Shop drawings of all power equipment shall contain exact details of device placement, phasing and numbering, in form of elevations, for each major piece of equipment. Shop drawings shall be submitted on the following:
1. SECTION 260513: POWER CABLES, 601V-38kV
2. SECTION 260573: POWER DISTRIBUTION SYSTEM ELECTRICAL STUDIES

3. SECTION 260943: LIGHTING CONTROL SYSTEM
4. SECTION 261200: PADMOUNT TRANSFORMERS
5. SECTION 262200: DRY TYPE TRANSFORMERS
6. SECTION 262413: SWITCHBOARDS
7. SECTION 262416: POWER PANELBOARDS - CIRCUIT BREAKER TYPE
8. SECTION 262417: LIGHTING PANELBOARDS
9. SECTION 262816: SAFETY SWITCHES AND FUSES
10. SECTION 264300: SURGE PROTECTIVE DEVICES
11. SECTION 265000: LIGHTING MATERIALS AND METHODS
12. SECTION 271000: STRUCTURED CABLING SYSTEM
13. SECTION 275100: SOUND SYSTEMS
14. SECTION 283100: FIRE ALARM SYSTEM
15. SECTION 287800: EMERGENCY RESPONDER RADIO COVERAGE SYSTEM
16. ALL POWER DISTRIBUTION EQUIPMENT (i.e. SWITCHBOARDS, PANELBOARDS, DRY TYPE TRANSFORMER, ETC.)
17. ALL ELECTRICAL AND TELECOMMUNICATION EQUIPMENT LAYOUTS - Submittals shall include ¼" = 1'-0" CAD drawings (hand drawn sketches will not be accepted) of each electrical room, IT room, electrical equipment stand, generator area, or any other similar area with electrical equipment. Drawings shall indicate all panelboards, transformers, switchboards, generators, equipment racks, control panels, HVAC equipment, etc. that are located in each electrical/IT area. Layouts shall show that each piece of electrical equipment has the clearances, working space and dedicated equipment space required by applicable codes. Additionally, drawings shall demonstrate a pathway a minimum of 24" wide with all equipment doors open to 90 degrees. No conduits to equipment within these areas shall be installed until submittals have been provided and returned without exception by the design team.

D. The contractor shall fully review, comment upon and correct all shop drawings as required to assure compliance with contract documents prior to submittal to Architect. The failure of the contractor to properly review and correct shop drawings prior to submittal will result in rejection of shop drawings by the engineer. Review by the Architect will be for general conformance with contract documents. The contractor shall be fully responsible for correctness of all submitted dimensions, details, quantities and locations.

E. None of the above items shall be installed until shop drawings or catalog data have been reviewed by Architect without rejection or required resubmittal. Any listed item not submitted, even if specified, shall be considered not acceptable and shall be removed if directed.

F. Any required resubmittal will be reviewed by the Architect for conformance with previously issued comments only. The contractor shall be responsible for verifying that all items not specifically requiring resubmittal have not been altered from the previously reviewed submittal.

G. Material proposed for substitution shall be of the same quality, perform the same functions, conform to such physical dimensions and appearance as are required by the Architect. All material proposed for substitution is subject to the approval of the Architect and his authority for approval is final. No material proposed for substitution will be considered unless all submittal data complies with the drawings and specifications of Section 16 as to time of submission, number of copies of submittal, and detail requirements.

H. Samples of material shall be furnished where required by drawings or Division 26/27/28 Specification, or as requested by the Architect on items proposed as substitutes.

I. Submit to Architect a certificate of final inspection from local inspection department.

PART 3 - EXECUTION

3.1 SITE VISIT

A. The Contractor shall visit the site to determine existing dimensions and conditions affecting electrical work. Failure to do so in no way relieves Contractor of his responsibility under Contract.

3.2 CLEARANCE WITH UTILITIES

A. It shall be the responsibility of this Contractor, prior to bid, to reaffirm with the utility companies involved, that the locations, arrangement (and with power company voltage, phase, and metering required) and connections to utility service are in accordance with their regulations and requirements. If their requirements are at variance with these drawings and specifications, the Contract price shall include any additional cost necessary to meet those requirements without extra cost to Owner after a contract is entered into.

B. On many projects the utility company may levy charges due to locations, size or type service involved. The Contractor shall be responsible for these charges (including permanent meter deposit), unless such charges are not available prior to bid and Contractor so documents as described below. The meter deposit will be refunded to the contractor at time of Owner's acceptance.

C. Should above cost not be available, prior to bid, Contractor must submit a letter signed by a responsible utility company person so stating with his bid and in turn must be submitted by Prime Contractor with his bid to Owner. The cost will then be deleted from the Contract and become responsibility of the Owner.

D. The contractor shall be fully responsible for scheduling and coordinating all required utility company work with associated utility companies prior to start of work. Contractor shall be responsible for notifying the owner of any required utility company costs/fees, forms, contracts, etc. as required to keep the project on schedule as early as possible, and for providing necessary forms from utility company to owner for signing where necessary.

E. Arrange with utility companies for such services as shown or herein specified and installation of meter where shown. Furnish with shop drawings a signed document from utility companies describing the location and type of services to be furnished and any requirements they may have. This document shall be signed for each utility company by a person responsible for granting such service.

3.3 WORKMANSHIP

A. All work shall be in accordance with the latest editions of NFPA 70 (National Electrical Code), NFPA 101 (Life Safety Code), National Electric Safety Code, International Building Code, applicable NECA standards and the rules and regulations of State and Local Authorities Having Jurisdiction.

B. All work shall be executed in a workmanlike manner and shall present a neat and mechanical appearance upon completion.

C. All equipment, devices, etc. shall be installed in accordance with manufacturer's recommendations.

D. All items shall be installed straight and plumb in a workmanlike manner and care shall be exercised so that like items are mounted the same position, heights and general location.

E. Keep site clean of accumulation of cartons, trash and debris.

3.4 SAFETY

A. The contractor is solely responsible for all job safety. Architect assumes no responsibility for job safety. Maximum consideration shall be given to job safety and only such methods as will reasonably ensure the safety of all persons shall be employed. The codes and regulations of OSHA shall be given strict compliance as well as such other codes, laws, and regulations as may be applicable.

3.5 CONTRACT DOCUMENTS

A. Contract documents indicate diagrammatically, extent, general character and approximate location of work. Where work is indicated but minor details omitted, furnish and install it complete so as to perform its intended functions. For details and mechanical equipment, follow drawings provided by other disciplines (Architectural, Mechanical, Structural, Civil, etc.) and fit electrical work thereto.

B. Contract documents consist only of the hardcopy documents issued by the Prime Architect. Electronic documents issued directly by the electrical engineer to the contractor and/or its sub-contractors/vendors are issued for convenience only (electronic documents are not formal contract documents).

C. If the contractor and/or one of its suppliers require a one-time transfer of electronic files of the current electrical construction documents to prepare shop drawings (or for another similar purpose), it shall:
   1. Sign a waiver prepared by the electrical engineer prior to the transmittal of these files.
   2. Agree to pay the electrical engineer a fee of $50.00 per drawing, up to a maximum of $400 per transfer, payable upon receipt of the files.
   3. To the fullest extent permitted by law, indemnify, hold harmless, and defend JRA from all claims, damages, losses and expenses, including attorneys' fees arising out of or resulting from the use of the CAD files.

D. Take finish dimensions at job in preference to scaled dimensions.

E. Except as above noted, make no changes in or deviations from work as shown or specified except on written order of Architect.

3.6 UNDERGROUND UTILITY/EQUIPMENT COORDINATION

A. Prior to commencement of work, verify exact locations of all existing or proposed underground utilities and/or underground equipment and verify that proposed electrical installation does not conflict with these items. Notify Architect immediately if any conflict is found.

3.7 EQUIPMENT STORAGE

A. Store all electrical equipment in dry, covered locations as directed by equipment manufacturers.

Contractor shall be responsible for replacing or repairing improperly-stored equipment as directed by Architect.

3.8 EXCAVATION, CUTTING AND PATCHING

A. Perform all cutting and excavating as necessary for installation of electrical systems, unless specifically covered under another section. After Architect's observation, complete all excavation, filling and backfilling as directed under specifications for preparation of site and earthwork. Foundations for equipment shall be as specified under concrete section. Concrete pads shall be minimum of 6" thick; unless greater thickness required by equipment manufacturer. Obtain specific approval of Architect before cutting into any structural members.

B. For all such work employ competent workmen, and finish up in neat and workmanlike manner, equal to quality and appearance to adjacent work.

3.9 PENETRATIONS

A. All penetrations in water tight barriers shall be made so that barrier rating is not compromised. Furnish roof flashing for all equipment installed under Division 26/27/28 that penetrates through the roof. Appropriate flashing is specified under roofing and sheet metal section. Supply these flashings for installation under roofing and sheet metal section.

B. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly to maintain the fire/smoke rating of the associated membrane.

C. Where penetrations are required through structural elements, verify penetration locations and sizes with structural engineer. In no case shall the structural integrity be compromised without written approval from structural engineer.

3.10 INSTALLATION OF EQUIPMENT - GENERAL

A. Care shall be exercised in exact routing and location of all items so as not to obstruct access to equipment, personnel walkways, or expose it to potential mechanical damage.

B. Items shall be securely anchored and/or fastened. Provide proper support for all equipment, devices, conduits, boxes, panels, etc. as required by code and for a workmanlike installation. Provide guy wiring for wood poles where required to prevent leaning. All construction shall meet the seismic design requirements of the building code. Items (especially transformers, light fixtures, equipment racks, freestanding gear, etc.) installed in seismic zones C, D, E or F shall be supported and braced per applicable codes and standards.

C. All wall, pole or frame-mounted electrical equipment shall be mounted to metal unistrut (or similar) frames of same material as electrical equipment. For example, pole-mounted painted or galvanized steel disconnect switches shall be mounted to galvanized steel unistrut frames.

D. All electrical equipment, furnished by Contractor or by others shall be covered and protected during construction.

E. All control cabinets, panels, motor control centers and other electrical cabinets and enclosures shall have all trash removed and be vacuumed clean. All foreign paint, etc., shall be removed from exterior and all scratches in finish touched up with same color and material as original. Any rusted areas shall be sanded, primed and repainted.

F. All relays, starters, push-button and other control devices shall be cleaned and if necessary, lubricated with CRC 2-26 to assure free operation.

3.11 MOTORS, STARTERS AND CONTROLS

A. Unless otherwise specified or shown, all motors will be furnished and installed under other sections of this specification.

B. Electrical Contractor shall install all starters and all electrical power wiring and connections to motors and starters.

C. Unless otherwise specified or shown, all control items for motors shall be furnished, installed and wired in conduit under other divisions of this specification.

3.12 CIRCUITS AND BRANCH CIRCUITS

A. Outlets shall be connected to branch circuits as indicated on drawings by circuit numbers. No more outlets than are indicated shall be connected to a circuit.

B. Branch circuit homeruns shall be installed as shown on drawings. Multiple homerun conduits shall not be combined by contractor into larger, single homerun conduits unless specific permission is granted by the Engineer.

3.13 LUG/TERMINAL RATINGS

A. All lug/terminal ratings, sizes, locations, types, etc. shall be coordinated with the associated conductor sizes, types, routings, etc. by the contractor.

B. All lugs/terminals/etc. shall be rated for 75 degree C terminations (minimum, unless specified otherwise).

3.14 EQUIPMENT FAULT CURRENT RATINGS

A. All equipment and breakers shall meet the minimum RMS symmetrical interrupting capacity ratings shown on plans for the associated distribution equipment. All interrupting ratings shall be full ratings. Where new devices or breakers are added to existing distribution equipment, the new devices/breakers shall have interrupting ratings matching or exceeding that of the existing distribution equipment.

3.15 OUTLET LOCATION

A. Symbols shown on drawings and mounting heights indicated on drawings and in specifications are approximate only. The exact locations and mounting height must be determined on the job and it shall be the Contractor's responsibility to coordinate with other trades to ensure correct installation.

3.16 IDENTIFICATION

A. Each panel shall have each circuit identified. Panels without branch circuit nameplates shall have typewritten directories.

B. Each individually mounted switch, circuit breaker, starter and/or any other control or protective device shall identify equipment fed and fuse size, if any, by engraved plastic nameplate, white with black letters, screw attached.

C. See Specification Section 260553 for additional requirements.

3.17 GROUNDING

A. All equipment shall be grounded and bonded in accordance with all state/local regulations, The National Electrical Code and as specified herein.

3.18 TELEPHONE WORK

A. Provide telephone raceways, outlets and backboards, as shown. Provide additional work as described in Specification Section 271000 and/or shown on drawings. Bond all raceways together at backboards and provide No. 6 ground wire extending from raceway bonds to cold water pipe, in 1/2 inch raceway. Carefully ream ends of all raceways.

3.19 PAINTING

A. Refer to Painting/Finishing specifications for requirements regarding field painting of exposed conduit. Any scratches, dents or rust spots in conduit electrical enclosures, panels, motor control or any other electrical items shall have the dents removed, and they, along with any rust spots or scratches, sanded and touched up with the same exact color paint as original finish.

3.20 ACCEPTANCE TESTING

A. Upon completion of work, the entire electrical system installed within this project shall be tested and shall be shown to be in perfect working condition, in accordance with the intent of the specifications and drawings. It shall be the responsibility of the Electrical Contractor to have all systems ready for operation and to have an electrician available to operate same in accordance with and under the supervision of the observation representative(s) of the Architect. The Electrician shall be available to assist in removal of panel fronts, etc., to permit inspection as required.

B. The electrical sub-contractor shall include in bid price start-up assistance and training from a certified representative of the manufacturer for the following systems:
1. SECTION 260943: LIGHTING CONTROL SYSTEM
2. SECTION 271000: STRUCTURED CABLING SYSTEM
3. SECTION 275100: SOUND SYSTEMS
4. SECTION 283100: FIRE ALARM SYSTEM
5. SECTION 287800: EMERGENCY RESPONDER RADIO COVERAGE SYSTEM

3.21 OPERATION AND MAINTENANCE DATA

A. One set of marked “AS BUILT” drawings, three (3) sets of all equipment catalog and maintenance data and three (3) sets of all final shop drawings, on all equipment requiring same shall be turned over to owner. These items shall be bound in hard back book. Contractor shall explain and demonstrate all systems to Owner’s representative.

3.22 GUARANTY-WARRANTY

A. Furnish a written Guarantee-Warranty, countersigned and guaranteed by General Contractor, stating:
1. That all work executed under this section will be free from defects of workmanship and materials for a period of one (1) year from date of final acceptance of this work.

2. Above parties further agree that they will, at their own expense, repair and replace all such defective work, and all other work damaged thereby, which becomes defective during the term of the Guaranty-Warranty.

END OF SECTION 260500

SECTION 260513

POWER CABLES, 601V-38kV

PART 1 - DESCRIPTION

A. Medium Voltage Cables rated 601V-38kV

PART 2 - PRODUCTS

2.1 601V-38KV CABLE

A. Cable shall consist of:
1. Single stranded Class B annealed uncoated Copper conductor with extruded semi-conducting strand screen
2. Ethylene propylene rubber (EPR) insulation (133% Insulation Level) with a semi-conducting insulation shield
3. Concentric conductor bare copper neutral wire
4. Outer PVC jacket to meet or exceed all requirements of ICEA S-93-639, AEIC CS8 and UL 1072.

B. Cable shall be:
1. Rated for cable-tray use (sizes #1/0 and larger).
2. Rated for dry or wet locations, including locations with direct sunlight exposure.
3. Rated for the voltages indicated on plans.

2.2 MANUFACTURER

A. Cable shall be Okonite Okoguard-Okoseal Type URO-J, 133% insulation level, Shielded Power Cable or equal as manufactured by General Cable or Southwire.

PART 3 - EXECUTION

3.1 INSTALLATION OF CABLE

A. No splices shall be pulled into conduit.

B. Both conductors and conduits shall be continuous between termination points.

C. No conductor shall be pulled until conduit is cleaned of all foreign matter.

3.2 TERMINATIONS

A. Cable shall be terminated using Raychem series HVT shielded outdoor cable terminators installed in strict conformance with manufacturers recommendations. Splices made below grade shall be submersible.

3.3 CABLE DESIGNATION AND COLOR CODING

A. Non-ferrous identifying tags or pressure sensitive labels shall be securely fastened to all cables at all terminal points, all junction boxes, and every 50’ on-center in cable trays. Tags or labels shall be stamped or printed to correspond with markings on drawings so that cable ID and phase

can be readily identified.

B. A color coding system, as approved by local authority and owner, shall be followed throughout the network.

3.4 TESTING

A. Cable shall be tested by an independent testing engineer to ensure that cable meets specification requirements and has been installed without damage. Provide all instruments, labor and materials for tests. Testing shall include Dielectric Withstand Voltage ("Hi-Pot") testing test for fifteen minutes with cable leakage current readings taken at one-minute intervals. Test voltage shall be as directed by the cable manufacturer to assess dielectric withstand ratings without damaging cable. Test results shall logged, typed, signed by the testing engineer and submitted with final close-out documents for the project. Leakage current shall remain constant or shall decrease through the test for the cable to pass the test. All cable not passing above tests shall be replaced and retested.

END OF SECTION 260513

SECTION 260519

POWER CONDUCTORS AND CABLES 51V-600V

PART 1 - GENERAL

1.1 DESCRIPTION

A. Power Wires and Cables

B. Low Voltage Wires and Cables

PART 2 - PRODUCTS

2.1 POWER WIRES AND CABLES - 600 VOLT

A. General: Conductors shall have current carrying capacities as per N.E.C. and with 600 volt insulation, #12 minimum except for controls and fixture wire. Conductors shall be copper.

B. General Application (see below for exceptions):
1. At or Below Grade (including within slab-on-grade):
   a. #8 or larger conductors:
      1) XHHW or RHH/RHW/USE stranded (in conduit).
   b. #10 or smaller conductors for circuits terminating at motors:
      1) THHN/THWN or XHHW stranded (in conduit).
   c. #10 or smaller conductors (excluding circuits terminating at motors):
      1) THHN/THWN or XHHW solid (in conduit).
2. Above Grade:
   a. #8 or larger conductors:
      1) THHN/THWN, XHHW or RHH/RHW/USE stranded (in conduit).
   b. #10 or smaller conductors for circuits terminating at motors:
      1) THHN/THWN, XHHW or RHH/RHW/USE stranded (in conduit).
   c. #10 or smaller conductors (excluding circuits terminating at motors):
      1) THHN/THWN, XHHW or RHH/RHW/USE solid (in conduit).
3. Power Wire and cable shall be as manufactured by Southwire, Rome, Encore Wire, American Insulated Wire, Okonite, Phelps-Dodge, Amercable, Aetna or approved equal.

C. Emergency Feeder Wiring
1. Where specifically required by NEC articles 700, 701, or other similar sections, feeder-circuit wiring for emergency systems and legally-required standby systems shall be a listed electrical circuit protective system consisting of 2-hour fire-rated, mineral insulated, copper-sheathed wiring cable (Pyrotenax System 1850 or equal).

D. Class 1 Control Cabling (120VAC Control Circuits, Etc.)
1. Unless specified otherwise, Class 1 control cabling shall:
   a. Be rated for exposed cable tray installation.
   b. Be plenum rated.
   c. Be UL-rated for the proposed application.
   d. Be multi-conductor with overall outer sheath as required by the application. The insulation of each conductor within the overall multi-conductor cable shall be uniquely color-coded. Ground conductors (when provided) within the multi-conductor cable

shall have green insulation. Conductors with green insulation shall not be used for conductors other than ground.
e. Utilize copper conductors.
f. Have wire gauge as required to limit voltage drop to acceptable limits determined by the system supplier and to meet all applicable code requirements.
g. Where installed underground, within slab-on-grade or in exterior locations, be rated for wet locations.
h. Where required for specific systems, meet the specific requirements (conductor quantity, wire gauge, insulation type, shielding, etc.) of the system supplier.
i. Be rated for 600V.
j. Be industrial grade.
k. Have stranded conductors.
l. Have sunlight/oil-resistant PVC/Nylon insulation and jacket with ripcord.

2. Control cabling shall be as manufactured by Belden, AlphaWire or General Cable.

E. Fixture Wiring
1. Conductor Types:
a. Type TFFN or XFF.
2. Minimum Sizes:
a. For fixtures up to 300 watts: #16.
b. For fixtures over 300 watts up to 1500 watts: #14.
c. For fixtures over 1500 watts: as required.
d. Conductors to concrete pour fixtures: #12.
3. Fixture wire shall extend only from fixture to first junction, and not over 6 feet, except for concrete pour units.

2.2 WIRE CONNECTIONS:

A. All connector types:
1. Shall be properly rated for the proposed application by UL and per the manufacturer.

B. At Motor Connections (within motor terminal boxes):
1. On Unshielded Wire:
a. Single conductor per phase: shall be made with insulated set screw connectors or 3M 5300 Series 1kV Motor Lead Connections kits with mechanical lugs as required.
b. Multiple conductors per phase: shall be made with insulated mechanical lugs, rated for the associated motor cable types, by Polaris or Ilsco.
2. On Shielded Power Wire:
a. The braided shields and internal grounding conductors of shielded power (not instrumentation) cables shall be grounded at BOTH ends (at VFD/starter and at motor) with a termination kit provided by the cable supplier. This termination kit shall include a connection ring that makes contact around the full circumference of the braided shield, and connects all internal grounds to a common external ground point.
3. Cabling within motor terminal boxes shall be trained such as to prevent any splice/termination/connection kits from contacting inside edge(s) of the motor terminal boxes (to prevent chaffing of the insulation/splice/wiring which could lead to faults). Contractor shall carefully coordinate all required motor terminal box sizes to ensure proper capacity for all required conductors/splices.

C. Other Dry locations:

1. On Wire larger than #10: shall be made with solderless, non-insulated compression-type connectors meeting requirements of Federal Specification WS-610e for Type II, Class 2 and shall be covered with Scotch #33 electrical tape so that insulation is equal to 150% of conductor insulation.
2. On Wire #10 and smaller: shall be made with one of the following:
   a. Ideal Wing Nuts or equal by 3M .
   b. Ideal Push-In Wire Connectors (for #12 and smaller only).

D. Other Wet/Damp locations:
1. On Wire larger than #10: shall be made with underground/direct-burial, waterproof rated EPDM or TPE-insulated connectors by Ilsco, Burndy or T&B.
2. On Wire #10 and smaller: shall be made with one of the following:
   a. Ideal Weatherproof or Underground Wire Connectors pre-filled with 100% silicone sealant as required by the application.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. All wires and cables shall be installed in conduit unless specifically noted otherwise.

B. All joints and splices on wire shall be made with solderless connectors, and covered so that insulation is equal to conductor insulation.

C. No splices shall be pulled into conduit.

D. No conductor shall be pulled until conduit is cleaned of all foreign matter.

E. Wire and cable shall be neatly formed, bundled and tied in all panelboards, wireways, disconnect switches, pullboxes, junction boxes, cabinets and other similar electrical enclosures.

F. All wires and cables installed in underground or other wet locations shall be rated by the manufacturer for wet locations.

G. Network cabling shall be continuous from endpoint to endpoint and shall not be spliced unless specifically noted otherwise.

H. All conductors/cabling (including spare conductors) shall be properly terminated unless specifically directed otherwise. See above for general termination hardware requirements.

3.2 POWER WIRE AND CABLE INSTALLATION:

A. No power conductor shall be smaller than #12 except where so designated on the drawings or hereinafter specified.

B. Multi-wire lighting branches shall be used as indicated.

C. Where more than three current-carrying conductors are installed in a single raceway or cable, conductors shall be derated as indicated in NEC Table 310.15(B)(3)(a).

D. Raceways/cables shall generally not be installed exposed to sunlight on roofs unless specifically required. Where raceways or cables are installed exposed to sunlight on roofs, conductors shall

be derated with ampacities adjusted per NEC Table 310.15(B)(3)(c).

E. In installing parallel power conductors, it is mandatory that all conductors making up the feeder be exactly the same length, the same size, the same type of conductor with the same insulation. Each group of conductors making up a phase or neutral must be bonded at both ends in an approved manner.

F. In installing overhead main power services, a minimum of 5'-0" of cable per run shall be extended beyond the weatherhead(s) for connection to service drop. Confirm exact requirements with local utility company.

3.3 WIRE CONNECTIONS

A. See Part 2 above for material types.

B. Aluminum Wire Connections:
1. Where aluminum wiring is allowed, connections shall utilize compression fittings, no exceptions (Anderson Versa Crimp or equal).

C. Any stranded wire connection to wiring devices shall be made with crimp type terminals.

D. All electrical connections and terminals shall be tightened according to manufacturer's published torque-tightening values with calibrated torque wrenches as required to clearly indicate final torque value to the contractor. Where manufacturer's torque values are not provided, those specified in UL 486A & 486B shall be used.

E. All connections and connector types shall be installed in strict compliance with all requirements of the connector manufacturer.

F. Under no condition shall the specified conductors be connected to terminals rated less than 75°C. Where conductors sized #1 or smaller are shown to be terminated at equipment and the terminals of that equipment are rated for less than 75°C, contractor shall install junction box near equipment to capture the specified conductors, splice with compression connections (rated for a least 75°C) and extend conductors with ampacity rating as required by NEC (based on terminal temperature rating) to equipment terminals. The length of the conductors to be terminated shall be as directed by the AHJ but not less than 48 inches.

3.4 LOW VOLTAGE (LESS THAN 50V) CONTROL AND NETWORK CABLE INSTALLATION:

A. All wires and cables shall be installed in conduit unless specifically noted otherwise. Low voltage control and/or network cabling located within concealed, accessible ceiling spaces (such as above lay-in ceilings) may be run without conduit if the following requirements are met:
1. Cabling shall be plenum-rated, multi-conductor.
2. Cabling shall be supported by cable tray or with J-hook supports on intervals not to exceed 5'-0" on center. Cabling shall be supported solely from the cable tray or j-hooks supported from the building structure, without using piping, ductwork, conduit or other items as supports.
3. Cabling shall be properly bundled with plenum-rated Velcro straps on intervals not to exceed 30" on center.
4. Properly-sized conduit(s) shall be provided wherever cabling enters an inaccessible or exposed area (such as above gyp board ceilings or through walls). End bushings shall be

provided on both ends of all raceway terminations. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly.

3.5 CIRCUITS AND BRANCH CIRCUITS

A. Outlets shall be connected to branch circuits as indicated on drawings by circuit number adjacent to outlet symbols, and no more outlets than are indicated shall be connected to a circuit.

3.6 LABELING AND COLOR CODING OF WIRE AND CABLE

A. Refer to Specification Section 260553 for all labeling requirements.

B. A color coding system as listed below shall be followed throughout the network of branch power circuits as follows:

PHASE	120/208/240/ COLOR	120/240 HIGH LEG DELTA COLOR	277/480 VOLT COLOR
A	BLACK	BLACK	BROWN
B	RED	ORANGE (FOR HI-LEG)	ORANGE
C	BLUE	BLUE	YELLOW
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

C. Where dedicated neutrals are installed for multi-wire branch circuits, the neutral conductors shall be color coded as follows:

PHASE	120/208/240/ COLOR	120/240 HIGH LEG DELTA COLOR	277/480 VOLT COLOR
NEUTRAL A	WHITE W/ BLACK TRACER	WHITE W/ BLACK TRACER	GRAY W/ BROWN TRACER
NEUTRAL B	WHITE W/ RED TRACER	WHITE W/ ORANGE TRACER (FOR HI-LEG NEUTRAL)	GRAY W/ ORANGE TRACER
NEUTRAL C	WHITE W/ BLUE TRACER	WHITE W/ BLUE TRACER	GRAY W/ YELLOW TRACER

D. Control Conductors: Shall be color coded by use of colored “tracers”. No control circuit shall contain two identical conductors. For example, a set of five (5) control conductors for a pushbutton station represents one (1) control circuit which would require five (5) uniquely-colored control conductors.

3.7 TESTING

A. The insulation resistance of all feeder conductors (feeding electrical distribution equipment such as switchboards, panelboards, transfer switches, transformers, etc.) shall be tested at the load side of the feeder breaker with a 1000-volt DC Megger Tester prior to energization or final termination. Any feeder conductor with an insulation resistance less than the recommended

minimums in the latest version of NETA Acceptance Testing Specification ("ATS") standard shall be replaced by the contractor at the contractor's expense. All final test results shall be clearly documented (with date, time, feeder, results, test equipment, etc.), and the final test results shall be submitted to the design team for review.

END OF SECTION 260519

SECTION 260526

GROUNDING

PART 1 - GENERAL

1.1 GENERAL

A. THE WORK UNDER THIS SECTION INCLUDES BUT IS NOT LIMITED TO GROUNDING OF THE FOLLOWING:
1. Service Equipment.
2. Transformers.
3. Non-current carrying conductive surfaces of equipment.
4. Metal Buildings.
5. Structures.
6. Other Equipment.

1.2 GENERAL REQUIREMENTS

A. All equipment, building steel, and main service shall be effectively and permanently grounded with a conductor cross section as required by the National Electrical Code and of capacity sufficient to ensure continued effectiveness of the ground connections for fault current. Ground conductors shall be as short and straight as possible, protected from mechanical injury and, if practicable, without splice or joint.

B. All grounding connections shall be installed in accordance with the National Electrical Code and all local codes and requirements. Such codes shall be considered minimum requirements and the installation of the grounding system shall ensure freedom from dangerous shock voltage exposure and provide a low impedance ground fault path to permit proper operation of overcurrent and ground fault protective devices.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. All grounding conductors shall be insulated with green colored, 600 volt insulation unless noted otherwise.

B. Motors having power supplied by single conductor wire in conduit shall be grounded through the conduit system. Flexible conduit shall be “jumpered” by an appropriate bonding conductor.

2.2 GROUNDING ELECTRODES

A. Grounding electrodes shall be copper-clad steel rods 3/4 inch in diameter and ten feet long. Where longer electrodes are necessary to reduce the ground resistance, Contractor shall provide sectional rods, connectors, drive heads, etc.

2.3 CONNECTIONS

A. All conductor-to-conductor, conductor-to-ground rod, conductor-to-structure, conductor-to-fence connections of #6 and larger sized conductors and underground ground connections shall be permanent exothermic welded connections (Cadweld or equal) unless otherwise noted on

applicable drawings.

B. Connections to equipment shall be by bolted compression type lugs (except for motors). When the conductor is #6 and larger, the lug shall be joined to the conductor by an exothermic weld (Cadweld or equal).

C. Motors to be grounded by the grounding conductors run with the power conductors shall have a split-post grounding stud installed in the connection box.

D. Each cast pull box or junction box shall have a ground lug, connected to largest ground conductor to enter box.

E. Ground connections at conduit terminations shall be made by approved grounding bushings (see Raceways Specification Section for additional requirements).

2.4 MANUFACTURERS

A. Conduit clamps and connectors shall be manufactured by Raco, OZ., or Ercon.

B. Lugs shall be as manufactured by Square “D”, Burndy, or T and B.

C. Exothermic weld connections shall be as manufactured by Cadweld, or approved equal.

D. Ground rods shall be as manufactured by Joslyn or McGraw Edison.

E. Split post grounding shall be as manufactured by Burndy or T and B.

PART 3 - EXECUTION

3.1 MAIN SERVICE GROUND

A. The main service grounding electrode system shall consist of the following items bonded together by the grounding electrode conductor:
1. The main underground cold water pipe (metal).
2. The metal frame of the building.
3. Driven ground rods. Ground rods shall be embedded at the lowest point in the building and below the permanent moisture level. Ground rods shall be spaced a minimum of ten (10) feet apart and connected in parallel until resistance to ground does not exceed five (5) ohms.

B. The grounding electrode system shall be connected to the grounded conductor (neutral) on the supply side of the service disconnecting means by a grounding electrode conductor not smaller than that shown in Table 250.66 of the N.E.C. The main service equipment grounding conductor shall be connected to the grounding conductor on the supply side of the service disconnecting means in accordance with Table 250.122 of the N.E.C. for the ampere rating of the service entrance equipment. Where in a service entrance switchboard, the equipment grounding conductor shall not be less than 25% of the main bus rating. These connections shall be made inside the service entrance equipment enclosure.

3.2 TRANSFORMER GROUNDS

A. Dry type insulation transformers with a grounded conductor in the secondary shall be grounded in accordance with N.E.C. Section 250-30.

3.3 EXPOSED NON-CURRENT-CARRYING METAL PARTS

A. General: Ground connections to equipment or devices shall be made as close to the current carrying parts as possible, that is, to the main frame rather than supporting structures, bases or shields. Grounding connections shall be made only to dry surfaces that are clean and dry. Steel surfaces shall be ground or filed to remove all scales, rust, grease, and dirt. Copper and galvanized steel shall be cleaned to remove oxide before making welds or connections.

B. Code size ground conductors shall be run in all power conduits and properly terminated at each end.

C. Ground conductors shall be routed as straight as possible. Where possible, ground conductors shall be routed such as to avoid bends exceeding 90 degrees or with a radius of less than 8".

D. Exposed ground conductors shall generally be routed in raceways where possible. Raceway types and installation shall comply with Specification Section 260533 (Raceways) requirements.

E. Motors: Exposed non-current-carrying metal parts, shall be grounded by a grounding conductor either run with power conductors, and/or separate grounding conductors. Drawings will show method(s) to be used. The ground conductors with all motor conductors shall be connected to the ground buss in the motor connection box. Jumper connections shall be installed between frames and rigid conduit for equipment having flexible conduit connections (sealtight). All AC motor grounds shall provide a low impedance path to ground.

F. Raceways & boxes: All raceways, conduits, armored or shielded cable and all exposed non-current carrying metal parts shall be grounded. Such items shall be bonded together and permanently grounded to the equipment ground buss. Metallic conduits shall be connected by grounding or clamps to ground buss. Flexible "jumpers" shall be provided around all raceway expansion joints. Bonding straps for steel conduit shall be copper. Jumper connections shall be provided to effectively ground all sections or rigid conduit connected into plastic pipe. No metallic conduit shall be left ungrounded. In conduit systems interrupted by junction or switch boxes where locknuts and bushings are used to secure the conduit in the box, the sections of conduit and box must be bonded together. If conduit, couplings or fittings have a protective coating or non-conductive material, such as enamel, such coating must be thoroughly removed from threads of both couplings and conduit and the surface of conduit or fitting where the ground clamp is secured.

G. Enclosures: Metal conduits entering free standing motor control centers, switchboards or other free standing equipment shall be grounded by bare conductors and approved clamp. Any conduits entering low voltage (480 volts or below) equipment through sheet metal enclosure and effectively grounded to enclosure by double locknut or hub, that meets NEC grounding/bonding requirements, need not be otherwise bonded.

H. Equipment: In addition to equipment grounding provisions mandated by code requirements, additional equipment grounding provisions (including local ground rods, connections, etc.) shall be provided by the contractor as directed by equipment suppliers.

I. Both ends of ground busses in motor control centers, switchboards, etc., shall be separately connected to the main ground buss to form two separate paths to ground.

J. Fences and Grills: Fences and metal grills around equipment carrying voltage above 500 volts between phases shall be bonded together and to ground. Fences and grill work shall be grounded at every post, column, or support, and on each side of every gate.

3.4 ACCEPTANCE DOCUMENTATION AND TESTING

A. Contractor shall take and store photographs of all underground grounding system connections prior to burial of connections, for review by Engineer.

B. Upon completion of work, the entire ground system shall be shown to be in perfect working condition, in accordance with the intent of the Specifications.

C. Contractor shall measure the resistance between the main ground bonding jumper to true earth ground using the Fall of Potential method as described by ANSI/IEEE Standard 81 (“Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of an Earth System”). If the measured value is greater than five ohms, additional grounding electrodes shall be installed as described in Part 3.1 above. The final ground resistance value shall be submitted in writing, and documented via picture of the meter reading from the Fall of Potential test, to the Architect prior to the final observation, and shall be included in final O&M documentation.

END OF SECTION 260526

SECTION 260533

RACEWAYS

PART 1 - GENERAL

1.1 DESCRIPTION

A. THE WORK UNDER THIS SECTION INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
1. Conduits
2. Conduit Fittings
3. Couplings & Connectors
4. Bushings
5. Raceway Hardware, Conduit Clamps & Supports
6. Watertight Entrance Seal Devices

PART 2 - PRODUCTS

2.1 CONDUITS

A. Rigid Galvanized Steel and I.M.C.:
1. Shall be galvanized outside and inside by hot dipping.
2. Shall be as manufactured by Republic, Wheatland, Pittsburg Standard, Youngstown, Allied or equal.

B. E.M.T.:
1. Shall be Electro-Galvanized.
2. Shall be as manufactured by Republic, Wheatland, Pittsburg Standard, Youngstown, Allied or equal.

C. Rigid Aluminum:
1. Shall be manufactured of 6063 Alloy, T-1 temper.
2. Shall be manufactured by Republic (Nucor), Wheatland, Allied (Atkore), Penn or equal.

D. Schedule 40 and 80 PVC:
1. Shall be composed of polyvinyl chloride and shall be U.L. rated type 40 or 80 for use with 90 degree rated conductors. Conduit shall conform to NEMA Standards and applicable sections of N.E.C.
2. The conduit manufacturer shall have had a minimum of 5 years experience in the manufacture of the products. Non-metallic raceways shall be as manufactured by Carlon, Triangle, Can-Tex, Allied or equal.

E. HDPE Innerduct
1. Shall be composed high density polyethylene and shall be orange in color, unless noted otherwise.
2. Shall be corrugated unless noted otherwise.
3. Shall be manufactured by Carlon, Ipex or equal.

F. Flexible Metallic Conduit:

1. Shall be continuous spiral wound and interlocked galvanized material, code approved for grounding.

G. Liquidtight Flexible Metallic Conduit:
1. Shall be galvanized steel-core sealtite, code approved for grounding.
2. Shall have an outer liquidtight, nonmetallic, sunlight-resistant jacket over an inner flexible metal core.
3. Shall be as manufactured by Electric-Flex, Anaconda or equal.

2.2 FITTINGS, COUPLINGS & CONNECTORS

A. Rigid Galvanized Steel and I.M.C. couplings and connectors shall be standard threaded type, galvanized outside and inside by hot dipping. Threadless and clamp type are not acceptable. Couplings/connectors shall be as manufactured by Raco, Efcor, or Appleton or equal.

B. All rain tight connectors shall be threaded Myers or approved equal, rated for outdoor application.

C. E.M.T. couplings and connectors shall be set screw, or steel compression type. All couplings and connectors shall be 720B, 730, 750B, or 760 series of Efcor or equal series of Raco. Pressure indented type connectors or cast metal will not be approved for any location. E.M.T. couplings and connectors shall be as manufactured by O-Z/Gedney, T&B, Efcor, Raco, Midwest or equal. E.M.T. fittings, couplings and connectors located within concrete (where allowed) shall be compression type and shall be adequately sealed with tape to ensure a concrete-tight seal.

D. Rigid Aluminum couplings and connectors shall be standard threaded type, of the same alloy as the associated conduit. Threadless and clamp type are not acceptable. Fittings shall be as manufactured by Thomas & Betts, Crouse-Hinds, Appleton, Pyle-National or equal.

E. All PVC couplings, adapters, end bells, reducers, etc., shall be of same material as conduit.

F. Liquidtight Flexible Metallic Conduit connectors shall be liquidtight with insulating throat or end bushing, designed for application with Liquidtight Flexible Metallic Conduit. Fittings shall be as manufactured by Efcor, Raco, Midwest or equal.

G. All LB unilets sizes 1 ¼" or larger shall have rollers.

H. Miscellaneous conduit fittings shall be as manufactured by Appleton, Crouse-Hinds, Pyle-National, Russell & Stoll or equal.

2.3 BUSHINGS

A. All non-grounding rigid bushings 1-1/4" and larger shall be the insulating type (O-Z/Gedney type "BB" or equal by T&B, Midwest Electric or Penn Union).

B. All non-grounding rigid bushings 1" and smaller shall be threaded malleable iron with integral noncombustible insulator rated for 150°C. Non-grounding rigid conduit bushings shall be O-Z/Gedney type "B" or equal by T&B, Midwest Electric or Penn Union.

C. All grounding rigid bushings shall be threaded malleable iron with integral noncombustible insulator rated for 150°C. All grounding rigid conduit bushings shall be O-Z/Gedney type

"BLG" or equal by T&B, Midwest Electric or Penn Union.

2.4 HARDWARE, CONDUIT CLAMPS AND SUPPORTS

A. All hardware such as expansion shields, machine screws, toggle bolts, "U" or "J" bolts, machine bolts, conduit clamps and supports shall be of corrosion resistant materials (stainless steel, aluminum, galvanized or plated steel, or other approved materials).

B. Hardware in contact with aluminum handrails, plates or structural members and all hardware in exterior, wet or corrosive areas shall be type 316 stainless steel or aluminum (with bitumastic paint coating to isolate aluminum from contact with concrete where necessary) unless specifically noted otherwise.

C. Supports in exterior, wet or corrosive locations shall be type 316 stainless steel or aluminum (with bitumastic paint coating to isolate aluminum from contact with concrete where necessary) unless specifically noted otherwise.

D. Supports in extremely corrosive environments (such as chlorine or fluoride storage rooms) shall be PVC-Coated aluminum unless specifically noted otherwise.

E. Hardware and conduit clamps shall be as manufactured by Efcor, Steel City, G.A., Tinnerman or equal.

2.5 WATERTIGHT ENTRANCE SEAL DEVICES

A. For new construction, seal devices shall consist of oversized sleeve and malleable iron body with sealing rings, pressure rings, sealing grommets and pressure clamps as required (O-Z/Gedney type FSK/WSK or equal).

B. For cored-hole applications, seal devices shall consist of assembled dual pressure disks with neoprene sealing rings and membrane clamps as required (O-Z/Gedney type CSM or equal).

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Minimum Diameter: 1/2-inch.

B. Raceway Type: Raceway types shall be as specified below, unless indicated otherwise on drawings:
   1. Exterior, Exposed: Rigid Galvanized Steel or I.M.C. unless otherwise noted.
   2. Other Exterior (Concrete-Encased or Direct Earth Buried): Schedule 40 PVC. PVC conduit shall convert to metallic conduit prior to exiting concrete-encasement or direct earth burial. See "transition" items below for additional requirements. Conduits shall be left exposed until after Architect's observation.
   3. Interior, Exposed:
      a. Hazardous Locations: Rigid Galvanized Steel .
      b. Wet Locations (including, but not limited to, Pump Rooms, Wet Wells, Underground Vaults, and other similar locations): Rigid Galvanized Steel or I.M.C. .
      c. Dry Locations Where Subject to Mechanical Damage (including, but not limited to, below 10'-0" A.F.F. in shop, storage, warehouse and other similar areas): Rigid Galvanized Steel or I.M.C..

d. Extremely Corrosive Locations (Chlorine Storage Rooms, Fluoride Storage Rooms and other similar areas): Schedule 80 PVC.
e. Other Dry Locations: E.M.T.

4. Interior, Concealed:
   a. Embedded inside Poured Concrete Walls, Ceilings or Floors, with a minimum of 2" of concrete between finished surface and outer wall of conduit on all sides, where no anchor bolts, screws or other similar items will be installed: Schedule 40 PVC. PVC conduit shall convert to metallic conduit (exact type as specified elsewhere within this section) prior to exiting poured concrete-encasement of wall, ceiling, floor or ductbank. See "transition" items below for additional requirements.
   b. Other Raceways Embedded inside Poured Concrete Walls, Ceilings or Floors (not meeting requirements above): Rigid Galvanized Steel or I.M.C. (coated with two (2) spiral-wrapped layers of 3M Scotchrap 50 PVC tape or two coats of asphaltum paint where below grade or within concrete).
   c. Other Raceways: E.M.T.
5. Terminations at motors, transformers and other equipment which has moving or vibrating parts:
   a. Exterior or Wet Locations (including, but not limited to, Pump Rooms, Wet Wells, Underground Vaults, and other similar locations): Liquidtight Flexible Metallic Conduit (shall generally not exceed 24 inches in length) with watertight fittings.
   b. Dry, Interior Locations: Flexible Metallic Conduit (shall generally not exceed 24 inches in length).
6. Terminations at fixtures mounted in grid-type ceilings:
   a. Flexible Metallic Conduit or MC cabling (shall generally not exceed 72 inches in length and shall run from junction box to fixture, not from fixture to fixture).
7. Transition from underground or concrete-encased to exposed:
   a. Convert PVC to Rigid Galvanized Steel (coated with two (2) spiral-wrapped layers of 3M Scotchrap 50 PVC tape or two coats of asphaltum paint where below grade or within concrete) utilizing Rigid Galvanized Steel 90 degree bends (and vertical conduits as required by application) prior to exiting concrete/grade (except at outdoor pull boxes and under freestanding electrical equipment, where terminations shall be by PVC end bells installed flush with top of slab). Exposed portions of these coated conduits shall extend a minimum of 6" above floor level, and shall be installed at uniform heights.

3.2 RACEWAY INSTALLATION

A. General:
1. Follow methods which are appropriate and approved for the location and conditions involved. Where not otherwise shown, specified, or approved in a particular case, run all wiring concealed.
2. Where conduit crosses a structural expansion joint an approved conduit expansion fitting shall be installed.
3. A non-conductive polypropylene pull string, properly tied/secured at either end, shall be installed in all empty conduits.
4. Metal conduit field-cuts shall be cut square with a hacksaw and the ends reamed after threading.
5. PVC conduit field-cuts shall be made with hacksaw, and ends shall be deburred.
6. All PVC joints shall be made as follows:
   a. Clean the outside of the conduit to depth of the socket, and the inside of socket with an approved cleaner.

   b. Apply solvent cement as recommended by the conduit manufacturer to the interior of the socket and exterior of conduit, making sure to coat all surfaces to be joined.
   c. Insert conduit into the socket and rotate 1/4 to 1/2 turn and allow to dry.
7. All metallic conduit installed below grade or within concrete shall be coated with two (2) spiral-wrapped layers of 3M Scotchrap 50 PVC tape or two coats of asphaltum paint prior to installation.
8. Install ground wire sized per N.E.C. Table 250.122 in all conduits.
9. Use of running threads is absolutely prohibited. Conduit shall be jointed with approved threaded conduit couplings. Threadless and clamp type not acceptable.
10. Conduits shall be sized in accordance with latest National Electrical Code except when size shown on drawings. 1/2-inch conduit shall not contain conductors larger than No. 12 or more than four (4) No. 12 conductors.
11. Exposed, field-cut threads on all metal conduits shall be painted with zinc primer (for Galvanized Rigid or I.M.C.) .

B. Routing/Locating:
1. Exposed conduit runs shall be run level and plumb and shall, on interior of buildings, be run parallel and/or at right angles to building walls and/or partitions.
2. Conduit with an external diameter larger than 1/3 the thickness of a concrete slab shall not be placed in the slab. Conduits in slab shall not be spaced closer than 3 diameters on center.
3. Conduit run in ceiling spaces shall be run as high as possible, all at same level, and shall be supported from building structure. Do not support conduit from any other installation.
4. Conduit run within exterior CMU, concrete or other similar walls shall be run within the CMU cells / concrete structure / etc. Conduits shall not be run on the outside surface of CMU cells / concrete structure / etc. underneath exterior veneers / etc., which could cause a thermal break in the wall insulation or a future water intrusion problem.
5. Install conduit runs to avoid proximity to steam or hot water pipes. In no place shall a conduit be run within 6” of such pipes except where crossing is unavoidable, then conduit shall be kept at least 3” from the covering of the pipe crossed.
6. Before installing raceways for motors, HVAC equipment and other fixed equipment, check location of all equipment connections/terminal boxes with equipment supplier and locate and arrange raceways appropriately.
7. A minimum of 12” of clearance (or more as required by associated utility companies) shall be provided between the finished lines of exterior, underground conduit runs and exterior, underground utilities (gas, water, sewer, etc.).
8. Where any portion of raceway is installed in a wet environment (such as below grade) and located at a higher elevation than the raceway termination point in a dry environment, install watertight compound inside raceway at termination around cabling to prevent transfer of water through conduit system. Watertight compound shall be rated for the potential water head pressure, based on the assumption that ground water level would be at grade level.

C. Bends:
1. Do not make bends (in any raceway, including flexible conduits) that exceed allowable conductor bending radius of cable to be installed or that significantly restrict conductor flexibility.
2. All bends within concrete-encased ductbanks installed in exterior locations shall be long radius bends (24” minimum bending radius – varies with conduit diameter).
3. Where numerous exposed bends or grouped together, all bends shall be parallel, with same center and shall be similar in appearance

4. All PVC elbows, bends, etc., shall be either factory bends or made with an approved heat bender.

D. Support:
1. Anchor conduit securely in place by means of approved conduit clamps, hangers, supports and fastenings. Arrangement and methods of fastening all conduits shall be subject to Engineer's direction and approval. All conduits shall be rigidly supported (wire supports may not be used in any location). Use only approved clamps on exposed conduit.
2. Conduit in riser shafts shall be supported at each floor level by approved clamp hangers.
3. Right angle beam clamps and U bolts shall be specially formed and sized to snugly fit the outside diameters of conduits.
4. Where installed in seismic zones, suspended raceways shall be braced in two (2) directions as required to prevent swaying and excessive movement.
5. Raceways installed on top of flat roofing shall be supported a minimum of 3 ½" above roof with rubber block supports (Cooper B-Line Dura-Blok or equal). Installation shall be in strict accordance with support manufacturer's instructions and recommendations.

E. Terminations:
1. All conduit connections to sheet metal cabinets or enclosures located in exterior or wet locations shall terminate by use of rain tight (Meyers) hubs.
2. Where rigid or I.M.C. conduits enter sheet metal boxes, they shall be secured by approved lock nuts and bushings.
3. Where metal conduits enter outdoor pull boxes, manholes, under freestanding electrical equipment or other locations where direct metal-to-metal contact does not exist between enclosure and conduit, grounding bushings shall be installed. Each grounding bushing shall be connected to the enclosure ground and all other grounding bushings with properly sized grounding conductors.
4. Where E.M.T. enters sheet metal boxes they shall be secured in place with approved insulating fittings.
5. Where PVC enters outdoor pull boxes, manholes or under freestanding electrical equipment, PVC end bells shall be installed.
6. Contractor shall be responsible for coordinating required conduit sizes with equipment hubs/conduit entry provisions (such as at motor tap boxes) prior to installation of conduit systems. Contractor shall field adjust final conduit sizes at terminations where so required (only as allowed by code) from those indicated on plans to coordinate with equipment hubs/conduit entry provisions.
7. Where conduit terminates in free air such that associated cabling/circuitry becomes exposed (such as at cable trays, etc.), conduit shall generally terminate in a horizontal orientation (to prevent dust/debris/etc. from entering conduit system). Where vertical conduit termination is necessary, the termination shall be provided with cord-grip conduit terminations to seal the conduit system.
8. Conduit ends shall be carefully plugged during construction.
9. Permanent, removable caps or plugs shall be installed on each end of all empty raceways with fittings listed to prevent water and other foreign matter from entering the conduit system.

F. Penetrations:
1. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly. Refer to drawings and other specifications for additional requirements.
2. All penetrations shall be at right angles unless shown otherwise.

3. Structural members (including footings and beams) shall not be notched or penetrated for the installation of electrical raceways unless noted otherwise without specific approval of the structural engineer.
4. Dry-packed non-shrink grout or watertight seal devices shall be used to seal openings around conduits at all penetrations through concrete walls, ceilings or aboveground floors.
5. All raceways entering structures, or where water is otherwise capable of entering equipment/devices through the raceway system, shall be sealed (at the first box or outlet) with foam duct sealant to prevent the entrance of gases or liquids from one area to another or into equipment/devices.
    a. Where the elevation of the raceway penetration (into the structure) is no more than 15' below the other (higher) end of the same raceway, Polywater FST sealant (rated to hold back up to 22' of continuous water head pressure), or pre-approved equal, shall be used.
    b. Where the elevation of the raceway penetration (into the structure) is between 15' and 75' below the other (higher) end of the same raceway, Polywater PHRD Custom Mechanical Seals (rated to hold back up to 36psi or 83' of continuous water head pressure), or pre-approved equal, shall be used.
    c. Where the elevation of the raceway penetration (into the structure) is more than 75' below the other (higher) end of the same raceway, the contractor shall propose a custom solution designed to hold back or to drain the possible water within the associated raceway. Submittals shall be provided to the engineer for review/approval, including a summary of the anticipated elevations/PSIs, details of the proposed installation, cut-sheets of devices/materials, etc.
6. Additionally, where necessary to ensure that water does not enter equipment/devices through the raceway system (where raceways extend to equipment/devices from wet areas), junction boxes with drain assemblies in bottom shall be located at low point of raceway system near equipment/devices (to drain water out of raceway system before it enters equipment/devices). Contractors shall provide drains in raceway systems where so necessary to prevent water entry into equipment/devices.
7. All raceways passing through concrete roofs or membrane-waterproofed walls or floors shall be provided with watertight seals as follows:
    a. Where ducts are concrete encased on one side: Install watertight entrance seal device on the accessible side of roof/wall/floor as directed by equipment manufacturer.
    b. Where ducts are accessible on both sides: Install watertight entrance seal device on each side of roof/wall/floor as directed by equipment manufacturer.
8. All raceways passing through walls of rooms containing/storing noxious chemicals (chlorine, ammonia, etc.) or through hazardous locations shall be sealed with conduit seals (Crouse-Hinds type EYS or equal).
9. All raceways terminating into electrical enclosures/devices/panels/etc. located in hazardous locations shall be sealed with conduit seals (Crouse-Hinds type EYS, EZS or equal) within 18" of the termination.

G. Exterior Electrical Ductbanks:
1. Where exterior electrical concrete-encased ductbanks are indicated on drawings, conduit runs between buildings or structures shall be grouped in concrete-encased ductbanks as follows:
    a. A minimum of 3" of concrete shall encase each side of all ductbanks.
    b. A minimum of 1 ½" of separation shall be provided between each conduit within ductbanks. PVC spacers shall be installed at the necessary intervals prior to placement of concrete to maintain the required spacing and to prevent bending or displacement of the conduits.

c. Top of concrete shall be a minimum of 30" below grade. A continuous magnetic marking tape shall be buried directly above each ductbank, 12" below grade.
d. Exact routing of ductbanks shall be field verified and shall be modified as necessary to avoid obstruction or conflicts.
e. Underground electrical raceways shall be installed to meet the minimum cover requirements listed in NEC Table 300.5. Refer to drawings for more stringent requirements.

END OF SECTION 260533

SECTION 260534

OUTLET BOXES, JUNCTION BOXES, WIREWAYS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Outlet and Junction Boxes

B. Pull Boxes

C. Wireways

PART 2 - PRODUCTS

2.1 OUTLET BOXES & JUNCTION BOXES (THROUGH 4-11/16")

A. Sheet Metal: Shall be standard type with knockouts made of hot dipped galvanized steel as manufactured by Steel City, Raco, Appleton, Bowers or equal.

B. Cast: Shall be type FS, FD, JB, GS, or SEH as required for application as manufactured by O-Z/Gedney, Appleton, or equal.

C. Nonmetallic: Shall be type Polycarbonate/ABS construction as required for application with non-metallic quick-release latches as manufactured by Hoffman, O-Z/Gedney, Appleton, or equal.

2.2 JUNCTION AND PULL BOXES (LARGER THAN 4-11/16")

A. Oil-Tight JIC: Shall be Hoffman Type CH box or approved equal.

B. Galvanized Cast Iron or Cast Aluminum: Shall be O-Z/Gedney or approved equal.

C. Stainless Steel: Shall be as manufactured by O-Z/Gedney, Hoffman or approved equal. Boxes shall have continuous hinges, seamless foam-in-place gaskets and screw-down clamps.

D. Nonmetallic: Shall be type Polycarbonate/ABS construction as required for application with non-metallic quick-release latches as manufactured by Hoffman, O-Z/Gedney, Appleton, or equal. Boxes shall have hinged covers and screw-down clamps.

E. Wireways: Shall be standard manufacturer's item as manufactured by Hoffman, Square "D", Burns, B & C or equal. Wireways shall have hinged covers and screw-down clamps.

F. Pre-cast Polymer Concrete Below-Grade Hand Holes & Pull Boxes:
1. Enclosures, boxes and cover are required to be UL Listed and conform to all test provisions of ANSI/SCTE 77 "Specifications For Underground Enclosure Integrity" for Tier 15 applications (15,000lb design load and 22,500lb test load) unless noted otherwise.
2. All covers shall have a minimum coefficient of friction of 0.05 in accordance with ASTM C1028 and the corresponding Tier level shall be embossed on the top surface.

3. Cover shall be bolt-down include factory-labeling to read “Electric”, “Communications” or other as directed.
4. Hardware shall be stainless steel.
5. Shall be Quazite PG/LG Style or approved equal.

G. Galvanized Cast Iron Below-Grade Pull Boxes:
1. Enclosures, boxes and cover are required to conform to AASHTO H-20 requirements for deliberate vehicular traffic applications unless noted otherwise.
2. Cover shall be checkered, bolt-down include factory-labeling to read “Electric”, “Communications” or other as directed.
3. Hardware shall be stainless steel.
4. Shall be furnished with grounding kit.
5. Shall be O-Z/Gedney Type YR or approved equal.
   a.

PART 3 - EXECUTION

3.1 APPLICATION

A. General
1. All boxes and wireways shall be of sufficient size to provide free space for all enclosed conductors per NEC requirements. Fill calculations shall be performed by contractor per NEC requirements.

B. Outlet Boxes & Junction Boxes (through 4-11/16”)
1. Sheet metal boxes shall be used on concealed work in ceiling or walls and exposed work in dry, interior locations
   a. Exception: Where exposed and installed within finished/public spaces such as offices, corridors, lobbies, etc., cast boxes shall be used for wiring device outlets. Cast boxes are not required in back-of-house areas such as electrical rooms, mechanical rooms, etc. .
2. Cast boxes shall be used wherever Rigid or I.M.C. conduits are installed.
3. All boxes installed in extremely corrosive areas (such as chlorine and fluoride storage rooms) where non-metallic raceways are used shall be non-metallic.
4. Except when located in exposed concrete block, switch and receptacle boxes shall be 4" square for single gang installation. Appropriate gang boxes shall be used for mounting ganged switches.
5. When installed in exposed concrete block, switch and receptacle boxes shall be square type designed for exposed block installation.
6. Ceiling outlet boxes shall be 4" octagon 1-1/2" deep or larger required due to number of wires.
7. Boxes installed in hazardous locations shall be explosion-proof rated for the associated application, constructed of copper-free cast aluminum.

C. Junction & Pull Boxes (larger than 4-11/16”)
1. For all below grade exterior use and elsewhere as shown:
   a. In areas subject to future vehicular traffic: shall be galvanized cast iron (rated AASHTO H-20 Loading unless noted otherwise).
   b. In areas not subject to vehicular traffic: shall be galvanized cast iron or pre-cast polymer concrete (rated for Tier 15 Loading unless noted otherwise).

2. All boxes installed exposed in exterior or wet areas shall be powder-coated galvanized steel (NEMA 3R).
3. All boxes installed exposed in corrosive areas shall be stainless steel (NEMA 4X).
4. All boxes installed in extremely corrosive areas (such as chlorine and fluoride storage rooms) where non-metallic raceways are used shall be non-metallic.
5. Boxes installed in hazardous locations shall be explosion-proof rated for the associated application, constructed of copper-free cast aluminum.
6. All others shall be oil tight JIC box not less than 16 gauge.

3.2 INSTALLATION

A. General
1. All boxes and wireways shall be securely anchored.
2. All boxes shall be properly sealed and protected during construction and shall be cleaned of all foreign matter before conductors are installed.
3. All boxes and wireways shall be readily accessible. Contractor shall be responsible for furnishing and installing access panels per architect's specifications. Locations shall be as directed by the architect as required to make boxes, wireways, electrical connections, etc. accessible where above gypsum board ceilings or in other similar locations.
4. All metallic boxes and wireways shall be properly grounded.
5. Refer to Specification Section 260553 for identification requirements.

B. Outlet Boxes & Junction Boxes (through 4-11/16")
1. Boxes shall be provided with approved 3/8" fixture studs were required.
2. Recessed boxes for wiring devices, surface fixtures, or connections, shall be set so that the edge of cover comes flush with finished surface.
3. There shall be no more knockouts opened in any sheet metal box than actually used.
4. Any unused opening in cast boxes shall be plugged.
5. Back to back boxes to be staggered at least 3 inches.
6. Under no circumstances shall through-the-wall boxes be used.

C. Junction & Pull Boxes (larger than 4-11/16")
1. Pull boxes shall be installed as indicated on plans and/or as required due to number of bends, distance or pulling conditions.
2. Boxes to be imbedded in concrete shall be properly leveled and anchored in place before the concrete is poured.
3. All pull boxes and/or junction boxes installed exterior below grade, shall have their tops a minimum of 1-1/2 inches above surrounding grade and sloped so that water will not stand on lid. A positive drain shall be installed, to prevent water accumulation inside.
4. Above grade pull boxes shall be installed on concrete anchor bases as shown on Plans.

D. Wireways and/or wall-mounted equipment
1. Mount each wireway to channels of the same metal type as the wireway.
2. Conductors serving a wireway shall be extended without reduction in size, for the entire length of the wireway. Tap-offs to switches and other items served by the wireway shall be made with ILSCO type GTA with GTC cap.

END OF SECTION 260534

SECTION 260553

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Wire and cable identification.

B. Pullbox & Junction Box Identification

C. Electrical distribution & utilization equipment identification.

D. Emergency and Standby Power receptacle identification.

PART 2 - PRODUCTS

2.1 WIRE AND CABLE IDENTIFICATION

A. Intermediate Locations:
1. Wires and cable labels shall be white, thermal transfer, halogen-free, flame-retardant marker plates (sized to accommodate three lines of text) permanently affixed to the associated cable with UV-resistant plastic wire ties. Labels shall be Panduit #M200X/300X series or equal.

B. Circuit/Cable Termination Locations:
1. Wires and cable labels shall be non-ferrous identifying tags or pressure sensitive labels unless noted otherwise.

2.2 ELECTRICAL DISTRIBUTION & UTILIZATION EQUIPMENT IDENTIFICATION

A. Labels on electrical distribution & utilization equipment shall be black-on-white engraved Bakelite nameplates permanently affixed to the equipment with rivets or silicone adhesive unless noted otherwise.

B. Text used on labels on electrical distribution & utilization equipment shall be sufficiently sized to allow user to quickly/easily read labels while standing a normal/reasonable distance from the equipment. Text sizes shall be adjusted based on types of equipment (large switchgear would require larger labels than small toggle-type disconnect switches). If there is any question about what is reasonable, contractor may submit typical physical sample label(s) for each major application to the engineer for review/approval, at its discretion.

C. Labels on electrical distribution equipment fed from emergency or legally-required standby sources (such as emergency generators) shall be white-on-red engraved Bakelite nameplates permanently affixed to the equipment with rivets or silicone adhesive.

2.3 EMERGENCY AND STANDBY POWER RECEPTACLE IDENTIFICATION

A. Receptacles fed from emergency or standby power sources (such as emergency generators) shall be provided with factory-marked engraved coverplates as follows:
1. Emergency System source: Red engraved lettering to read “EMERGENCY”.

2. Legally-Required or Optional Standby Generator source:
   a. If only part of facility is fed with generator backup: Black engraved lettering to read "FED FROM GENERATOR".
   b. If entire facility is fed with generator backup: No "….GENERATOR…" label required.

PART 3 - EXECUTION

3.1 GENERAL

A. Any proposed deviation in identification methods and materials from those described herein shall be submitted to Architect for review and comment prior to installation.

B. Contractor shall provide all labeling or identification required by applicable local, state and national codes. These specifications do not intend to itemize all code-required labeling or identification requirements.

C. All labels/identification shall be positioned such as to be readable from the normal perspective without adjusting wiring/cables/labels. For example, labels/identification of wires/cables within cable trays shall be positioned to point towards the viewer (typically downward for overhead cable trays, or upward for cable trays within trenches).

D. All labels/identification (except for handwritten labels on concealed pullbox/junction box covers as noted below) shall be typewritten/printed/engraved in a neat, workmanlike, permanent, legible, consistent and meaningful manner. Labels shall not be handwritten unless specific approval is granted by engineer.

3.2 WIRE AND CABLE IDENTIFICATION

A. General:
   1. Where cabling is exposed (such as within cable trays), provide two wire ties per cable (one on either end of marker plate to provide a flush installation). Where cabling is concealed (such as within pullboxes/wireways), one wire tie per cable will be acceptable.

B. Intermediate Locations:
   1. Thermal transfer labels shall be securely fastened to all wiring and cabling in the following locations:
      a. Wireways
      b. Pullboxes/Junction boxes larger than 4-11/16"
      c. Pullboxes/Junction boxes through 4-11/16" where wires and cables are not easily identifiable via the color coding and box labeling
      d. Vaults & Manholes
      e. Approximately every 50 feet within cable trays (especially at locations where cables exit or diverge). Labels within cable trays shall be grouped (rather than being pre-labeled on cables and pulled into cable trays).
      f. Other similar intermediate locations.
   2. Labels shall be stamped or printed with the following data so that the feeder or cable can be readily identified and traced:
      a. From where the circuit originates (including panel designation and circuit number):
         1) Ex: "FROM: PP-A CIR. 3 (IN MAIN ELEC ROOM)"
      b. To where the circuit extends (using the common name of the equipment):
         1) Ex: "TO: RTU-6 (ON ROOF)"

c. The purpose of the circuit:
   1) Ex: "POWER"
d. The set number (If parallel power feeds are used).
   1) Ex: "SET NO. 3 OF 4"

C. Circuit/Cable Termination Locations:
1. Where multiple termination points exist within a circuit origination point (panelboard, switchboard, MCC, starter, etc.) or other similar circuit endpoint (control panel, etc.), labels shall be securely fastened to all ungrounded and neutral conductors to clearly identify the terminal and/or circuit number associated with each conductor. For example, within lighting panels, each phase and neutral conductor shall be labeled near the terminals at a clearly visible location with the associated circuit number(s), so that if all conductors were unterminated, the labels would clearly indicate which conductor was associated with each circuit.

D. Refer to Specification Section 260519 for all color-coding requirements of wires and cables.

3.3 PULLBOX & JUNCTION BOX IDENTIFICATION

A. Concealed pullboxes/junction boxes:
1. Front surface of all pullbox/junction box covers in concealed areas (such as above lay-in ceilings) or within mechanical/electrical rooms (and other similar areas where appearance of boxes is not an issue) shall be neatly marked with the ID of circuits/cables contained with permanent black marker on cover of box (Ex: "RP-1A Cir. 1, 2 & 3"). Additionally, front surface of box shall be painted red where box contains fire alarm system cabling.

B. Exposed pullboxes/junction boxes:
1. Interior surface of all pullbox/junction box covers in exposed areas shall be labeled "Power", "Telecommunications", "Fire Alarm" or with other similar general text neatly with permanent black marker to indicate function of box. Circuit/cable labeling within box (see above) shall identify specific cables contained. Additionally, interior surface of cover shall be painted red where box contains fire alarm system cabling.

C. Where pullboxes/junction boxes are named on contract documents (Ex:"PULLBOX #3"), an engraved nameplate shall be installed on the front surface of the box to identify the name.

3.4 ELECTRICAL DISTRIBUTION & UTILIZATION EQUIPMENT IDENTIFICATION

A. General:
1. All new and existing equipment modified by this project shall include arc-flash warning labels in accordance with NEC article 110.16.

B. All Panels, Motor Control Centers, Switchboards, Switchgear, Transformers, Etc.:
1. Engraved nameplates identifying name of equipment, nominal voltage and phase of the equipment and where the equipment is fed from shall be installed on front surface of all panels, motor control centers, switchboards, switchgear, transformers, etc.:
   a. Ex: First Line: "NAME: RP-A", Second Line: "120/208V-3Ø-4W", Third Line: "FED FROM: PP-A CIR. 4 (IN MAIN ELEC ROOM)"
2. Refer to Panelboard Specification Sections for additional labeling requirements (circuit directory cards, permanent circuit labels, permanent circuit numbers, etc.) required inside panelboards.

C. Safety/Disconnect Switches and Utilization Equipment (HVAC Equipment, Pumps, Powered Valves, Control Panels, Starters, Etc.)::
   1. Engraved nameplates identifying equipment being fed and where the equipment is fed from shall be installed on front surface of all disconnect switches (including both visible blade type switches and toggle-type switches) and on utilization equipment (where not clearly identified by immediately adjacent local disconnect switch):
      a. Ex: First Line: "RTU-6", Second Line: "FED FROM: PP-A CIR. 5"
   2. Where safety/disconnect switches are installed on the load side of variable frequency drives, the safety/disconnect switch shall be furnished with an additional engraved nameplate to read: "WARNING: TURN OFF VFD PRIOR TO OPENING THIS SWITCH".
   3. Safety/Disconnect switches feeding equipment that is fed from multiple sources (such as motors with integral overtemperature contacts that are monitored via a control system) and Utilization Equipment fed from multiple sources shall be furnished with an additional BLACK-ON-YELLOW engraved nameplate to read: "WARNING: ASSOCIATED EQUIPMENT FED FROM MULTIPLE SOURCES – DISCONNECT ALL SOURCES PRIOR TO OPENING COVER".

D. Emergency Systems:
   1. A sign shall be placed at the service entrance equipment (and at any remote shunt trip operators, or similar, for service equipment) indicating the type and location of on-site emergency power sources (such as generators, central battery systems, etc.) per NEC requirements.
   2. All boxes and enclosures (including transfer switches, generators, power panels, junction boxes, pullboxes, etc.) dedicated for emergency circuits shall be permanently marked with white-on-red engraved nameplates so they will be readily identified as a component of an emergency circuit or system.
   3. Where an Essential Electrical System (EES) is installed, all enclosures, raceways and equipment that are components of the EES shall be readily identified as such. Raceway shall be identified at intervals not exceeding 25 ft.

E. Services:
   1. All Service Equipment:
      a. Engraved nameplates identifying maximum available fault current, including date the fault current calculation was performed, in accordance with NEC article 110.24.
         1) Ex: First Line: "AVAILABLE FAULT CURRENT: 16,154 AMPS", Second Line: "DATE CALCULATED: JULY 8, 2013"
      b. All service entrance equipment shall be clearly labeled as being service entrance rated.
   2. Where a building or structure is supplied by more than one service (or any combination of branch circuits, feeders and services), a permanent plaque or directory shall be installed at each service disconnect location denoting all other services, feeders & branch circuits supplying that building or structure and the area served by each, per NEC requirements.

F. Generators:
   1. Generators shall be labeled with engraved nameplates identifying name of equipment.

3.5 EMERGENCY AND STANDBY POWER RECEPTACLE IDENTIFICATION

A. Receptacles fed from emergency or standby power sources (such as emergency generators) shall be provided with factory-marked engraved coverplates as described above.

3.6 OTHER IDENTIFICATION

A. Factory-engraved coverplates identifying functions of light switches and other similar devices shall be installed where so required by plans/specifications.

END OF SECTION 260553

SECTION 260573

POWER DISTRIBUTION SYSTEM ELECTRICAL STUDIES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. THE WORK UNDER THIS SECTION INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
   1. Power Distribution System Electrical Studies.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Short Circuit Studies, Protective Devices Evaluation Studies, Protective Device Coordination Studies and Arc Flash Hazard Studies shall be performed by the same entity, which shall be a Professional Engineer registered in the state where the equipment will be installed. The studies shall be per the requirements set forth in the latest edition of NFPA 70E-Standard for Electrical Safety in the Workplace. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E, Annex D.

B. The studies shall be submitted to the Architect prior to shipment of any electrical distribution equipment.

C. The studies shall include all portions of all electrical systems affected by the project (including any existing systems/equipment) from the utility service to any existing equipment at the facility (including all existing equipment fed from the same service point as any new equipment) and to all new equipment installed under this contract. All induction motors 50 HP or below and fed from the same bus may be grouped together. All induction motors greater than 50 HP shall be included individually with associated starters and feeder impedance. See individual study sections below for additional scope requirements.

D. The studies shall be performed using the latest revision of the SKM Systems Analysis Power*Tools for Windows (PTW) or EasyPower software program.

E. Normal system connections and those which result in maximum fault conditions shall be adequately covered in the study.

F. The contractor shall be responsible for collecting data on any existing or proposed electrical equipment, devices, conductors, etc. as required to prepare the study, and shall supply pertinent electrical system conductor, circuit breaker, generator, and other component and system information in a timely manner to allow the studies to be completed prior to shipment of equipment.

G. The Power Distribution System Electrical Studies shall be performed by Square 'D', G.E., Siemens or Cutler Hammer; or a third-party vendor if specifically approved by the engineer prior to preparation of the studies.

H. The proposed vendor shall have completed a minimum of five (5) equivalent Arc-Flash Hazard

Studies in the past three (3) years.

2.2 SHORT CIRCUIT STUDY

A. The Short Circuit Study shall be performed with aid of a computer program. The study input data shall include the power company's short circuit contribution, resistance and reactive components of the branch impedances, X/R ratios, base quantities selected, and other source impedances.

B. Short circuit momentary duty values and interrupting duty shall be calculated on each individual basis with the assumption that there is a three-phase bolted short circuit at the respective switchgear bus, switchboard, low voltage motor control center, distribution panelboard, and other significant locations throughout the system.

C. The short circuit tabulation shall include symmetrical and asymmetrical fault currents, and X/R ratios. For each fault location, the total duty on the bus, as well as the individual contributions from each connected branch, including motor back EMF current contributions shall be listed with its respective X/R ratio.

2.3 PROTECTIVE DEVICE EVALUATION STUDY

A. The Protective Device Evaluation Study shall be performed to determine the adequacy of circuit breakers, switches, transfer switches, and fuses by tabulating and comparing the short circuit rating of these devices with the calculated fault currents. Appropriate multiplying factors based on system X/R ratios and protective device rating standards shall be applied.

B. Any problem areas or inadequacies in the equipment due to short circuit currents shall be promptly brought to the Architect's attention.

2.4 PROTECTIVE DEVICE COORDINATION STUDY

A. The Protective Device Coordination Study shall be performed to provide the necessary calculation and logic decisions required to select or to check the selection of power fuse ratings, protective relay characteristics and settings, ratios and characteristics of associated current transformers, and low voltage breaker trip characteristics and settings. The objective of the study is to obtain optimum protective and coordination performance from these devices.

B. The coordination study shall show the best coordination attainable for all breakers down through the largest breaker at each piece of distribution equipment. Coordination study shall demonstrate selective coordination where required by applicable codes or contract documents.

C. Phase and ground overcurrent protection shall be included as well as settings of all other adjustable protective devices. Where ground fault protection is used, coordination of the ground fault protection with the first downstream overcurrent phase protection device shall be demonstrated.

D. All restrictions of the National Electrical Code shall be adhered to and proper coordination intervals and separation of characteristic curves be maintained.

2.5 ARC-FLASH HAZARD STUDY

A. The Arc-Flash Hazard Study shall be performed with the aid of computer software intended for this purpose in order to calculate Arc-Flash Incident Energy (AFIE) levels and flash protection

boundary distances.

B. The Arc-Flash Hazard Study shall be performed in conjunction with a short-circuit Study and a time-current coordination Study.

C. The Arc-Flash Hazard Study shall be performed for the following equipment:
1. All Distribution Equipment – This includes but is not limited to the following:
   a. Switchgear
   b. Switchboards
   c. Motor Control Center
   d. All Lighting and Power Panelboards
   e. Fused Disconnect Switches rated greater than 100A
2. Separately enclosed devices fed from protection device rated greater than100A - This includes but is not limited to the following:
   a. Control Panels
   b. VFD's
   c. RVSS

D. A generic Arc-Flash label shall be applied to other electrical equipment that has not been included in the study. This includes but is not limited to the following equipment:
1. Non-fused Disconnect Switches
2. Fused Disconnect Switches rated 100A or less
3. Transformers
4. Control Panels, VFD's, RVSS, etc. rated 100A or less

E. Where a main protective device is provided, the study shall be performed on the line side and load side of the main. The worst-case result shall be used for the study result and label.

F. The Study shall be performed under worst-case Arc-Flash conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.

G. Where incident energies are calculated to fall within the high marginal region of a given Hazard/Risk Category Level, the Hazard/Risk Category Level shall be increased one level.

H. The Arc-Flash Hazard Study shall be performed in compliance with the latest IEEE Standard 1584, the IEEE Guide for Performing Arc-Flash Calculations. Where IEEE 1584 does not have a method for performing the required arc-flash calculations (such as for single phase equipment), calculations shall be performed and system shall be modeled using modules/methods as recommended by the arc flash software supplier (for example, using SKM Unbalanced/Single Phase Studies module for modeling single phase systems).

I. Equipment labels to identify AFIE and appropriate Hazard/Risk Category in compliance with NFPA 70E and ANSI Z535.4 (latest version of these requirements) shall be provided to the Electrical Contractor. The Electrical Contractor shall affix the labels to the distribution equipment devices as directed by the equipment manufacturer. These labels shall, at a minimum, include the following:
1. WARNING label.
2. Hazard/Risk Category.
3. Arc Flash Boundary Distance.
4. Incident Energy (in cal/cm2) at Working Distance.
5. Shock Hazard Voltage.

6. Limited Approach Boundary Distance.
7. Restricted Approach Boundary Distance.
8. Prohibited Approach Boundary Distance.
9. Equipment Name.
10. Name of Firm who prepared the Study.
11. Project Number of the Firm who prepared the Study.
12. Date that the Study was prepared.
13. Method for calculating analysis data.
14. Statement to read: "Any system modification, adjustment of protective device settings, or failure to properly maintain equipment will invalidate this label" (or equivalent).

PART 3 - EXECUTION

3.1 SUBMITTAL REQUIREMENTS

A. The results of the studies shall be summarized in a final report. The report shall include the following sections:
   1. General:
      a. Description, purpose, basis and scope of the studies
      b. Single line diagram of the portion of the power system which is included within the scope of the work. The single line diagram shall fit on one sheet of paper (size as required) unless approved otherwise by engineer. The following information shall be shown on the single line diagram:
         1) Device Name
         2) Branch Fault Currents with directional indicators
         3) General Location (for busses only)
         4) Other basic component information such as cable type, cable length, breaker rating, buss short circuit rating, transformer voltages, transformer size, fuse size, etc..
   2. Short Circuit Study:
      a. Tabulation of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties, and commentary regarding same.
   3. Protective Device Evaluation/Coordination Study:
      a. Protective devices time versus current coordination curves**,** tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
      b. Fault current calculations including definitions of terms and a guide for interpretation of computer printout.
      c. Documentation from utility company on their letterhead showing their anticipated values of available short circuit currents X/R ratios and protective devices with which the power distribution system will coordinate.
      d. Time-current characteristics of the respective protective devices shall be plotted on log-log paper. Plots shall be printed in color with a dedicated color and pattern for each curve for clear identification.
      e. Plots shall include complete titles, respective single line diagrams and legends, and associated power company's relay or fuse characteristics, significant motor starting characteristics, complete parameters of transformers, complete operating bands of low voltage circuit breakers trip curves and fuses.
      f. The coordination plots shall indicate the type of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, transformer magnetizing inrush and

ANSI transformer withstand parameters, cable thermal overcurrent withstand limits and significant symmetrical and asymmetrical fault currents.

g. The coordination plots for phase and ground protective devices shall be provided on a system basis.
h. A sufficient number of separate curves shall be used to clearly indicate the coordination achieved.

4. Arc-Flash Hazard Study:
   a. Tabulation of device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, personal-protective equipment classes and AFIE levels.
   b. Recommendations for reducing AFIE levels and enhancing worker safety.

B. Furnish all labor, materials, calculations, electrical equipment, technical data and incidentals required to provide a complete short circuit study, coordination study and arc flash hazard study of protective devices, busses, etc. from the utility service to any existing equipment at the facility and all new equipment installed under this contract.

C. The study shall comply with the following applicable provisions and recommendations of the latest revisions of the following: ANSI C37.5, IEEE Standard No. 399, and IEEE Standard No. 141.

D. Submit calculations and results of the short circuit, protective device evaluation and coordination and arc flash hazard studies prior to submitting shop drawings for new equipment. Contractor shall verify that all proposed equipment is properly rated per the short circuit and protective device evaluation portions of the study prior to releasing equipment for manufacturing.

E. Submit a copy of a sample typical arc flash label layout (meeting requirements outlined above) that will be used for the project.

F. Submit final electronic copies of all SKM program files/models/input data/etc. used to perform the study to the owner with final close-out documents. These files shall be complete as required to allow future users to recreate the study.

3.2 INSTALLATION

A. Contractor shall adjust all breaker settings as recommended by the coordination study prior to energizing equipment.

B. Contractor shall affix arc flash hazard notification labels (as determined by the results of this study) to each piece of distribution equipment prior to energization of equipment. A generic arc-flash warning label shall be affixed to any electrical equipment not included in the analysis as outlined above.

C. Where short circuit rating of equipment is dependent on setting of upstream overcurrent device, provide and install label for equipment indicating the required settings of the associated device.

END OF SECTION 260573

SECTION 260943

LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.1 INTRODUCTION

A. The work covered in this section is subject to the requirements in the General Conditions of the Specifications. Contractor shall coordinate the work in this section with the trades covered in other sections of the specification to provide a complete and operable system.

1.2 SYSTEM DESCRIPTION

A. Extent of lighting control system work is indicated by drawings and by the requirements of this section. Contractor shall furnish and install a complete, integrated, stand alone automatic lighting control system including programmable Lighting Control Panels with internal astronomic timeclock(s), Networking between panels, Dataline low voltage control switch inputs for zone control, Photocell input for outdoor lighting control, Occupancy Sensors, and Daylighting Controls from a single supplier. Contractor is responsible for confirming that the panels and sensors interoperate as a single system.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in the manufacture of lighting control equipment and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Comply with NEC, NEMA, and FCC Emission requirements for Class A applications.

C. UL Approvals: Relay panels and accessory devices are to be UL listed under UL 916 Energy Management Equipment. Configured to order or custom relay panels shall be UL Listed under UL 508, Industrial Control Panels.

1.4 SUBMITTALS

A. Submittals Package: Submit the shop drawings, and the product data specified below at the same time as a package.
   1. Shop Drawings: Building floorplans showing all proposed devices and composite wiring and/or schematic diagram of each control circuit as proposed to be installed (standard diagrams will not be accepted).
   2. Product Data: Catalog sheets, specifications and installation instructions.

1.5 APPROVED MANUFACTURERS

A. Watt Stopper/Legrand – Lighting Integrator series

B. Equal by Acuity Lighting

C. Any other system wishing to be considered must submit descriptive information 10 days prior to bid. Prior approval does not guarantee final approval by the electrical engineer. The contractor shall be completely responsible for providing a system meeting this specification in its entirety. All deviations from this specification must be listed and individually signed off by the

consultant.

PART 2 - PRODUCTS

2.1 LIGHTING CONTROL PANELS

A. Provide lighting control panels in the locations and capacities as indicated on the plans and schedules. Each panel shall be of modular construction and consist of the following components:

1. Enclosure/Tub shall be NEMA 1, NEMA 3R, or NEMA 4 as indicated on the plans, sized to accept an interior with 1-8 relays, 1-24 relays and six (6) four pole contactors, or 1-48 relays with six (6) four pole contactors, per enclosure. Multiple enclosures shall be provided where required for the specified quantities of relays/contactors.
2. Cover shall be configured for surface or flush wall mounting of the panel as indicated on the plans. The panel cover shall have a hinged and lockable door with restricted access to line voltage section of the panel.
3. Interior assembly shall be supplied as a factory assembled component specifically designed and listed for field installation. The interior construction shall provide total isolation of high voltage (class 1) wiring from low voltage (class 2) wiring within the assembled panel. The interior assembly shall include intelligence boards, power supply, DIN rails for mounting optional Class 2 control devices, and individually replaceable latching type relays. The panel interiors shall include the following features:
   a. Provision for one or two optional control and automation cards.
   b. Removable, plug-in terminal blocks with screw less connections for all low voltage terminations.
   c. Individual terminal block, override push button, and LED status light for each relay
   d. Switch inputs associated with each relay and group channel shall support two or three wire, momentary or maintained contact switches or 24VDC input from occupancy sensors.
   e. Automatic support for occupancy sensor sequence of operation. Low voltage inputs automatically reconfigure when connected to a Watt Stopper occupancy sensor head. Occupancy sensor shall switch lighting on and off during unoccupied periods but shall not turn lighting off during scheduled occupancy periods.
   f. Isolated contacts within each relay shall provide true relay state to the electronics. True relay state shall be indicated by the on-board LED and shall be available to external control devices and systems.
   g. Automatic sequenced operation of relays reduces impact on the electrical distribution system when large loads are controlled simultaneously.
   h. Group, channel, and pattern control of relays shall be provided through a simple button-press interface within the panel. Any group of relays can be associated with a channel for direct on/off control or pattern (scene) control via a simple programming sequence using the relay and channel override push buttons and LED displays.
   i. Relay group status for each channel shall be provided through bi-color operation of the LED indicators. Solid red indicates that all relays in the group are on, solid green indicates that the group is in a mixed state, and blinking green indicates that the relays have blink warned and are currently timing out.
   j. Each relay and channel terminal block shall provide a 24V pilot light signal. It shall be possible to configure the system for support for any Class 2 pilot light voltage with the use of an auxiliary power supply.

k. Single pole latching relays with modular plug-in design. Relays shall provide the following ratings and features:
   1) Electrical:
      a) 30 amp ballast at 277V
      b) 20 amp ballast at 347V
      c) 20 amp tungsten at 120V
      d) 30 amp resistive at 347V
      e) 1.5 HP motor at 120V
      f) Short circuit current capacity equal to (or greater than) that of the associated circuits (see associated panelboard schedules on drawings)
   2) Mechanical:
      a) Individually replaceable, ½" KO mounting with removable Class 2 wire harness
      b) Actuator on relay housing provides manual override and visual status indication, accessible from Class 2 section of panel
      c) Dual line and load terminals each support two #14 – #12 solid or stranded conductors
      d) Tested to 300,000 mechanical on/off cycles
   3) Isolated low voltage contacts provide for true relay status feedback and pilot light indication.

l. Power supply shall be a multi-voltage transformer assembly with rated power to supply all electronics, occupancy sensors, switches, pilot lights, and photocells as necessary to meet the project requirements. Power supply to have internal over-current protection with automatic reset and metal oxide varistor protection.

2.2 LONWORKS® BASED DIGITAL COMMUNICATIONS

A. The lighting control panel shall support digital communications to facilitate the extension of control to include multiple panels and other intelligent field devices. Digital communications shall be LonWorks® based and use the LonTalk® protocol in an open topology architecture.
   1. Dataline communications wire shall be 18 AWG, 4 unshielded copper conductors (two independent twisted pairs) meeting Class 2P NEC code requirements. The dataline shall be topology free and can be run in a serial, "T"or star configuration.
   2. The Dataline wire will be supplied by the equipment manufacturer and will include the manufacturers name, catalog number printed on the wire jacket. The contractor, at their own expense will, replace an improper dataline wire.
   3. Panels shall be digitally addressed and support bi-directional communication between each other and other intelligent field devices specified elsewhere.
   4. Intelligent field devices supported shall include digital dataline switches, network clock/programmer, telephone interface module, BMS interface module, photocell control module, programmable thermostat, and universal switch module.

2.3 BROWSER BASED PROGRAMMING AND CONTROL

A. The lighting control system shall include a web browser based user interface that shall allow programming and override of the system from any PC browser with network connectivity to the lighting controls. The Automation Appliance shall include as a minimum the following features:
   1. The interface shall be a TCP/IP based server device that is connected to the lighting control system global dataline and shall not require that software be installed on the client PC(s) for operation.

2. Provide support for connection of one or more personal computers directly via Ethernet or enterprise connectivity via a local area network, wide area network or internet connection.
3. Provide the option for a plug-in 56K baud modem to enable dial in connection via standard telephone line. All functionality of the browser interface shall be available through the dial-up connection.
4. Log in to the lighting control system through the browser interfaced shall provide multi-level security. Users shall be assigned log in access levels to restrict program modification to authorized users.
5. User programming shall include eight independent schedules for each lighting control panel, as well as, eight global schedules that affect channels in all panels on the network. Schedules shall overlap such that a panel specific schedule for any channel will override a global schedule for that channel.
6. Schedules shall be capable of seven day repeating and calendar date event based formats.
7. User programming shall be scenario based and shall include the following options:
   a. Scheduled ON / OFF
   b. Manual ON / Scheduled OFF
   c. Manual ON / Auto Sweep OFF (for AS-100 Switches)
   d. Astro ON / OFF (or Photo ON / OFF)
   e. Astro and Schedule ON / OFF (or Photo and Schedule ON / OFF)
8. It shall be possible to view the status of and override any relay or channel group via the browser interface screens.
9. Provide support and user interface screens for integration of the photocontrol module, dataline switches, touch-tone telephone module, and universal switch module.
10. Provision for integration with the building automation system shall be via the industry standard BACnet protocol. Any of the eight global schedule channels shall individually be set to follow the BAS schedules rather than the internal Automation Appliance schedules. Relays in all panels shall be exposed to the BAS as binary output objects. It shall be possible for the BAS to read the status of each relay and to override each relay via BACnet.
11. The interface shall monitor all networked components and automatically generate alarms if any component fails to properly respond to control. Alarms shall be annunciated via the browser screens and via email to selected recipients where a proper SMTP server connection has been set up.
12. The user programming in the lighting control panels and dataline switches shall be available for viewing or download to the client PC as a standard PDF file.
13. A backup function shall permit the complete system program to be saved to the hard drive of any client PC connected to the lighting control system through the browser interface. A restore function shall allow a saved program to be reloaded to the interface.

2.4 EIGHT CHANNEL DIGITAL PHOTOCONTROL MODULE

A. Provide a weatherproof Class 2 photocell for measuring exterior light levels. The photocell shall be mounted facing north as indicated on the plans. The photocell shall be connected to a photocontrol module mounted on the DIN rail inside the low voltage section of a lighting control panel and connected to the dataline communications wire.
   1. The photocontrol Module shall integrate seamlessly with either the Network Clock, Automation Appliance, or the BMS Interface Module. The control module shall measure the actual exterior light and display this level in foot candles (fc) on the unit LCD display.
   2. The controller shall have eight individual set point adjustments that are available to the lighting control network over the dataline communications wire.
   3. Features
      a. Real time, 2 line LCD display of actual exterior light level up to 200 fc.

b. Channel set points and parameters programmed via the Network Clock or BMS Interface Module.
c. Choice of OPERATE or TEST modes, with simulated light level for testing.
d. Automatic dead band and 5 minute time delay to avoid cycling.

2.5 DIGITAL DATALINE SWITCHES

A. Intelligent digital switching shall be provided operating on the dual twisted pair communication wire. Switches shall be available in single, dual, quad, or octal (1-button, 2-button, 4-button, or 8-button) designs. The single, dual, and quad devices shall mount in a standard single-gang box, the octal version in a two-gang box.

1. Each button shall be individually programmable. Programming of buttons shall not require the use of a computer or other programming device. It shall be possible to assign relays or channels to buttons using a simple button press interface. Each button can control any one of the following options:
   a. Any individual relay in any single panel.
   b. Any group of relays in any single panel.
   c. Any group of relays in the system (via network clock, Automation Appliance, or WinControl software package).
2. For applications that require pattern switching, buttons shall function as a scene control using an ON/OFF/Not Controlled pattern of relays instead of the normal All ON/OFF.
3. Switches shall be constructed of non-breakable grey Lexan on all exposed parts and shall include a stainless steel wall plate, unless noted otherwise on plans.
4. Individual buttons shall have a removable clear cover to allow standard 9 mm (3/8 inch) labeling tape to be used to identify the controlled loads.
5. Each switch shall use a bi-color LED pilot light for the individual buttons to indicate status of the controlled relay or group of relays. LED indications are Red for All ON, Green for Mixed State (some relays in the group ON and others OFF), and No LED for All OFF.
6. Switch LED pilot lights shall flash green to indicate impending off sweep during the five-minute grace period following blink warning of the lights. Once the button is pressed, the LED will change to Red to acknowledge the occupant's override command to keep lights ON.
7. Multiple dataline switches programmed to control the same relay or relay group shall indicate the same status automatically.
8. Each switch shall also include a locator light illuminating the switch for easy location in the dark.
9. The dual, quad, and octal switches shall all include a single master button that will override all relays controlled by the individual buttons OFF, or Restore them to their original state. Each switch's master button configuration can be altered to perform a Master ON/OFF, OFF Only, or Disabled function if desired.
10. Switches can be configured to follow a "Cleaning" scenario. This specific scenario shall prevent the cleaners from overriding OFF any relays previously turned ON by an occupant.
11. Each switch is available in a Key lock override version. Once a key is inserted, the individual buttons will function for five minutes.

2.6 AUTOMATIC LIGHTING CONTROLS

A. System shall provide automatic lighting shutoff for all interior lighting circuits controlled by the system (excluding night lights and other similar circuits) per latest ASHRAE 90.1 & IECC standards, unless specifically shown otherwise on plans.

B. System shall provide blink-warnings for interior lighting circuits (excluding circuits with HID light fixtures) controlled by the control panel 5 minutes prior to automatic shutoff.

C. System shall include provisions for holiday scheduling, to allow automatic "ON" programming to be skipped on holidays and other scheduled off days per applicable energy code requirements.

D. Low voltage remote override switches shall be provided as shown on drawings.

E. Exact preset times for lighting control zone controls (where applicable) and lighting control system operation shall be per owner's direction. Contractor shall submit a proposed lighting control schedule indicating type of "ON" control (occupancy, time-of-day, manual, etc.), type of "OFF" control (occupancy, time-of-day, manual, etc.) and proposed preset times for all zones to owner for review prior to implementation. The following general control schemes shall generally be used where the owner has no preferences unless shown otherwise on plans:
   1. Exterior Security Lighting (at doorways, etc.):
      a. On: Photocell or Astronomic – dusk.
      b. Off: Photocell or Astronomic – dawn.
   2. Other Exterior Lighting:
      a. On: Photocell or Astronomic – dusk.
      b. Off: Preset Time (as directed by the facility operator).
   3. Interior Lighting with Occupancy Sensor Controls:
      a. Corridors, restrooms, lobbies and other similar public spaces
         1) On: Occupancy Sensor.
         2) Off: Occupancy Sensor.
      b. Storage rooms, janitor's closets, telecommunications rooms, and other similar unoccupied spaces:
         1) On: Manual Local Switch.
         2) Off: Occupancy Sensor.
      c. Offices, classrooms, breakrooms, conference rooms, work areas, kitchens, gymnasiums, and other similar occupied spaces:
         1) On:
            a) Manual Local Switch (if digital controls are provided) or
            b) Occupancy Sensor (if hardwired controls are provided). Partial on only where required by code.
         2) Off: Occupancy Sensor (A "grace period" shall be provided, in which the occupancy sensor can turn lights back "on" for a short period of time (approximately 15 seconds) after lights are turned off automatically).
   4. Interior Lighting with Time-of-Day Controls:
      a. Corridors, restrooms, lobbies and other similar public spaces
         1) On: Preset Time (as directed by the facility operator).
         2) Off: Preset Time (as directed by the facility operator).
      b. Storage rooms, janitor's closets, telecommunications rooms, and other similar unoccupied spaces:
         1) On: Manual Local Switch
         2) Off: Preset Time (as directed by the facility operator).
      c. Offices, classrooms, breakrooms, conference rooms, work areas, kitchens, gymnasiums, and other similar occupied spaces:
         1) On: Manual Local Switch
         2) Off: Preset Time (as directed by the facility operator).

2.7 WIRING

A. See Specification Section 270500 for additional requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Refer to Specification Section 270500 for additional cable installation requirements.

B. Master/centralized lighting control switches (particularly switches located in areas where not all associated lighting fixtures are visible from the switch) and individual buttons of other lighting control stations with more than two (2) buttons shall be labeled (on switch coverplate or directly on buttons) with factory-engraved labeling. Exact wording of labeling shall be per owner's direction unless shown otherwise on plans.

3.2 SUPPORT SERVICES

A. Pre-installation Coordination
1. Exact occupancy sensor and daylight sensor types and locations shall be determined by the lighting control system supplier for a fully-functional system with adequate coverage throughout areas controlled by occupancy sensors. Exact locations shall be coordinated with actual HVAC register locations, furniture/casework/etc. locations, sensor coverage patterns, etc. for proper coverage in all areas. In no case may fewer devices or lower-quality devices be used in each area than indicated on contract documents.

B. System Start Up and Commissioning
1. The electrical contractor shall provide the manufacturer, the facility owner and the electrical engineer with ten working days written notice of the system startup and adjustment date.
2. Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all lighting control system components. The startup requirement is intended to verify:
   a. That all occupancy and daylighting sensors are located, installed, and adjusted as intended by the factory and the contract documents.
   b. The occupancy sensors and daylighting sensors are operating within the manufacturers specifications.
   c. The sensors and relay panels interact as a complete and operational system to meet the design intent.
3. Manufacturer to provide a written statement verifying that the system meets the above requirements.

C. Re-commissioning – After 30 days from occupancy re-calibrate all preset times, sensor time delays and sensitivities and relocate occupancy sensors if so required to meet the Owner's Project Requirements. Provide a detailed report to the Design Team and Owner of re-commissioning activity.

D. System Training
1. Manufacturer shall provide factory authorized technician to train owner personnel in the operation, programming and maintenance of the lighting control system including all occupancy sensors and daylighting controls.

E. System Programming
   1. Manufacturer shall provide system programming including:
      a. Wiring documentation.
      b. Switch operation.
      c. Telephone overrides.
      d. Operating schedules.

3.3 WARRANTY

A. The contractor shall warrant the completed lighting control system to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.

END OF SECTION 260943

SECTION 261200

PADMOUNT TRANSFORMERS

PART 4 - GENERAL

4.1 SUMMARY

A. Scope: Provide labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, and erection for a medium voltage liquid filled pad mounted transformer (also identified as MV XFMR, XFMR) as required for the complete performance of the work, and as shown on the Drawings and as herein specified. Transformers shall be delivered to the project site for installation in a future phase of the overall project.

B. The new transformer will "loop-feed" to feed an existing transformer.

C. Supplier shall submit with bid proposed shipping dates for all equipment specified herein. Any equipment with shipping dates outside of the project requirements will be rejected.

D. Related Sections: Related sections include, but shall not be limited to, the following:
1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
2. Applicable general requirements for electrical Work specified within Division 26 Specification Sections apply to this Section.

4.2 REFERENCES

A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.
1. American Society for Testing and Materials (ASTM)
   a. ASTM D877, "Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes"
2. Institute of Electrical and Electronics Engineers, Inc. (IEEE)
   a. IEEE C37.47, "Specifications for Distribution Fuse Disconnecting Switches, Fuse Supports, and Current-Limiting Fuses"
   b. IEEE C57.12.00, "Standard General Requirements for Liquid-Immersed Distribution, Power and Regulating Transformers"
   c. IEEE C57.12.34, "Standard Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers, 10 MVA and Smaller: High Voltage, 34,500 Nominal System Voltage and Below; Low Voltage, 15 kV Nominal System Voltage and Below"
   d. IEEE C57.12.28, "Switchgear and Transformers, Pad-Mounted Equipment - Enclosure Integrity"
   e. IEEE C57.12.90, "Standard Test Code for Liquid-Immersed Distribution Power, and Regulating Transformers and Guide for Short-Circuit Testing of Distribution and Power Transformers"
   f. IEEE C57.13, "Requirements for Instrument Transformers"

g. ANSI/IEEE 386, "Separable Insulated Connector Systems for Power Distribution Systems above 600 Volts"

3. National Electrical Manufacturers Association (NEMA)
   a. TR 1, "Transformers, Regulators and Reactors"
   b. NEMA AB1 - Molded Case Circuit Breakers.
4. National Fire Protection Agency (NFPA)
   a. NFPA 70, "National Electrical Code (NEC)"
5. International Organization for Standardization (ISO):
   a. ISO 9001, "Quality Management Systems - Requirements"
6. Underwriters Laboratories, Inc. (UL):
   a. UL 1561, "Standard for Dry-Type General Purpose and Power Transformers"
7. USA Federal Regulations, Policies and Acts
   a. Energy Policy and Conservation Act 1975 & Energy Policy Act 2005
   b. 10 CFR 429 - Certification, Compliance, and Enforcement for Consumer Products and Commercial and Industrial Equipment
   c. 10 CFR 431 – Energy Efficient Program for Certain Commercial and Industrial Equipment

4.3 DEFINITIONS

A. Unless specifically defined within the Contract Documents, the words or acronyms contained within this specification shall be as defined within, or by the references listed within this specification, the Contract Documents, or, if not listed by either, by common industry practice.
   1. MV: Medium voltage
   2. XFMR: Transformer
   3. ONAN: Oil Natural, Ambient Natural

4.4 SUBMITTALS

A. Most submittal requirements including those for electrical equipment of all types are specified elsewhere. Additional requirements should only be listed herein if they only pertain to MV VFDs and not to electrical equipment in general.

B. General: Submittals shall be in accordance with the requirements this Section and in accordance with the following
   1. Submit shop drawings within fourteen days (14) of contract award.
   2. Submit proposed shipping dates for all equipment.
   3. Submit sufficient information to determine compliance with the Contract Documents. Identify submittal data with the specific equipment tags and/or service descriptions to which they pertain. Submittal data shall be clearly marked to identify the specific model numbers, options, and features of equipment and work proposed.
   4. Deviations from the Contract Documents shall be indicated within the submittal. Each deviation shall reference the corresponding specification number, show the Contract Document requirement text and/or illustration, and shall be accompanied by a detailed written justification for the deviation.
   5. Submit required product data and shop drawings specific to each product and accessory proposed.

C. Operation & Maintenance (O&M) manuals shall be provided as specified herein.
   1. Submit required Operations & Maintenance data specific to each product and accessory proposed.

4.5 DELIVERY

A. Transformers must be delivered to the job site in time to meet project schedule.

4.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of specified products of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of ten years.
   1. The manufacturer shall have a valid ISO 9001 certification and an applicable quality assurance system that is regularly reviewed and audited by a third-party registrar. Manufacturing, inspection, and testing procedures shall be developed and controlled under the guidelines of the quality assurance system.
   2. The manufacturer or their representative shall have service, repair, and technical support services available 24 hours 7 days a week basis.

B. Installer Qualifications: Installer shall be a firm that shall have a minimum of [10] years of successful installation experience with projects utilizing equipment similar in type and scope to that required for this Project.

C. All work performed and all materials used shall be in accordance with the National Electrical Code, and with applicable local regulations and ordinances. Equipment assemblies, materials, and equipment shall be listed and labeled by Underwriter's Laboratories or by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

4.7 DELIVERY, STORAGE, AND HANDLING

A. Prior to delivery to the Project site, ensure that suitable storage space is available to store materials in a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity, and corrosive atmospheres. Materials shall be protected during delivery and storage and shall not exceed the manufacturer stated storage requirements. As a minimum, store indoors in clean, dry space with uniform temperature to prevent condensation. In addition, protect electronics from all forms of electrical and magnetic energy that could reasonably cause damage.

B. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and equipment tag number or service name as identified within the Contract Documents.

C. Inspect and report any concealed damage or violation of delivery storage, and handling requirements to the Engineer.

4.8 WARRANTY

A. The manufacturer shall warrant products against defects in material and workmanship for 24 months from the date of commissioning or 36 months from the date of shipment, whichever comes first, provided that the manufacturer performs functional testing, commissioning and first parameter adjusting of equipment. During the warranty period the manufacturer shall repair or replace defective products. This warranty shall be in addition to any provided by the Contractor. The warranty shall exclude normal wear and tear under normal usage and any damage caused by abuse, modification, or improper maintenance by entities other than the manufacturer or its approved representative.

B. Additional Owner Rights: The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

4.9 SPECIAL TOOLS AND SPARE PARTS

A. The Contractor shall provide a recommended spare parts list with the following information provided as a minimum:
1. Contact information for the closest parts stocking location to the Owner.
2. Critical spare parts shall be identified as those parts being associated with long lead times and/or those being critical to the unit's operation.
3. Maintenance spares shall be identified as being those parts required to regularly perform scheduled maintenance on the furnished equipment. These spares shall include, but shall not be limited to, consumable spares that are required to be exchanged during scheduled maintenance periods.

B. Spare parts shall be provided for each type and size of unit furnished. At a minimum, the following shall be provided:
1. Provide the minimum spare parts recommended by the manufacturer.

C. Any manufacturer specific special tool, not normally found in an electrician’s toolbox, required to remove and install recommended or furnished spare parts shall be furnished.

D. Spare parts shall be properly marked and packaged for long term storage. Printed circuit boards shall be provided in separate anti-static containers.

PART 5 - PRODUCTS

5.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements provide Square D Liquid Pad Mounted Transformers.

B. Acceptable Products: MV XFMRs specified herein shall be the product of a single manufacturer. Products and manufacturers specified are to establish a standard of quality for design, function, materials, and appearance. Products shall be modified as necessary by the manufacturer for compliance with requirements. Provide the following specified product and manufacturer without exception, unless approved as a substitute by addendum to the Contract Documents prior to the bid date:
1. Square D Liquid Pad Mounted Transformers by Schneider Electric
2. UTB Transformers
3. Cooper Power Systems
4. Maddox
5. Other approved equals approved prior to bid date.

5.2 LIQUID FILLED PAD MOUNTED TRANSFORMERS

A. The transformer(s) shall be UL listed and labeled compartment type per UL1561, UL/FM Classification Combination labeled, self-cooled, for mounting on a pad and shall comply with the latest applicable standards. Transformers shall comply with 10 CFR 431 as registered on US Department of Energy’s Compliance Certification Database per 10 CFR 429

B. The average temperature rise of the windings, measured by the resistance method, shall be 65° C when the transformer is operated at rated kVA output in a 40° C ambient. The transformer shall be capable of being operated at rated load in a 30° C average, 40° C maximum ambient, as defined by IEEE C57.12.00 without loss of service life expectancy.

C. For temperature rise, 65° C is standard

D. Coolant and insulating fluid shall be **less-flammable seed-oil based fluid**.

E. If the lower-voltage compartment has exposed live parts that are over 600 V, a non-hygroscopic barrier shall be placed to require its removal or opening before access to the lower-voltage compartment can be attained.

F. The transformer tank and compartment shall conform to IEEE C57.12.28 or C57.12.29, as appropriate and be so constructed as to limit disassembly, breakage, and prying open of any doors, panels, and sills when the doors are in the closed and locked position.

G. The transformer(s) shall be self-cooled (ONAN) with kVA ratings as follows:
1. Transformer T1 – 500 kVA

H. Primary voltage 7,200/12470V wye. Secondary voltage 277/480V wye, 4-wire, 60 Hz with two 2-1/2% full capacity above normal and two 2-1/2% below normal taps. Impedance shall be 5.32, ±7-1/2%. Basic impulse level of the primary winding shall be as specified in IEEE C57.12.00 for comparable kV class. Wye-wye transformers shall have the high neutral and shall be internally connected to the low voltage neutral with provisions for opening this connection.

I. See Single line diagram for riser diagram. Secondary compartments shall have provisions to connect the cables as indicated on single line diagram, including all spades required.

J. The transformer shall be of sealed-tank construction of sufficient strength to withstand a pressure of 7 psi without permanent distortion. The cover shall be welded and the handhole fastenings tamper-resistant. The transformer shall remain effectively sealed for a top oil temperature range of -5° C to 105° C. When required, cooling panels will be provided on the back and sides of the tank. Lifting eyes and jacking pads will be provided.

K. Coils shall be wound with aluminum conductors.

L. The core shall be manufactured using high grade, grain-oriented silicon steel laminations carefully annealed after fabrication to restore high magnetic permeability. Magnetic flux is to be kept well below the saturation point.

M. The high voltage terminations and equipment shall be dead front.

N. HV dead front bushings shall 200 Amp, either universal wells or one-piece integrated for use with separable connectors. Bushings shall be externally clamped and front removable.

O. The low voltage bushings (<600V) shall be molded polymer, and provided with blade-type spade terminals with NEMA standard hole spacing arranged for vertical take-off. The low voltage neutral shall be an insulated bushing, grounded to the tank by a removable ground strap.

P. Provide a load break, gang operated, liquid immersed switch that is externally operable from the high voltage compartment using a distribution hot-stick.

Q. Switches shall be as follows
1. Three 2-position switches to be used as "sectionalizing" switches on extended radial or loop-feed systems with feed-from-the-left, feed-from-the-right, isolated-from-either-side, or through-feed-to-both-sides.

R. Liquid-immersed switch(s) to be rated at: 200 A.

S. Fusible Protection
1. Select one of the following options for fusible protection:
2. Provide internal liquid immersed cartridge fuses sized at approximately three times the full-load primary current.
3. Provide Bay-O-Net liquid immersed fuses that are externally replaceable with a hot-stick without opening the transformer tank.

T. Surge Protection - Provide three distribution class lightning arresters for surge protection. Arresters are to be mounted in the high voltage compartment.

U. The following accessories shall be provided as standard on all transformers:
1. Tap changer with silver-plated stationary and movable contacts, for de-energized operation only, which is externally operable and padlockable.
2. Nameplate in low voltage compartment.
3. Pentahead bolts for compartment doors.
4. Key interlock to primary or secondary compartment door.
5. Mounting provisions for low voltage current transformers and potential transformers.
6. 1” upper filter press and filling plug
7. 1” drain valve with sampling device, 75-500 kVA only.
8. Dial type thermometer without contacts.
9. Magnetic liquid-level gauge without contacts
10. Pressure vacuum gauge.
11. Pressure relief valve.
12. Automatic pressure relief device (self-resealing with indicator).
13. Sudden pressure relay (with seal-in relay).
14. Bushing well inserts
15. Feed-thru inserts.
16. MOVE elbow arresters.

5.3 TESTING

A. Testing shall be done in accordance with IEEE C57.12.91 and shall include, as the minimum, the following tests:
1. Ratio
2. Polarity
3. Phase Rotation
4. No-Load Loss
5. Excitation Current
6. Impedance Voltage
7. Load Loss
8. Applied Potential

9. Induced Potential
10. QC Impulse Test
11. Temperature Test
12. Sound Test.

5.4 MARKINGS AND LABELING

A. All identification and warning labels and nameplates exterior to the MV Transformer shall be resistant to weather, UV, and their intended installation environment.

B. Each MV Liquid Filled Pad Mount Transformer shall be provided with an engraved nameplate identifying the project specific equipment tag and service description.

C. Warning labels and nameplates shall be present at access locations to advise personnel of possible hazards.

PART 6 - EXECUTION

6.1 GENERAL

A. Equipment shall be delivered to the job-site for installation in future phase(s) of the overall project.

B. Examine equipment exterior and interior prior to installation. Report any damage and do not install any equipment that is structurally, moisture, or mildew damaged.

C. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Engineer, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

D. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

E. Install equipment in accordance with reviewed product data, final shop drawings, manufacturer's written instructions and recommendations, and as indicated on the Drawings.

F. Provide final protection and maintain conditions in a manner acceptable to the manufacturer that shall help ensure that the equipment is without damage at time of Substantial Completion.

6.2 FIELD QUALITY CONTROL

A. Functional testing, commissioning, and first parameter adjusting shall be carried out by a factory-trained manufacturer's field service representative. This manufacturer's field service technician shall provide all material, equipment, labor and technical supervision to perform inspection, testing and adjustments to ensure equipment is installed, adjusted, and tested in accordance with the manufacturer's recommendations and is ready for operation. The manufacturer's field service technician shall replace damaged or malfunctioning equipment and report to the Engineer any discrepancies or issues with the installation.

B. The manufacturer's representative shall, upon satisfactory completion of inspection and testing, attach a label to all serviced devices indicating the date serviced and testing company

responsible.

6.3 FIELD TESTING AND COMMISSIONING

A. Operational Readiness Testing
   1. The Contractor shall inspect and test furnished equipment and associated systems for conformance to the contract documents, including equipment manufacture's recommendations, and readiness for operation. The test shall include the following as a minimum:
      a. Visually inspect for physical damage and proper installation
      b. Perform tests in accordance with manufacturer's instructions
      c. Perform tests to ensure compliance with Contract Documents
      d. Perform tests that equipment is ready for operation
      e. Touch-up paint all chips and scratches with manufacturer-supplied paint and transfer remaining paint to Owner
   2. Contractor shall submit an operational readiness test report documenting all test results, including all assumptions, conditions, allowances and corrections made during the test. The report shall provide a listing of all modifications and adjustments made onsite to include any settings / parameters not identified as factory defaults within the equipment's O&M documentation. The test report shall include a signed statement from the Contractor, installer(s) and the factory-trained manufacturer's representative(s) certifying that the furnished equipment and associated system have been installed, configured, and tested in accordance with the manufacturer's recommendations, completely conforms to the requirements of the Contract Documents and is ready for operation.

6.4 TRAINING

A. O&M Training: Onsite training specific to the equipment furnished shall be provided to the Owner's staff by a factory trained manufacturer's representative. Training duration shall be sufficiently adequate to cover the operation and maintenance of the equipment and shall consist of not less than 1 session with 2 hours of onsite classroom and hands-on instruction for a minimum of 4 attendees per session.
   1. The instructor shall provide sufficient time and detail in each session to cover the following as a minimum:
      a. Theory of operation
      b. Major components of equipment
      c. Operation of equipment
      d. Configurations of equipment
      e. Maintenance, troubleshooting and repair
      f. Replacement of component level parts
   2. The submitted O&M manuals shall be used for training.][Manuals and documentation shall be provided to each participant for training.

END OF SECTION 261200

SECTION 262200

DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 GENERAL

A. THE WORK UNDER THIS SECTION INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
   1. Dry Type Transformers

1.2 GENERAL REQUIREMENTS

A. Voltage for 3 phase units shall be 480V to 120/208V, three phase, four wire unless shown otherwise. Voltage of single phase units shall be 480V to 120/240V single phase, three wire unless shown otherwise.

B. Where isolation transformer is indicated on drawings, furnish K-13 rated transformer with dual-faraday electrostatic shield.

C.

PART 2 - PRODUCTS

2.1 INSULATION

A. Transformers shall be ventilated with 220 degree Celsius insulation class system and designed to withstand a temperature rise of 150 degree Celsius unless specifically shown otherwise on the drawings.

2.2 ENERGY EFFICIENCY

A. Transformers shall comply with the latest applicable DOE energy efficiency requirements and latest edition of NEMA standard TP-1 and shall be labeled for the EPA Energy Star Program.

2.3 SOUND RATING

A. Sound level shall not exceed a 5db reduction from ST-20 maximum requirements. Sound level in decibles may not exceed the following:

	KVA	DESIGN SOUND LEVEL
1.	KVA	DESIGN SOUND LEVEL
2.	0-45	40 db
3.	46-150	45 db
4.	151-300	50 db
5.	301-700	57 db

B. Sound levels shall be determined in accordance with NEMA and ASA Standards. Core and coils shall be mounted on vibration isolator pads.

2.4 ENCLOSURES

A. Transformers mounted in dry, interior locations shall be furnished with NEMA 1 enclosures unless shown otherwise.

B. Transformers mounted outdoors or in wet locations shall be furnished with NEMA 3R enclosures with drip shields unless shown otherwise.

C. Transformers installed inside motor control centers or other similarly enclosed equipment may be “open” units not requiring additional enclosures.

2.5 CLEARANCE REQUIREMENTS

A. Transformer construction/efficiency/ventilation shall allow 3” (or less) clearance from rear and sides.

2.6 TAPS

A. All units shall be equipped with a minimum of two (2) 2 ½% taps above nominal (FCAN) and a minimum of four (4) 2 ½% taps below nominal (FCBN) as required to allow adjustment of the turns ratio of the transformer to account for site voltage adjustments.

2.7 MANUFACTURER

A. Transformers shall be Square 'D', G.E., Siemens or Cutler Hammer.

PART 3 - EXECUTION

3.1 GENERAL

A. Minimum clearances shall be provided on all sides of transformers per manufacturer’s and code requirements.

B. Where site voltages so require, transformer taps shall be adjusted to maintain nominal voltage on secondary side of transformer. Adjustment of dry-type transformer taps shall not be made until all upstream voltage adjustments (such as voltage tap adjustments at service transformers) are finalized.

C. Refer to Specification Section 260526 for transformer grounding requirements.

D. Refer to Specification Section 260553 for transformer identification requirements.

3.2 MOUNTING

A. Transformers shall be mounted as indicated on plans. No units shall be wall mounted unless shown or directed otherwise.

B. Floor mounted transformers:
1. Shall be installed on a minimum of four (4) double-deflection neoprene vibration isolators (by Amber/Booth, Korfund Dynamics or Mason Industries - size as required – with seismic restraint capability ratings as required by the associated seismic zone).
2. Shall be installed on four-inch thick concrete pads unless specifically shown otherwise. Pad shall have beveled edges.

C. Suspended transformers:
1. Shall be trapeze-mounted on unistrut frame supported by a minimum of four steel rods and shall be mounted as high as possible or at height directed (transformers shall not be mounted above lay-in ceilings or in areas with restricted ventilation). Shall be installed

using a minimum of four (4) double-deflection neoprene vibration isolators (by Amber/Booth, Korfund Dynamics or Mason Industries - size as required – with seismic restraint capability ratings as required by the associated seismic zone).

2. Contractor shall supply extra supports as may be required due to size and weight.
3. Additional seismic bracing shall be provided for suspended transformers in seismic zones as required to provide a fully code-compliant installation.

END OF SECTION 262200

SECTION 262413

SWITCHBOARDS

PART 1 - GENERAL

1.1 SCOPE

A. This section deals with requirements for circuit breaker type switchboards.

PART 2 - PRODUCTS

2.1 SWITCHBOARDS

A. General:
1. Switchboard shall be totally enclosed, self supporting metal structure, contain industrial type main and distribution molded case circuit breakers and other associated equipment as indicated. The switchboard shall be completely front accessible.
2. Each switchboard, as a complete unit, shall be given a single integrated equipment rating by the manufacturer. The integrated equipment short circuit rating shall certify that all equipment is capable of withstanding the stresses of a fault equal to that of the least over current protective device contained therein. Such rating shall be established by the actual tests by the manufacturer on a similar equipment construction as the subject switchboard. This test data shall be available and shall be furnished to the engineer, if requested, with or before the submittal or approved drawing. Entire switchboard assembly, including all bussing, shall have SCCR ratings meeting or exceeding the minimum AIC ratings listed on the plans for the switchboard. When a power distribution system electrical study (including short circuit stud, etc.) is a part of the project, contractor shall further verify that all proposed equipment is properly rated (per the results of the study) prior to submitting shop drawings. All ratings shall be full ratings. Series ratings will not be allowed unless shown otherwise on drawings.
3. Future Provisions: All unused spaces provided, unless otherwise specified, shall be fully equipped for future devices, including all appropriate connectors and mounting hardware.
4. Top/bottom feed arrangement and lug sizes/quantities shall be coordinated by the contractor.

B. Bussing:
1. The switchboard bussing shall be silver plated copper and of sufficient cross-sectional area to continuously conduct rated full load current as shown on plans with a maximum temperature rise of 50 degrees C., above an ambient temperature of 25 degrees C. Switchboard shall have a 25% full length ground bus. Neutral bus shall be full capacity. Connections for all current carrying parts shall be bolted. Aluminum bussing is not acceptable. Tapered bussing is not acceptable.
2. The main horizontal bus shall be located at the back of the switchboard to permit a maximum of available conduit area. The end section shall have bus provisions for future addition. The provisions shall include the bus installed to the extreme side of the switchboard and pre-punched to facilitate future bolted splice plates. The horizontal main bus supports, connections, and joints shall be bolted with grade 5 carriage bolts and Belleville washers. The main horizontal bus shall be same size, continuous through the board.

2.2 CIRCUIT BREAKERS

A. Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated (or can be adjusted to is 1200A or higher, breakers shall be electronic trip and shall be provided with arc energy-reducing maintenance switching (with local status indicator) to reduce arc flash energy per NEC 240.87 requirements.

B. Circuit breakers shall be quick-break, quick-make thermal-magnetic type for alternating current unless noted otherwise. Breakers shall trip free of the handle and tripping shall be indicated by the handle assuming a position between OFF and ON. Multipole breakers shall be internal common trip with single operating handle; external handle ties are not acceptable.

C. All breakers shall meet the minimum RMS symmetrical interrupting capacity ratings shown on plans for the associated panel. All interrupting ratings shall be full ratings. Series ratings will not be allowed unless shown otherwise on drawings.

D. Main circuit breakers, 1000 amps and larger, on 277/480 volt, 3 phase, 4 wire systems shall be electronic trip molded case 80% rated equipped with ground fault sensing and automatic trip unless noted otherwise. The following requirements shall be met:
   1. These main breakers shall be equipped with an electric trip device having the following fully-adjustable, time/current response adjustments:
      a. Long Time Pickup.
      b. Long Time Delay.
      c. Short Time Pickup.
      d. Short Time Delay
      e. Ground Fault Pickup.
      f. Ground Fault Delay.
      g. Instantaneous settings.

E. All circuit breakers shall be installed so that the center of the grip of the operating handle, when in its highest position, is not more than 6’-7” above the floor or working platform (the height of the concrete housekeeping pad shall be included in the breaker height calculations).

F. All branch circuit breakers shall be listed to UL489 or shall be specially-tested to be HACR listed.

2.3 SWITCHBOARD FRAMING & CONSTRUCTION

A. The switchboard shall be fabricated on a die-form steel base assembly consisting of formed steel and commercial channel welded or bolted together to rigidly support the entire shipping unit for moving on rollers and floor mounting. The framework is to be formed code gauge steel, rigidly welded and bolted together to support all cover plates, bussing, and component devices during service and installation. The dimensions shall be shown on plans. These dimensions shall not be exceeded without specific approval.

B. Each switchboard section shall have one open bottom and individual removable top plate for installation and termination of conduit. Top and bottom conduit area is to be clearly shown and dimensioned on the shop drawings. The wireway front covers are to be hinged to permit access to the branch circuit breaker load side terminals without removing the covers. All front plates used for mounting meters, selector switches or other front mounted devices shall be hinged with all wiring installed and laced with flexibility at the hinged side. All course plates shall be screw

removable and small enough for easy handling by one man. The paint finish shall be gray enamel over a rust-inhibiting phosphate primer, ASA #48.

2.4 ACCESSORIES

A. Each circuit breaker shall have engraved black on white engraved nameplate, providing circuit identification.

B. Provide power meter (with door-mounted display) to monitor, display and alarm relevant current, voltage, power and energy variables. Shall be Square 'D' #PM850 or equal.

2.5 MANUFACTURER

A. Switchboard to be manufactured by Square 'D', G.E., Siemens or Cutler Hammer or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Switchboards shall be installed on four inch thick concrete pads unless specifically shown otherwise. Pad shall extend a minimum of 4 inches to all sides of the switchboard and shall have beveled edges.

B. All switchboard dimensions and clearances shall be carefully checked and coordinated with the proper trades to ensure proper mounting space and support prior to roughing in equipment.

C. Wiring in panelboard gutters shall be done in a neat and workmanlike manner. Wiring shall be grouped into neat bundles and secured with approved tie wraps.

3.2 PERFORMANCE TESTING

A. The ground-fault protection system when provided shall be performance tested after installation by a qualified person(s) using primary current injection in accordance with the instructions provided with the equipment and NEC requirements. A written record of the testing shall be provided.

B. The arc energy reduction protection system when provided shall be performance tested after installation by a qualified person(s) using primary current injection in accordance with the instructions provided with the equipment and NEC requirements. A written record of the testing shall be provided.

3.3 SWITCHBOARD IDENTIFICATION

A. Refer to Specification Section 260553.

END OF SECTION 262413

SECTION 262416

POWER PANELBOARDS - CIRCUIT BREAKER TYPE

PART 1 - GENERAL

1.1 GENERAL

A. The work under this section includes but is not limited to the following:
1. Power Panelboards
2. Power Circuit Breakers

PART 2 - PRODUCTS

2.1 PANELBOARDS - GENERAL

A. Panelboards shall be dead front type, having lugs only or circuit breaker in mains as shown in panelboard schedule with circuit breaker branches.

B. Panelboard bus structure and main lugs or main breaker shall have current ratings as shown on plans. Such rating shall be established by heat rise test with Maximum hot spot temperature on any connector or bus bar not to exceed 50 degrees C rise above ambient at full rated load. Heat rise test shall be conducted in accordance with UL Standard UL67. Bus structure shall be tin-plated aluminum or tin-plated copper. All neutral busses shall be full size. All panelboards shall contain ground buss.

C. Entire panelboard assembly, including all bussing, shall have SCCR ratings meeting or exceeding the minimum AIC ratings listed on the plans for the panel. All ratings shall be full ratings. Series ratings will not be allowed unless shown otherwise on drawings.

D. Panelboards shall be listed by Underwriters Laboratories and shall bear the UL label. Panelboards shall be suitable for use as service equipment when required.

E. Top/bottom feed arrangement and lug sizes/quantities shall be coordinated by the contractor.

F. Service entrance panelboards shall be provided with barrier such that no uninsulated, ungrounded service busbar or service terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing load terminations**.**

2.2 CIRCUIT BREAKERS

A. Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated (or can be adjusted to is 1200A or higher, breakers shall be electronic trip and shall be provided with arc energy-reducing maintenance switching (with local status indicator) to reduce arc flash energy per NEC 240.87 requirements.

B. Circuit breakers shall be quick-make and quick-break, whether actuated automatically or manually. Circuit breakers shall have inverse time tripping characteristics with automatic release which shall trip free of the handle. Circuit breaker handles shall be three distinct positions—“OFF”, “ON”, and “TRIPPED”. When a circuit breaker opens on overload or short circuit, the operating handle shall automatically assume the “TRIPPED” position.

C. Multipole breakers shall be internal common trip with single operating handle. External handle ties are not acceptable, unless specifically noted otherwise (such as for multi-wire branch circuits described below).

D. Circuit breakers feeding multiwire branch circuits (as defined by NEC) consisting of separate single phase loads sharing a common neutral shall be provided with handle ties to simultaneously disconnect all ungrounded conductors per NEC Article 210.4(B). The necessary locations of these handle ties shall be coordinated by the contractor. Where necessary, the contractor may rearrange circuit breakers (as minimally as possible) as required to meet this requirement.

E. Circuit breakers shall be of the bolt-on type.

F. Circuit breakers shall be “FA” frame and larger.

G. All breakers shall meet the minimum RMS symmetrical interrupting capacity ratings shown on plans for the associated panel. All interrupting ratings shall be full ratings. Series ratings will not be allowed unless shown otherwise on drawings.

H. The front face of all circuit breakers shall be flush with each other. Breaker numbers shall be permanently attached to trim.

I. All branch circuit breakers shall be listed to UL489 or shall be specially-tested to be HACR listed.

2.3 CABINETS, TRIM AND WIREWAY SPACE

A. Clear space from bottom of lugs to bottom of wireway shall be not less than 6 inches for 400 amps and below, 10 inches for 600 amps, 12 inches for 800 amps and above.

B. Panelboard interiors shall be fastened to cabinets by adjustable aligning supports.

C. Panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be as specified in UL Standard 50 for cabinets.

D. Fronts of cabinets shall be made from a single sheet of full finished steel having the door cut out. Doors shall have flush hinges, and lock utilizing all metal construction (with all locks keyed alike). Front shall be attached to cabinets with hinged trim with piano-hinge down full length of one side to allow access to wiring without complete removal of outer trim. Front shall be provided with a metal directory and holder with clear plastic covering welded to the inside of the door. Fronts shall be code gauge full-finished steel with rust inhibiting primer and baked enamel finished in ASA #49 gray. Panelboards installed in exterior or wet locations shall have NEMA 3R enclosures.

E. Each section of multi-section panelboards shall be of matching heights and depths.

F. Panelboard enclosures shall be furnished as shown on panel schedule on plans for surface, flush or motor control center mounting.

2.4 MANUFACTURER

A. Panelboards shall be as manufactured by Square 'D', G.E., Siemens or Cutler Hammer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All panelboard dimensions and clearances shall be carefully checked and coordinated with the proper trades to ensure proper mounting space and support prior to roughing in equipment. In no case shall any circuit breaker be located above 6'-7" A.F.F..

B. Wiring in panelboard gutters shall be done in a neat and workmanlike manner. Wiring shall be grouped into neat bundles and secured with approved tie wraps.

3.2 PERFORMANCE TESTING

A. The ground-fault protection system when provided shall be performance tested after installation by a qualified person(s) using primary current injection in accordance with the instructions provided with the equipment and NEC requirements. A written record of the testing shall be provided.

B. The arc energy reduction protection system when provided shall be performance tested after installation by a qualified person(s) using primary current injection in accordance with the instructions provided with the equipment and NEC requirements. A written record of the testing shall be provided.

3.3 PANEL IDENTIFICATION

A. Refer to Specification Section 260553.

END OF SECTION 262416

SECTION 262417

LIGHTING PANELBOARDS

PART 1 - GENERAL

1.1 GENERAL

A. The work under this section includes but is not limited to the following:
1. Lighting Panelboards
2. Circuit Breakers

PART 2 - PRODUCT

2.1 PANELBOARDS

A. Enclosure:
1. Panelboards shall be dead front type and shall be in accordance with Underwriter's Laboratories, Inc., standard of panelboards and enclosing cabinets and so labeled.
2. Panelboards installed in dry locations shall have enclosures fabricated from sheet steel and shall be finished in ASA #49. Panelboards installed in exterior or wet locations shall have NEMA 3R enclosures.
3. The door shall have a cylinder type lock. Lock shall be held in place by concealed screw to a captive nut, welded to inside of door. All locks shall be keyed alike.
4. A metal framed circuit directory card holder with clear plastic covering shall be factory-mounted on the inside of door.
5. Panels for 20 or more circuits, including spares and spaces, shall be 20 inches wide.
6. Panelboards enclosures shall be as shown on panel schedule on plans for surface, flush or motor control center mounting.
7. Provide hinged trim with piano-hinge down full length of one side to allow access to wiring without complete removal of outer trim.
8. Each section of multi-section panelboards shall be of matching heights and depths.

B. Bussing/Lugs:
1. Ampacity and service voltage of main buss, lugs or main breakers and branch circuit breakers shall be as shown on drawings.
2. All bussing and associated connectors shall be tin-plated aluminum or tin-plated copper.
3. All panelboards shall contain ground buss.
4. Entire panelboard shall be capable of withstanding a short circuit not less than the interrupting capacity of any breaker in the panel. When a power distribution system electrical study (including short circuit stud, etc.) is a part of the project, contractor shall further verify that all proposed equipment is properly rated (per the results of the study) prior to submitting shop drawings. Interrupting ratings shall be full ratings. Series ratings will not be allowed unless shown otherwise on drawings.
5. Buss connectors shall be for distributed phase arrangement.
6. Top/bottom feed arrangement and lug sizes/quantities shall be coordinated by the contractor.
7. Entire panelboard assembly, including all bussing, shall have SCCR ratings meeting or exceeding the minimum AIC ratings listed on the plans for the panel. When a power distribution system electrical study (including short circuit stud, etc.) is a part of the project, contractor shall further verify that all proposed equipment is properly rated (per the results

of the study) prior to submitting shop drawings. All ratings shall be full ratings. Series ratings will not be allowed unless shown otherwise on drawings.

8. Service entrance panelboards shall be provided with barrier such that no uninsulated, ungrounded service busbar or service terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing load terminations

C. Breaker arrangement and numbering:
1. Panelboards shall be factory assembled with branch breakers arranged exactly as indicated on plans.
2. Breakers shall be numbered vertically beginning top left. Multi-section panelboards shall be numbered consecutively through all sections.
3. Breaker numbers shall be permanently attached to trim.
4. Main breakers shall be vertically-mounted (branch-mounted or back-fed main breakers will not be acceptable unless specifically so shown on plans).

2.2 CIRCUIT BREAKERS

A. Circuit breakers shall be quick break, quick make, thermal magnetic type, for alternating current. Breakers shall trip free for the handle and tripping shall be indicated by the handle assuming a position between OFF and ON.

B. Circuit breakers shall be of the bolt-on type.

C. Multi-pole breakers shall be internal common trip with single operating handle; external handle ties are not acceptable, unless specifically noted otherwise (such as for multi-wire branch circuits described below).

D. Circuit breakers feeding multiwire branch circuits (as defined by NEC) consisting of separate single phase loads sharing a common neutral shall be provided with multi-pole breakers or handle ties to simultaneously disconnect all ungrounded conductors per NEC Article 210.4(B). The necessary locations of these multi-pole breakers or handle ties shall be coordinated by the contractor. Where necessary, the contractor may rearrange circuit breakers (as minimally as possible) as required to meet this requirement.

E. All breakers shall meet the minimum RMS symmetrical interrupting capacity ratings shown on plans for the associated panel. All interrupting ratings shall be full ratings. Series ratings will not be allowed unless shown otherwise on drawings.

F. All branch circuit breakers shall be listed to UL489 or shall be specially-tested to be HACR listed.

2.3 SPECIAL REQUIREMENTS

A. Any special requirements on the drawings, such as for increased interrupting rating, ground fault protection, etc., shall supersede these specifications, but only insofar as that particular requirement is concerned.

B. Lighting panels larger than 400A shall conform to the requirements for power panels.

2.4 MANUFACTURER

A. Panelboards shall be as manufactured by Square 'D', G.E., Siemens or Cutler Hammer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All panelboard dimensions and clearances shall be carefully checked and coordinated with the proper trades to ensure proper mounting space and support prior to roughing in equipment. In no case shall any circuit breaker be located above 6'-7" A.F.F..

B. Wiring in panelboard wireways shall be done in a neat and workmanlike manner. Wiring shall be grouped into neat bundles and secured with approved tie wraps.

C. For all flush-mounted panelboards, a minimum of three (3) one-inch empty conduits shall be stubbed out above the nearest accessible ceiling space for future use.

3.2 PANEL IDENTIFICATION

A. Refer to Specification Section 260553.

END OF SECTION 262417

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Wiring Devices

B. Plates

C. Finishes

PART 2 - PRODUCTS

2.1 WIRING DEVICES AND PLATES

A. Switches shall be AC type, extra-heavy duty industrial grade (unless otherwise shown) of ratings shown on drawings. Switches shall be as manufactured by Hubbell, P & S, Sierra, Bryant, GE, Arrow Hart or equal.

B. Receptacles shall have blade configuration and shall be heavy duty industrial grade (unless otherwise shown) of current and voltage rating as shown on drawings. Receptacles shall be as manufactured by Hubbell, P & S, Sierra, Bryant, GE, Arrow Hart or equal.

C. All GFCI-type receptacles shall continuously self-test and shall trip/deny power if the receptacle does not provide proper GFCI protection or if the line/load terminations are miswired and shall provide visual indication of power status, trip conditions, ground fault conditions and end-of-life status.

D. Each wiring device shall have a plate (see “Finishes” section below for specific requirements).

2.2 FINISHES

A. All wiring devices (switches, receptacles, etc.) shall be colored to match the coverplates described below. For instance, all items covered by stainless steel, aluminum or malleable iron plates shall be gray in color.
   1. Exceptions:
      a. Emergency wiring devices shall be red.
      b. Isolated ground wiring devices shall be orange.

B. Coverplates for recessed, wall-mounted electrical items (switches, receptacles, telephone outlets, etc.) shall be stainless steel unless shown otherwise.

C. Coverplates, trim rings, etc. for recessed, floor-mounted electrical items (floor outlets, underfloor duct junctions, etc.) shall match finish of building hardware (302/304 stainless steel, brass, etc.) in area installed.

D. Coverplates for exposed electrical items (switches, receptacles, telephone outlets, etc.) shall be of same material as exposed boxes (see Outlet Box Specification for required material type) and

shall have beveled edges.

E. Coverplates for receptacles in wet locations shall be low-profile, expandable, metallic, extra-duty, in-use type, rated for wet locations per NEC requirements unless noted otherwise. TayMac #MX4280/MX5280/MX7280 or equal.

F. See “Electrical Identification” specification section for coverplate labeling requirements.

PART 3 - EXECUTION

3.1 GENERAL MOUNTING

A. Symbols on drawings and mounting heights are approximate. The exact locations and mounting heights shall be determined on the job, and it shall be the Contractor's responsibility to coordinate with all trades to secure correct installation. For example, Contractor shall coordinate exact mounting heights over counters, in or above backsplashes, in block walls, and at other specific construction features.

B. Verify all door swings with Architectural. Locate boxes for light switches within four inches of door trim on swing side (not hinge side) of door.

C. Devices and associated plates shall not be used as support; outlet boxes shall be rigidly supported from structural members.

D. Mount all straight-blade receptacles vertically with ground pole up, unless specifically noted otherwise.

E. Unless otherwise shown or required by local handicap codes, outlet boxes shall be the following distances above the finished floor unless otherwise noted.
1. Receptacles and telephone outlets in offices and other finished areas: 1’-6” to the center of the box.
2. Receptacles and telephone outlets in equipment rooms and other unfinished areas: 4’-0” to the center of the box.
3. Receptacles over counters: As Noted
4. Switches, general: 4’-0” to the top of the box.
5. Fire Alarm Pull Stations: 4’-0” to the top of the box.
6. Fire Alarm Audio/Visual Devices: As shown on fire alarm shop drawings (Entire lens shall be above 80” and below 96” per NFPA 72).
7. Push-button, etc., general: 4’-0” to the top of the box.
8. Other device types: verify with engineer prior to rough-in.

END OF SECTION 262726

SECTION 262816

SAFETY SWITCHES AND FUSES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Safety Switches

B. Fuses

C. Branch Feeders

D. Feeders

PART 2 - PRODUCTS

2.1 SAFETY SWITCHES

A. Safety switches shall be quick-make, quick-break, NEMA heavy duty type HD, fused or nonfused as shown. Switch blades shall be fully visible in the off position.

B. Safety switches shall be furnished with transparent internal barrier kits to prevent accidental contact with live parts. Barriers shall provide finger-safe protection when the switch door is open and shall allow use of test probes and removal of fuses without removing barrier.

C. Fused switches shall have provisions for class R, rejection type fuses.

2.2 FUSES (600V)

A. Fuses for all branch switches shall be Bussman Mfg. Co., Dual Element, Class “R” Fusetron.

B. Fuses for main switch/switches shall be Bussman Mfg. Co. Hi-Cap.

2.3 MANUFACTURER

A. Safety switches shall be as manufactured by Square 'D', G.E., Siemens or Cutler Hammer.

B. Fuses shall be as manufactured by Bussman Mfg. Co. or equal.

PART 3 - EXECUTION

3.1 SAFETY SWITCHES

A. Safety switches shall be installed as shown on the plans and in accordance with N.E.C.

B. Locations shown for safety switches on plans are diagrammatical only. Exact locations shall be field coordinated by contractor as required to provide code-required clearances.

C. Switch enclosures shall be rated NEMA I indoors in dry locations and NEMA3R outdoors and in wet areas.

D. Adequate support shall be provided for mounting safety switches. Safety switches shall not be mounted to the associated equipment (unless the safety switch is furnished with the equipment).

3.2 FUSES

A. Fuses shall be sized as shown on drawings, unless a smaller size is required by the associated equipment supplier, in which case the contractor shall provide fuses sized as directed by the associated equipment supplier at no additional cost.

B. Provide not less than one spare set of fuses for each size used. Provide an additional spare set for each five sets of same size fuses used.

END OF SECTION 262816

SECTION 264300

SURGE PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes field-mounted SPDs for low-voltage (<1000 V) power distribution and control equipment.

B. The specified unit(s) shall provide effective high energy transient voltage surge suppression, surge current diversion and high frequency noise attenuation in all electrical modes for equipment connected downstream from the facility's meter or load side of the main overcurrent device. The unit(s) shall be connected in parallel with the facility's wiring system.

C. The unit(s) shall be designed and manufactured in North America by a qualified manufacturer of suppression filter system equipment. The qualified manufacturer shall have been engaged in the commercial design and manufacturer of such products for minimum of ten (10) years.

D. All products that are submitted according to these specification will be required to meet this specification in it's entirety for both service and distribution TVSS systems. Any product that is submitted and does not comply with all parts of this specification will be subject to rejection.

1.3 DEFINITIONS

A. VPR: Voltage Protection Rating.

B. SPD: Surge Protective Device(s)

C. $I_{(n)}$: Nominal Discharge Current

1.4 SUBMITTALS

A. See specification section 260500.

B. Product Data: For each type of product indicated. Include:
1. Maximum Single Impulse Surge Current Rating.
2. Surge Life (Repetitive Surge) Rating.
3. UL1449 (Latest Edition) Voltage Protection Ratings (VPR).
4. UL1449 (Latest Edition) Nominal Discharge Current (In).
5. Product dimensions and weights.
6. Furnished specialties and accessories.

C. Qualification Data:

D. Safety Agency File Number.

E. ISO 9001-2008 Certification.

F. ISO 1401-2001 Certification.

G. Operation and Maintenance Data: For SPDs to include all submittal data and any applicable operation and maintenance manuals.

H. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

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

B. The unit shall be UL 1449 Listed and CUL Approved as a Surge Protective Device and UL 1283 Listed as an Electromagnetic Interference Filter

C. Provide 2nd party certified data demonstrating SPD response to ANSI/IEEE C62.41.2-2002 standard waveforms when tested according to IEEE C62.45.

D. Comply with NFPA 70.

E. All SPDs provided within this project at the service entrance, distribution panels, and sub-panels shall be from the same manufacturer.

1.6 PROJECT CONDITIONS

A. Service Conditions: Rate SPDs for continuous operation under the following conditions unless otherwise indicated:
1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
2. Operating Temperature: 30 to 150 deg F.
3. Humidity: 0 to 95 percent, non-condensing.
4. Altitude: Less than 13,000 feet above sea level.

1.7 COORDINATION

A. Where field-mounted SPD's are specifically shown on plans, coordinate locations of field-mounted SPDs to allow adequate clearances for maintenance.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within specified warranty period.
1. Warranty Period: 10 years from date of Substantial Completion.

1.9 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. Replaceable Protection Modules: 1 of each size and type installed, where field-replaceable modular SPDs are provided.

2. Fuses: 1 of each size and type installed, where field-replaceable fuses are provided.

PART 2 - PRODUCTS

2.1 SURGE PROTECTIVE DEVICES

A. Manufacturer:
1. Integral Devices: Surge Protective Devices shall be as manufactured by the distribution equipment manufacturer (Square D, etc.), or by Surge Suppression Inc. if all of the performance of this specification are met and all UL listing of the equipment manufacturer are met.
2. External Devices (where specifically specified on plans): Surge Protective Devices shall be as manufactured by the distribution equipment manufacturer (Square D, etc.) or Surge Suppression Inc.

B. Each Surge Protective Device shall:
1. Be internal to the associated distribution equipment (without violating any applicable UL listings) unless specifically shown otherwise on plans.
2. Be UL 1449 (Latest Edition) listed.
3. Have short-circuit current rating complying with UL 1449 (Latest Edition), that matches or exceeds the short-circuit rating of the associated distribution equipment.
4. Be designed to withstand a maximum continuous operating voltage (MCOV) of not less than 115% of nominal RMS voltage.
5. Have fuses, rated at 200-kA interrupting capacity.
6. Have a minimum UL 1449 Nominal Discharge Current (I_n) Rating of 20kA.
7. Be fabricated using bolted compression lugs.
8. Provide suppression for seven (7) modes of protection.
9. Have LED indicator lights for power and protection status of each phase.
10. Have audible alarm, with silencing switch, to indicate when protection has failed.
11. Have form-C contacts rated at 2 A and 24-V ac minimum, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with facility monitoring and control system if monitoring by that system is required by plans or other specifications.
12. Have six-digit transient-event counter, mounted to front of equipment door, set to totalize transient surges (externally mounted SPD's may have the transient –event counter monted on the visible face of the SPD).
13. Meet all UL 96A requirements (for Lightning Protection Systems) where the device is installed at a service entrance of the facility. At a minimum, these devices shall:
    a. Be marked as Type 1 or Type 2 SPDs with product Identity consisting of "Surge Protective Device" or "SPD", and identifying all ratings so required by UL96A and the 4 digit alpha numeric Control Number.
    b. Have a minimum UL 1449 Nominal Discharge Current (I_n) Rating of 20kA.
    c. Be UL listed and labeled with holographic label.

C. Peak Single-Impulse Surge Current Rating shall be meet the following minimums unless specifically shown otherwise on plans:

Application	Per Phase	Per Mode

Service Entrance Devices	240 kA	120 kA
Downstream Devices	160 kA	80 kA

D. The ANSI/UL 1449 voltage protection rating (VPR) in grounded wye circuits, the SPDs shall not exceed the following:

Modes	**208Y/120V**	**480Y/277V**	**600Y/347V**
L-N,L-G, N-G	800	1200	1500
L-L	1200	2000	2500

E. The ANSI /UL 1449 VPR for 240/120 V, 3-wire or 4-wire circuits with high leg shall not exceed the following:

Modes	**240/120V**
L-N,L-G, N-G	1200/800

2.2 ENCLOSURES

A. Where external units are specifically specified on plans, units not mounted within electrical distribution equipment (such as switchboards, MCC's, etc.) shall be provided in enclosures with NEMA enclosure ratings that match or exceed the NEMA enclosure ratings of the equipment from which the units are fed. For example, a unit fed from a NEMA 4X stainless steel panelboard shall also be mounted within a NEMA 4X stainless steel enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All SPD's shall be integrally-mounted within the associated distribution equipment unless specifically shown otherwise on plans.

B. Install SPDs at service entrance on load side, with ground lead bonded to service entrance ground.

C. Install SPDs downstream of the service entrance with conductors or buses between suppressor and points of attachment as short and straight as possible. The lead lengths between the TVSS unit and the equipment being protected shall not exceed fourteen (14) inches without approval from the engineer. Do not bond neutral and ground. Leads shall be as straight as possible with no sharp bends.

D. Where externally-mounted SPD's are specifically shown on plans, provide circuit breaker as directed by the SPD supplier as a dedicated disconnecting means for SPD unless otherwise indicated.

3.2 FIELD QUALITY CONTROL

A. Ensure that interiors are free of foreign materials and dirt.

B. Check and test switches, pushbuttons, meters for proper operation.

C. Check and test indicating lights for proper operation and color.

D. Perform manufacturer's on site field test procedures.

3.3 STARTUP SERVICE

A. Do not perform insulation resistance (MEGGER) tests of the distribution wiring equipment with the SPDs installed. Disconnect all wires, including neutral, before conducting insulation resistance tests, and reconnect immediately after the testing is over.

3.4 SYSTEM WARRANTY

A. The SPD system manufacturer shall warranty the entire SPD system against defective materials and workmanship for a period of ten (10) years from the date of substantial completion. This warranty is in effect as long as the unit is installed in compliance with the manufacturer's installation, operation, and maintenance manual, UL Listing requirements, and any applicable national or local electrical codes.

B. Any SPD device which shows evidence of failure or incorrect operation, including damage as the result of lightning strikes, during the warranty period shall be replaced by the manufacturer at no charge to the owner. Warranty will provide for multiple exchanges of any inoperable devices at any time during the warranty period which starts at the date of substantial completion of the system to which the surge suppressor is installed.

C. The manufacturer is required to have a nationwide network of factory-authorized local service representatives for repair and service of this product. The manufacturer shall have a dedicated 1-800 telephone number for service problems and questions. This number shall be manned by a knowledgeable factory employee to ensure prompt response to any emergency situation that may arise.

END OF SECTION 264300

SECTION 265000

LIGHTING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Lighting Fixtures

B. Drivers

1.2 SUBMITTALS

A. Complete submittals shall be provided identifying all lighting fixture types and options, all lamp types (where applicable) and compliance with all contract requirements. The absence of clear submittal information specifically listing exceptions/deviations from detailed contract requirements will be understood to indicated that the contractor/supplier intends to meet all contract requirements. Refer to specification section 260500 for additional requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. Lighting fixtures shall be furnished as shown on plans and specified herein. It shall specifically be the responsibility of Contractor to verify exact types ceilings, walls, etc. and recessing depth of all recessed fixtures and furnish the specific mounting trims and accessories of the specified and/or accepted fixture specifically for the ceiling, wall etc. in which each fixture is to be installed.

B. Base bid manufacturers are listed on the lighting fixture schedule. Manufacturers listed without accompanying catalog numbers are responsible for meeting the quality standards, efficiency, maximum wattages and photometric distributions set by the specified product.

C. All lighting fixtures shall be so designed and shall have drivers and other similar items so installed as to function without interruptions or failures when operating in the environment in which they are proposed to be installed. Special attention shall be given to environments with potentially high ambient temperatures such as attic spaces, exterior soffits, confined interior soffits, coves, unconditioned spaces, etc. and shall be addressed by providing fixtures with suitable high ambient temperature ratings, remote mounting of drivers/ballasts, providing approved ventilation, etc. as directed by fixture manufacturer and approved by engineer, at contractor’s expense.

D. All fixtures installed such as to create penetrations through fire rated ceiling or wall assemblies shall be labeled as suitable for that purpose or installed with covers, tenting or other means as required to maintain the fire rating of the assembly.

2.2 LED LUMINAIRES

A. For the purpose of these specifications, LED Luminaires shall be defined as the entire LED fixture assembly including LED array, drivers, housing, electronics, etc. that compose the lighting fixture.

B. Furnish and install LED Luminaire of proper size, type, efficacy, delivered lumen output, color temperature, distribution pattern, operational life, and CRI as shown on drawings.

C. LED Luminaires shall be tested in accordance with LM-79 and LM-80 standards.

D. LED drivers shall comply with NEMA 410 standards for inrush current, etc.

E. Exterior, pole mounted LED Luminaires shall be provided with an easily-serviceable, UL recognized surge protection device that meets a minimum 10kA Category C Low operation (IECC C62.41.2-2002). Device shall be wired in front of light engine(s) and driver(s) and shall fail "open" such as to prevent fixture operation after a surge protection failure.

F. LED Luminaires shall have a guarantee-warranty of at least five years unless specifically noted otherwise on contract documents.

G. LED Luminaire assembly shall comply with ambient temperature requirements specified in General section above.

2.3 STEMS/PENDANTS

A. Hangers shall be approved ball aligner type swivel, 30 degrees from vertical with swivel below canopy.

B. Stems/Pendants shall be rigid or IMC conduit unless specified otherwise on plans. Proposed stem/pendant types shall be submitted for review prior to shipment of light fixtures from factory.

C. Stems/Pendants shall be provided as required to prevent swaying of fixtures due to HVAC system airflow or other similar occurrences.

D. Shall be painted the same color as the fixture trim unless noted otherwise.

2.4 MANUFACTURER

A. Fixtures and stems shall be manufactured as shown in fixture schedule or approved equals.

B. Drivers shall be as manufactured by Philips/Advance, GE, Lutron, Magnatec, Motorola, EldoLED or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION OF LIGHTING FIXTURES

A. Support:
1. Support of all lighting fixtures shall be responsibility of electrical contractor. All lighting fixture supports shall be installed in accordance with lighting fixture supplier's recommendations.
2. Contractor shall coordinate installation requirements for all wall-mounted fixtures (especially for wall-mounted fixtures on uneven wall surfaces, etc.) as required to assure a level/flat mounting surface and level/plumb/secure finished installation. Contractor shall provide flat mounting plates or other mounting provisions where necessary. Any proposed

mounting plates, etc. shall be submitted to and approved by project architect prior to ordering materials.

3. Fixtures shall be supported independent of ceiling from structural members of building.
4. Lay-in fixtures shall be supported by four (4) taut 12 gauge hanger wires connected from each corner of the fixture to the structure above so that fixture is supported independent of the ceiling.
5. Other recessed light fixtures (including recessed downlights) shall be supported with two (2) taut 12 gauge hanger wires connected from opposing corners of the light fixture to the structure above so that fixture is supported independent of the ceiling.
6. Pendant mounted fixtures shall be directly supported from the structure above using a 9 gauge hanger wire or an approved alternate support without using the ceiling suspension system for direct support.
7. Tandem fixtures may utilize common hanger wires.
8. All lay-in fixtures shall be attached to ceiling grid by means of approved clips and in accordance with the N.E.C.
9. Contractor shall submit typical hanging detail to Engineer before installing any fixtures.

B. Connections:
1. All grid fixtures shall be wired by flex individually to junction and not wired fixture to fixture.
2. All flex shall contain 3 conductors (3rd wire ground). Ground wire shall be securely grounded at each end. Other conductors shall be connected by approved connectors.

C. Row-Mounted fixtures:
1. All stems on row-mounted fluorescent fixtures shall be installed as follows (except fixtures with slide grip hangers):
   a. One stem shall be installed in the first fixture knockout from end of row (on the first and last fixture of the row).
   b. One stem shall be installed between each two fixtures. Stem shall center joint where fixtures join and shall attach by use of "joining plates".
2. All fixtures in continuous rows other than recessed grid type shall be connected by nipples with locknuts bushings.

D. Coordination:
1. Contractor shall coordinate all dimensions & locations of light fixtures prior to rough-in to ensure proper fit and coordination with other trades.
2. Contractor shall verify exact location of light fixture with Reflected Ceiling Plan. If there are any discrepancies, verify exact location with architect.
3. Contractor shall verify exact ceiling types being installed and shall adjust fixture trim types accordingly (prior to submitting light fixture shop drawings).

END OF SECTION 265000

SECTION 270500

AUXILIARY SYSTEM CABLES, 0-50V

PART 1 - GENERAL

1.1 DESCRIPTION

A. Cables rated for 0V-50V application

PART 2 - PRODUCTS

2.1 GENERAL

A. Unless specified otherwise, all cables within the scope of this specification section shall:
1. Be rated for exposed cable tray installation.
2. Be plenum rated.
3. Be UL-rated for the proposed application.
4. Be multi-conductor with overall outer sheath as required by the application. The insulation of each conductor within the overall multi-conductor cable shall be uniquely color-coded. Ground conductors (when provided) within the multi-conductor cable shall have green insulation. Conductors with green insulation shall not be used for conductors other than ground.
5. Utilize copper conductors.
6. Have wire gauge as required to limit voltage drop to acceptable limits determined by the system supplier and to meet all applicable code requirements.
7. Where installed underground, within slab-on-grade or in exterior locations, be rated for wet locations.
8. Where required for specific systems, meet the specific requirements (conductor quantity, wire gauge, insulation type, shielding, etc.) of the system supplier.

2.2 CLASS 1 CONTROL CABLING (120VAC CONTROL CIRCUITS, ETC.)

A. In addition to above requirements, and unless specified otherwise, Class 1 control cabling shall:
1. Be rated for 600V.
2. Be industrial grade.
3. Have stranded conductors.
4. Have sunlight/oil-resistant PVC/Nylon insulation and jacket with ripcord.
5. Be manufactured by Belden, AlphaWire or General Cable.

2.3 CLASS 2 & 3 CONTROL CABLING (FED FROM CLASS 2 OR 3 POWER SUPPLIES)

A. In addition to above requirements, and unless specified otherwise, Class 2 & 3 control cabling shall:
1. Be rated for 300V.
2. Be shielded if so recommended by the system supplier/integrator.
3. Have twisted conductors.
4. Have plenum-rated insulation/jacket with ripcord.
5. Be manufactured by AlphaWire, Belden, General Cable, Superior Essex or West Penn.

2.4 NETWORK CABLING

A. Furnish and install all Ethernet, Fiber Optic and Backbone Copper Telephone cabling in accordance with all BICSI requirements and in accordance with other applicable specification sections.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Routing:
1. All wires and cables shall be installed in conduit unless specifically noted otherwise. Where conduit is not otherwise required by contract documents, 0-50V Cabling located within concealed, accessible ceiling spaces (such as above lay-in ceilings) may be run without conduit if the following requirements are met:
   a. Cabling is plenum-rated, multi-conductor.
   b. Cabling is supported by cable tray or with J-hook supports on intervals not to exceed 5'-0" on center. Cabling shall be supported solely from the cable tray or j-hooks supported from the building structure, without using piping, ductwork, conduit or other items as supports.
   c. Cabling is neatly formed, bundled and tied with plenum-rated Velcro straps on intervals not to exceed 30" on center.
   d. Properly-sized conduit(s) are provided wherever cabling enters an inaccessible or exposed area (such as above gyp board ceilings, within walls or through walls).
   e. Cabling is not a part of a Fire Alarm System, Smoke Control System, Emergency Generator Control System or other life-safety related system.
2. End bushings shall be provided on both ends of all raceway terminations.
3. No splices shall be pulled into conduit.
4. No cabling shall be pulled until conduit is cleaned of all foreign matter.

B. Penetrations:
1. All fire/smoke barrier penetrations shall be made in accordance with a U.L. listed assembly.
2. For cabling not installed in conduit:
   a. Fire/smoke barrier penetrations shall be sealed utilizing an enclosed fire-rated pathway device (STI EZ Path or equal) containing a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and tested to the requirements of applicable ASTM/UL1479 standards.
3. For cabling installed within conduit from endpoint to endpoint:
   a. Fire/smoke barrier penetrations shall sealed utilizing fire caulk or other equivalent firestop systems around perimeters of conduits per UL requirements.
4. For cabling installed within cable trays:
   a. Fire/smoke barrier penetrations shall be sealed with one of the following methods:
      1) Continuous cable tray through the penetration, with a combination of large firestop pillows and small firestop pillows contained, supported and secured (to prevent unauthorized removal) on both sides by aluminum wire mesh and firestop putty. Firestop pillows shall be STI Series SSB or equal and Firestop putty shall be STI Spec Seal or equal.
      2) Cable tray broken at the penetration, with fire/smoke barrier penetrations sealed utilizing an enclosed fire-rated pathway device (STI EZ Path or equal) containing

a built-in fire sealing system sufficient to maintain the hourly fire rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed or retrofitted without the need to remove or reinstall firestop materials. The pathway shall be UL Classified and tested to the requirements of applicable ASTM/UL1479 standards.

C. Excess Cabling:
1. Excess cabling shall be neatly coiled within all junction boxes, pullboxes, wireways, etc. and at all terminations as required to allow future re-termination of cabling.

D. Terminations:
1. All conductors/cabling (including spare conductors) shall be properly terminated unless specifically directed otherwise. See below for general termination hardware requirements.
2. Cabling shall be neatly formed, bundled and tied at all terminations.

3.2 SPLICES/CONNECTIONS/TERMINATIONS:

A. Network Cabling:
1. Network and fiber optic cabling shall be continuous from endpoint to endpoint and shall not be spliced unless specifically noted otherwise.

B. Control Cabling:
1. Connections shall be made with T & B Sta-Kon wire joints EPT66M, complete with insulating caps. To be installed with WT161 Tool or C nest of WT11M Tool, Ideal Super - Nuts (not wire nuts), Ideal Wing Nuts, or Buchanan Elec. Products B Cap or Series 2000 Pressure connectors complete with nylon snap on insulators to be installed with C24 pressure tool.

C. Shielded cabling:
1. Unless directed otherwise by the system supplier, 0-50V cable shielding shall be grounded at the PLC/control panel end only (not at the field device end) with a termination kit as directed by the PLC/control panel supplier.
2. Shielded cabling shall be continuous from endpoint to endpoint and shall not be spliced without prior written approval from the Engineer.

3.3 LABELING

A. Refer to Specification Section 260553 for all labeling requirements.

END OF SECTION 270500

SECTION 271000

STRUCTURED CABLING SYSTEM

PART 1 - GENERAL

1.1 SCOPE:

A. This document describes the products and execution requirements relating to furnishing and installing Telecommunications Cabling. Backbone and Horizontal cabling comprised of copper and fiber cabling, and support systems are covered under this document.

B. All cables and related terminations, support and grounding hardware shall be furnished, installed, wired, tested, labeled, and documented by the structured cabling contractor as detailed in this document.

C. Product specifications, general design considerations, and installation guidelines are provided in this document. Quantities of telecommunications outlets, typical installation details, cable routing and outlet types are indicated on the plans. If the bid documents are in conflict, this specification shall take precedence.

D. Refer to Specification Section 260553 (Electrical Identification) for additional identification requirements.

E. Refer to Specification Section 270500 (Auxiliary System Cables, 0-50V) for additional material and installation requirements.

1.2 REGULATORY REFERENCES:

A. All work and materials shall conform in every detail to the rules and requirements of the National Fire Protection Association, the National Electrical Code, local ordinances and present manufacturing standards.

B. All materials shall be UL Listed and shall be marked as such. If UL has no published standards for a particular item, then other national independent testing standards shall apply and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.

C. All modular jacks, patch cords, consolidation point, and patch cords shall be ETL Verified (not just tested) to be category 6E component and channel compliant.

D. The cabling system described in this specification is derived from the recommendations made in recognized telecommunications industry standards. The following documents are incorporated by reference:
1. ANSI/TIA/EIA - 568-B.1, Commercial Building Telecommunications Cabling Standard Part 1: General Requirements, April, 2001
2. ANSI/TIA/EIA - 568-B.2, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components, April, 2001
3. ANSI/TIA/EIA - 568-B.2-1, Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted Pair Cabling Components, Addendum 1 – Transmission Performance Specifications for 4-pair 100 Ω Category 6 Cabling

4. ANSI/TIA/EIA - 568-B.3, Commercial Building Telecommunications Cabling Standard Part 3: Optical Fiber Cabling Components, March, 2000
5. ANSI/TIA/EIA – 569-E, Commercial Building Standard for Telecommunications Pathways and Spaces, 2019
6. ANSI/TIA/EIA – 606-A, Administration Standard for Telecommunications Infrastructure of Commercial Buildings, February, 2002
7. ANSI/TIA/EIA – 607-AJ, Commercial Building Grounding and Bonding Requirements for Telecommunications, August 1994
8. ANSI/ TIA/EIA – 758, Customer-Owned Outside Plant Telecommunications Cabling Standard, April 1999
9. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) 10TH edition.
10. National Fire Protection Agency (NFPA – 70), National Electrical Code (NEC) –2002
11. ANSI/TIA/EIA – 45-B, Test Procedures for Fiber Optic Connections.
12. ANSI/TIA/EIA – 526-14, Power Test for Fiber Runs.
13. FCC 47 CFR 68
14. NEMA 250
15. NEC Articles 770 and 800
16. ADA, Americans with Disabilities Act

E. If this document and any of the documents listed above are in conflict, then the more stringent requirement shall apply. All documents listed are believed to be the most current releases of the documents. The Contractor has the responsibility to determine and adhere to the most recent release.

F. This document does not replace any code, either partially or wholly. The contractor must be aware of local codes that may impact this project. All local State and federal codes are to be followed.

1.3 APPROVED CONTRACTOR:

A. The Structured Cabling Contractor must meet the following requirements:
1. Contractor must have a certified RCDD on staff. The project manager for this project shall have an RCDD certification, and RCDD shall be responsible for reviewing all aspects of the design, submittals and installation of all products.
2. All required submittal information shall be stamped by the RCDD.
3. Contractor must have a minimum of 3 years experience with projects of similar size and scope to this project.
4. The company performing the work must have been in business for a minimum of 3 years.
5. The company must have an office within 75 miles of the job site.

B. The Structured cabling contractor is responsible for workmanship and installation practices in accordance with the requirements of the standards described in these specifications and manufacturer's requirements.

1.4 WORK INCLUDED:

A. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. The structured cabling contractor will provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.

B. The work shall include, but not be limited to the following:
1. Furnish and install a complete telecommunications wiring infrastructure.
2. Furnish, install, and terminate all UTP and Optical Fiber cable
3. Furnish and install all wall plates, jacks, patch panels, and patch cords at equipment racks and at work outlets (unless shown otherwise on plans).
4. Furnish and install all required cabinets and/or racks as required and as indicated.
5. Furnish any other material required to form a complete system.
6. Perform channel testing (100% of horizontal and/or backbone links/channels) and certification of all components.
7. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.
8. Provide owner test results and documentation. (Testing documentation and As-built drawings)

1.5 SUBMITTALS:

A. Within thirty (30) days of notice to proceed the structured cabling contractor shall submit the following items:
1. Submit copies of the certification of the company and names of staff that will be performing the installation and termination of the installation to provide proof of compliance of this spec.
2. Submit proof from manufacturer of contractor's good standing in manufacturer's certification program.
3. Submit copy of contractor's RCDD certification.
4. Submit listing of five (5) projects of similar size and scope to this project that have been completed within the last five years. Include in this submittal owner's contact information for each project.
5. Submit letter from the manufacturer stating that the manufacturer will provide a twenty-five year (25) warranty in accordance with the requirements paragraph 1.03 (B) of these specifications.
6. Submit appropriate cut sheets and samples for all products, hardware and cabling.
7. Submit 1/8" = 1'-0" drawings of floor plans indicating all work outlets and the labeling designation for each jack.
8. Submit ½" = 1'-0" drawings of each MDF and each IDF showing all racks, patch panels, 110 blocks, etc.

B. Work shall not proceed without the engineer's approval of the submitted items.

C. The structured cabling contractor shall receive approval from the engineer on all substitutions of material. No substituted materials shall be installed except by written approval from the engineer.

1.6 DRAWINGS:

A. It shall be understood that the electrical details and drawings provided with the specification package are diagrammatic. They are included to show the intent of the specifications and to aid the structured cabling contractor in bidding the job. The structured cabling contractor shall make allowance in the bid proposal to cover whatever work is required to comply with the intent of the plans and specifications.

B. The structured cabling contractor shall verify all dimensions at the site and be responsible for their accuracy.

PART 2 - PRODUCTS

2.1 EQUIVALENT PRODUCTS:

A. Due to the nature and type of communications all products, including but not limited to faceplates, jacks, patch panels, racks, 110 blocks, and patch cords, for the purpose of this document, shall be manufactured by Hubbell, Ortronix, Panduit, Amp or Systimax. See below for acceptable cable manufacturers.

2.2 WORK AREA OUTLETS:

A. Work area cables shall each be terminated at their designated work area location in the connector types described in the subsections below. Included are modular telecommunication jacks. These connector assemblies shall snap into a faceplate.

B. The Telecommunications Outlet Assembly shall accommodate:
1. A minimum of two (2) modular jacks
2. Additional accommodations for specific locations as noted in the plans for optical fiber and/or additional copper cables as necessary
3. A blank filler will be installed when extra ports are not used.
4. A dust cap shall be provided on all modular jacks with the circuit number on the identifier strip.
5. Multiple jacks will be placed as documented on the plans.
6. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation. Prior to installation, the structured cabling contractor shall submit the proposed configuration for each outlet assembly for review by the architect.
7. The modular jack shall incorporate printed label strip on the dust cap module for identifying the outlet. Printed labels shall be permanent and compliant with ANSI/TIA/EIA-606-A standard specifications. Labels shall be printed using a printer such as a Brady hand held printer. Hand printed labels shall not be accepted.

C. Faceplates: The faceplates shall:
1. be UL listed and CSA certified.
2. be constructed of stainless steel (except where noted otherwise). All faceplate colors/materials in public areas shall be approved by the architect. In all cases the material and color of the faceplate shall match the adjacent electrical faceplate.
3. (where plastic faceplates are specifically allowed by the architect/engineer) shall match the faceplate color used for other utilities in the building or match the color of the raceway if installed in surface raceway.
4. be compliant with the above requirements along with the following when incorporating optical fiber:
    a. be a low profile assembly,
    b. incorporate a mechanism for storage of cable and fiber slack needed for termination,
    c. position the fiber optic couplings to face downward or at a downward angle to prevent contamination and,
    d. incorporate a shroud that protects the optical couplings from impact damage.
5. be available as single-gang or dual-gang.
6. possess recessed designation windows to facilitate labeling and identification.
7. shall include a clear plastic cover to protect labels in the designation window.
8. have mounting screws located under recessed designation windows.
9. comply with ANSI/TIA/EIA–606-A work area labeling standard.

10. allow for the UTP modules to be inverted in place for termination purposes.
11. be manufactured by an ISO 9001 registered company.

D. Voice / Data Jacks
1. Voice/Data jacks shall be 8-position modular jacks and shall be Category 6E performance as defined by the references in this document including ANSI/TIA/EIA-568-B.2-1. All pair combinations must be considered, with the worst-case measurement being the basis for compliance. Modular jack performance shall be third-party verified by a nationally recognized independent testing laboratory including, but not limited to, ETL.
2. The wiring scheme shall be T568A or T568B as directed by the owner.
3. The modular jack shall use dual reactance modular contact array.
4. The modular jack shall have low emission IDC contacts.
5. The modular jack shall use standard termination practice using 110 impact tool
6. The modular jack shall be backwards compatible to Category 3 and 5.
7. The modular jack shall be center tuned to category 6E test specifications.
8. Dust cover shall be used on each termination.

2.3 MODULAR PATCH PANELS:

A. The Modular Patch Panels shall
1. be modular design.
2. meet category 6E component compliance and be verified by a third-party nationally recognized independent testing laboratory
3. use low emission IDC contacts
4. use dual reactance technology to enhance the signal-to-noise ratio
5. require standard termination practices using a 110 impact tool
6. use a single piece IDC housing designed to accept larger Category 6E conductors
7. support both T568B and T568A wiring
8. include easy to follow wiring labels
9. include label fields
10. allow for the use of icons
11. include full length metal rear cable management
12. be available in standard or high density
13. be backward compatible to category 3 and 5.
14. be center tuned to category 6E test specifications
15. be sized to accommodate number of data or data and phone cables (where phone cables are terminated on patch panels in lieu of 110 blocks) served by each equipment room plus 30% spare capacity.
16. be separated by horizontal cable management sections.

2.4 RACKS:

A. The equipment rack shall provide vertical cable management and support for the patch cords at the front of the rack and wire management, support, and protection for the horizontal cables inside the legs of the rack.

B. Waterfall cable management shall be provided at the top of the rack for patch cords and for horizontal cables entering the rack channels for protection and to maintain proper bend radius and cable support. Double-sided wire management shall also be mounted above each patch panel and/or piece of equipment on the rack. The rack shall include mounting brackets for cable tray ladder rack to mount to the top of the rack. Velcro cable ties shall be provided inside

the rack channels to support the horizontal cable. Rack shall be black in color to match the patch panels and cable management.

C. Free-Standing Racks shall:
1. Be 4-post construction.
2. have a minimum capacity of 45U
3. have the necessary strain relief, bend radius and cable routing for proper installation of high performance cross connect products, meeting all specifications of ANSI/TIA/EIA-568-B.
4. have top cable trough with waterfall and built in patch/horizontal cable distribution separator.
5. have horizontal front and rear cable management above, below and between each 48-port patch panel.
6. have a rack-mounted power strip.
7. have EIA hole pattern on front and rear.
8. be available with a 6.0” channel depth.
9. be available with hook and loop straps for securing bulk cables inside the vertical U-channels.
10. assemble as 19” (483 mm) or 23” (584 mm) with no additional hardware.
11. be available with three styles of vertical patch cord management: interbay with latches, cable management rings, or fingerduct with covers.
12. provide floor and ceiling access for cable management and distribution.
13. provide pre-drilled base for floor attachment of rack.
14. be available in standard color of black.
15. be manufactured by an ISO 9001 registered company.

D. Wall-Mounted Racks shall:
1. provide the necessary strain relief, bend radius and cable routing for proper installation of high performance cross connect products, meeting all specifications of ANSI/TIA/EIA-568-B.
2. have top cable trough with waterfall and built in patch/horizontal cable distribution separator.
3. have horizontal front and rear cable management above, below and between each 48-port patch panel.
4. have a rack-mounted power strip.
5. have EIA hole pattern on front and rear.
6. be available with a 6.0” channel depth.
7. be available with hook and loop straps for securing bulk cables inside the vertical U-channels.
8. assemble as 19” (483 mm) or 23” (584 mm) with no additional hardware.
9. provide usable depth as required for standard network ethernet switch and other equipment
10. be available with three styles of vertical patch cord management: interbay with latches, cable management rings, or fingerduct with covers.
11. provide floor and ceiling access for cable management and distribution.
12. provide pre-drilled base for wall attachment of rack.
13. be available in standard color of black.
14. be manufactured by an ISO 9001 registered company.
15. be constructed to swing-out from wall (for rear access) via heavy-duty hinged corner and configurable for either left or right opening.

2.5 HORIZONTAL DISTRIBUTION CABLE:

A. Horizontal Distribution Cabling shall meet the following requirements:
   1. Shall be 100 Ohm Enhanced Category 6E Unshielded Twisted Pair (UTP) Cable.
   2. Physical Characteristics:
      a. Unless directed otherwise by owner (contractor shall verify with owner), Cat6E cable coloring shall be based on system type as follows, unless specifically approved otherwise:
         1) Data (or IP Voice): Blue
         2) Analog Voice: Grey
         3) Lighting Control System: White
         4) Fire Alarm or other Life-Safety System: Red
         5) CCTV Surveillance Cameras: Yellow
         6) Other: As directed by owner
      b. Shall be plenum-rated.
      c. Shall meet applicable requirements of ANSI/ICEA S-80-576.
      d. The diameter of the insulated conductor shall be .023 in. maximum.
      e. Shall consist of (4) 22-26 AWG twisted pairs.
      f. The overall diameter of the cable shall be no larger than 0.240 inches.
      g. The ultimate breaking strength measured in accordance with ASTM D 4565 shall be 400 N minimum.
      h. Cable shall withstand a bend radius of 1 inch at -20 degrees Celsius without jacket or insulation cracking.
      i. Cable shall be third party verified to meet ANSI/TIA/EIA-568-B.2-1.
      j. Where installed underground, within slab-on-grade or in exterior locations, be gel-filled and rated for wet locations.
   3. Transmission Characteristics:
      a. DC resistance of any conductor shall not exceed 9.38 Ohms per 100m max. at 20^{o} C. Measured in accordance with ASTM D 4566.
      b. The mutual capacitance of any pair at 1 kHz for 100m of cable shall not exceed 4.4 nF nominal.
      c. DC resistance unbalance any two conductors of any pair shall not exceed 5% when measured at or corrected to 20° C in accordance with ASTM D 4566.
      d. Structural return loss swept measurement for 100m or longer shall meet or exceed Category 6E requirements.
   4. Shall be manufactured by Amp NetConnect, Berk-Tek, Leviton, General Cable, Mohawk or Superior Essex.

2.6 BACKBONE - FIBER:

A. Backbone Fiber Optic Cabling shall meet the following requirements:
   1. All optical fiber shall be Indoor/Outdoor,Tight-Buffered, All-Dielectric, Plenum rated (unless specified otherwise on plans) with Singlemode OS2-rated 9/125 Optical Fibers.
   2. Each Fiber shall:

      a. Comply with ANSI/EIA/TIA-492AAAC-A
      b. Have attenuation measured in accordance with ANSI/EIA/TIA-455-46, 53 or 61.
      c. Have information transmission capacity measured in accordance with ANSI/EIA/TIA-455-51 or 30.
      d. Have measurements performed at 23 degrees C +/- 5 degrees.
      e. Have 10 GB speed from 5-10kw at 1310nm and 40-40km at 1550nm.
   3. Each indoor/outdoor fiber optic cable shall:

a. Be suitable for use in both outdoor and indoor applications without the use of a transition at the building entrance.
b. Be suitable for use in risers, plenums and horizontal applications.
c. Have a dry water blocking system for cable.
d. Have a fiber strand count of 12 (unless shown otherwise on plans).
e. Have a nominal 2.21 mm sub-unit diameter.
f. Have and be marked with an UL-OFNP Flame Rating (unless engineer specified otherwise on plans).
g. Comply with Bellcore GR-409 and GR20
h. Be independently verified to comply with ICEA S-104-696
i. Have strength members of FGE/Aramid yarn.
j. Be suitable for underground or above ground conduits.
k. (Where applicable) Have Tight Buffered fibers color coded in accordance with EIA / TIA 598 with an overall black jacket.
l. Be suitable for operation between -40° to +70° C
m. Be UV resistant
n. Be of an all dielectric design

4. Shall be manufactured by Berk-Tek, Corning, General Cable or Superior Essex.

2.7 COPPER CABLE SURGE PROTECTION DEVICES:

A. All copper circuits routed between or outside of buildings shall be provided with a surge protection device at each end. The surge protection device shall be labeled as meeting the requirements of the latest edition of UL 96A (exact requirements shall be coordinated with the lightning protection system supplier, where applicable).

B. The surge protection device shall be connected with a #6 AWG copper bonding conductor between the protector ground lug and the TC ground point.

2.8 PATCH CORDS:

A. The structured cabling contractor shall provide factory terminated and tested UTP and optical fiber patch cords and equipment cords for the complete cabling system. Patch cords shall be provided by the structured cabling contractor to connect patch panels to owner furnished electronics. The UTP patch cables shall meet the requirements of ANSI/TIA/EIA-568-B.2 and ANSI/TIA/EIA-568-B.2-1 for patch cord testing. Provide one set of optical fiber patch cables per fiber run that terminates on fiber patch panel and provide one category 6 patch cord for each category 6 work outlet that terminates on patch panel.

B. Copper (UTP) patch cords shall:
1. Be furnished to connect each patch panel jack to owner supplied electronics.
2. Be furnished for each work outlet jack.
3. Be a Category 6E patch cord manufactured by Panduit, Amp or Systimax.
4. Use 8 position connector with impedance matched contacts and designed using dual reactance.
5. Be constructed of 100 ohm, 4 pair, 24 AWG, stranded conductor, unshielded twisted pair copper per the requirements of the ANSI/TIA/EIA-568-B.2 and ANSI/TIA/EIA-568-B.2–1 standard.
6. Meet TIA category 6E component specifications in ANSI/TIA/EIA-568-B.2-1 100% factory tested to meet category 6E performance and ETL or any other nationally recognized 3rd party verification

7. Be capable of universal T568A or T568B wiring schemes.
8. Have modular connector that shall maintain the paired construction of the cable to facilitate minimum untwisting of the wires.
9. Have a performance marking indelibly labeled on the jacket (by the manufacturer).
10. Have the ability to accept color-coded labels and icons to comply with ANSI/TIA/EIA-606-A labeling specifications.
11. Have "snagless" protection for the locking tab to prevent snagging and to protect locking tab in tight locations and provide bend relief
12. Be available in three standard colors
13. Be available in 3 foot, 5 foot, 7 foot, 10 foot, and 14 foot standard lengths
14. Be backwards compatible to Category 3, 5 and 5e

C. Fiber Optic patch cords shall:
1. Be furnished in the quantity of two (2) per IDF in each IDF and two (2) per IDF in each MDF.
2. Be manufactured by Panduit, Amp or Systimax.
3. Be singlemode OS2 type.
4. Have connector type as directed by owner.
5. Have a performance marking indelibly labeled on the jacket (by the manufacturer).
6. Have the ability to accept color-coded labels and icons to comply with ANSI/TIA/EIA-606-A labeling specifications.
7. Be available in three standard colors
8. Be available in 3 foot, 5 foot, 7 foot, 10 foot, and 14 foot standard lengths

2.9 GROUNDING AND BONDING:

A. The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor. The TBB shall be installed independent of the building's electrical and building ground and shall be designed in accordance with the recommendations contained in the ANSI/TIA/EIA-607 Telecommunications Bonding and Grounding Standard.

B. The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding bus bar (TMGB). Each telecommunications room shall be provided with a telecommunications ground bus bar (TGB). Each grounding bus shall be 12"W x 4"H x ¼"THK and be mounted to the backboard with porcelain isolators.

C. All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labeled in accordance with the System Documentation Section of this specification.

2.10 FIRESTOP:

A. A firestop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.

B. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an UL listed firestop system. This requirement applies to through penetrations (complete

penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.

2.11 INNERDUCT:

A. Innerduct, shall be:
1. Non-metallic, corrugated with pre-installed pull tape.
2. Plenum-rated, where installed within buildings.
3. UL listed for the application.
4. Size as required by the application.
5. Orange in color in concealed areas or within telecommunications or electrical rooms. Color shall be custom as selected by owner in exposed areas (such as within cable trays overhead in areas without ceilings outside telecommunications/electrical rooms).

PART 3 - EXECUTION

3.1 PRE-INSTALLATION SITE SURVEY:

A. Prior to start of work, meet at the project site with the owner's representative and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the General Contractor will be necessary to plan the crucial schedule completions of the equipment rooms and telecommunication closets.

B. Examine areas and conditions under which the system is to be installed. Do not proceed with work until satisfactory conditions have been achieved.

3.2 WORK AREA OUTLETS:

A. Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturer's bend radius. In hollow wall installations where box-eliminators are used, excess wire can be stored in the wall. No more than 12" of UTP and 36" of fiber slack shall be stored in an in-wall box, modular furniture raceway, or insulated walls. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.

B. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-B.1 document, manufacturer's recommendations and best industry practices.

C. Pair untwist at the termination shall not exceed 12 mm (one-half inch).

D. Bend radius of the horizontal cable shall not be less than 4 times the outside diameter of the cable.

E. The cable jacket shall be maintained to within 25mm (one inch) of the termination point.

F. Data jacks, unless otherwise noted in drawings, shall be located in the bottom position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the right-most position(s).

G. Voice jacks shall occupy the top position(s) on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the left-most position(s).

3.3 HORIZONTAL DISTRIBUTION CABLE INSTALLATION:

A. All horizontal voice and data cabling shall be terminated on modular patch panels except for horizontal voice cables serving life safety related functions (fire alarm systems, security systems, elevator communications, etc.). All horizontal voice cabling serving life safety related functions shall be terminated on 110 blocks.

B. The voice and data cables shall be installed in separate patch panels.

C. All wiring above ceilings shall be installed in cable tray or open top cable hangers or in provided conduit.

D. Cable above accessible ceilings shall be supported 60” on center from cable support attached to building structure.

E. Do not untwist cable pairs more than 0.5 in. when terminating.

F. The Contractor shall be responsible for replacing all cables that do not pass Category 6 requirements for data and 5e for the voice applications.

G. Maximum horizontal cable length shall be 90 meters.

H. Cable shall have no physical defects such as cuts, tears or bulges in the outer jacket. Cables with defects shall be replaced.

I. Install cable in neat and workmanlike manner. Neatly bundle and tie all cable in closets. Leave sufficient cable for 90° sweeps at all vertical drops.

J. Do not install Category 6E cable with more than 110N (25 lbs) pull force, as specified in ANSI/TIA/EIA and BICSI TDDM practices. Utilize appropriate cable lubricant in sufficient quantity to reduce pulling friction to acceptable levels on long pulls inside conduit, pulls of multiple cables into a single small bore conduit, on conduit runs greater than 100 lineal feet with bends of opposing directions, and in conduit runs that exceed 180 degrees of accumulated bends. Use of tensile rated cords (i.e. fishing line) should be used for difficult or questionable pulls - to judge to go/no-go condition of the conduit and pulling setup.

K. Cables jackets that are chaffed or burned exposing internal conductor insulation or have any bare copper (“shiners”) shall be replaced.

L. Test, label and document as called for in contract documents.

M. Firestop all openings where cable is installed through a fire barrier.

3.4 HORIZONTAL CROSS CONNECT INSTALLATION:

A. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-B standard, manufacturer's recommendations and best industry practices.

B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).

C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.

D. Cables shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.

E. The cable jacket shall be maintained as close as possible to the termination point.

F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.5 OPTICAL FIBER TERMINATION HARDWARE:

A. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.

B. Each cable shall be individually attached to the respective splice enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief bracket in the enclosure.

C. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers routed in the splice tray.

D. Each cable shall be clearly labeled at the entrance to the splice enclosure. Cables labeled within the bundle shall not be acceptable.

E. A maximum of 12 strands of fiber shall be spliced in each tray

F. All spare strands shall be installed into spare splice trays.

3.6 BACKBONE CABLE INSTALLATION:

A. Raceways:
1. All backbone cables shall be installed inside innerducts (see specification above) within conduits meeting specification requirements unless specifically noted otherwise.
2. Backbone cables shall be installed separately (in separate innerducts/conduits) from horizontal distribution cables.
3. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
4. Where backbone cables and distribution cables are specifically specified to be installed in a cable tray or wireway, backbone cables shall be installed first, within innerducts meeting specifications above, bundled separately from the horizontal distribution cables.

B. Support:
1. Within Telecommunications Rooms or at Telecommunications Backboards, all backbone cables shall be securely fastened to the backboards on the walls.
2. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
3. Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.

4. Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.

3.7 COPPER TERMINATION HARDWARE:

A. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-A/B standard, manufacturer's recommendations and best industry practice.

B. Pair untwist at the termination shall not exceed 12 mm (one-half inch).

C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.

D. Cables shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.

E. The cable jacket shall be maintained to within 25 mm (one inch) of the termination point.

F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

3.8 RACKS:

A. Floor-mount racks shall be used unless specifically shown otherwise.

B. Floor-mount racks shall be securely attached to the concrete floor using a minimum 3/8” hardware or as required by local codes.

C. Racks shall be placed with a minimum of 36 inches clearance from the walls on all sides of the rack. When mounted in a row, maintain a minimum of 36 inches from the wall behind and in front of the row of racks and from the wall at each end of the row.

D. All racks shall be grounded to the telecommunications ground bus bar in accordance with Section 3.11 of this document.

E. Rack mount screws not used for installing patch panels and other hardware shall be bagged and left with the rack upon completion of the installation.

F. Wall mounted termination block fields shall be mounted on 4’ x 8’ x .75” void free plywood. The plywood shall be mounted vertically 12” above the finished floor. The plywood shall be painted with two coats of grey fire retardant paint.

G. Wall mounted termination block fields shall be installed with the lowest edge of the mounting frame 18” from the finished floor.

H. Rack-mounted patch panels (and the associated horizontal cable management sections) furnished within the contract shall occupy no more than 40% of the available space within the associated racks (also furnished within the contract) unless specifically shown or specified otherwise. A minimum of 60% of available rack space shall be reserved for owner-furnished equipment. Where the number of patch panels and horizontal cable management sections

would exceed 40% of the available rack space, an additional rack shall be installed.

3.9 EQUIPMENT TRAY FOR TELECOMMUNICATION ROOMS:

A. All equipment trays shall be 18" in width.

B. Furnish and install 18" equipment tray from each floor mount rack/server cabinet to wall. Furnish 18" equipment tray around wall as required to support cables. A minimum of two (2) walls shall be completely covered by equipment tray.

C. Furnish and install cable retaining posts on each side of tray every 4 feet as required to supports cables.

3.10 FIRESTOP SYSTEM:

A. All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

3.11 GROUNDING SYSTEM:

A. The TMGB in the MDF shall be connected to the building electrical entrance grounding facility with a #6 AWG ground. Each TBB in each IDF shall be connected to a ground bus in the MDF with #4/0 AWG minimum ground. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.

B. All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the TR or ER shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors.

C. The TBB shall adhere to the recommendations of the ANSI/TIA/EIA-607 standard, and shall be installed in accordance with best industry practice.

D. Installation and termination of the main bonding conductor to the building service entrance ground shall be performed by the electrical contractor.

3.12 IDENTIFICATION AND LABELING:

A. The contractor shall develop and submit for approval a labeling system for the cable installation. The Owner will negotiate an appropriate labeling scheme with the successful structured cabling contractor. At a minimum, the labeling system shall clearly identify all components of the system: racks, cables, panels and outlets. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme. Labeling shall follow the guidelines of ANSI/TIA/EIA-606-A.

B. All label printing will be machine generated by Panduit software (or other) using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized

to the OD of the cable, and placed within view at the termination point on each end. Outlet, patch panel and wiring block labels shall be installed on, or in, the space provided on the device.

3.13 TESTING AND ACCEPTANCE:

A. General
1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
2. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the Panduit Certification Program Information Manual and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.

B. Copper Channel Testing
1. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category performance. Horizontal cabling shall be tested using a Level III test unit for category E6 performance compliance, respectively.
2. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test unit in accordance with the manufacturers' recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
3. Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA-568-B.1 Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.
4. Category 6E Performance:
   a. Follow the Standards requirements established in:
      1) ANSI/TIA/EIA-568-B .1, B.2 and B.2-1
   b. A Level III test unit is required to verify category 6 performance.The basic tests required are:
      1) Wire Map
      2) Length
      3) Attenuation
      4) NEXT (Near end crosstalk)
      5) Return Loss
      6) ELFEXT Loss
      7) Propagation Delay
      8) Delay skew
      9) PSNEXT (Power sum near-end crosstalk loss)
      10) PSELFEXT (Power sum equal level far-end crosstalk loss)

C. Fiber Testing
1. All fiber testing shall be performed on all fibers in the completed end to end system. There shall be no splices unless clearly defined in an RFP. Testing shall consist of an end to end power meter test performed per EIA/TIA-455-53A. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.
2. Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for singlemode) in both directions.
3. Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.
4. Where links are combined to complete a circuit between devices, the structured cabling contractor shall test each link from end to end to ensure the performance of the system. ONLY LINK TEST IS REQUIRED. The structured cabling contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
5. Attenuation testing shall be performed with an approved hand held tester from an industry recognized test equipment manufacturer.

3.14 SYSTEM DOCUMENTATION:

A. Upon completion of the installation, the structured cabling contractor shall provide three (3) full documentation sets to the owners for approval. Documentation shall include the items detailed in the sub-sections below.

B. Documentation shall be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test result and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 working days of the completion of each testing phase. At the request of the Engineer, the structured cabling contractor shall provide copies of the original test results.

C. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the structured cabling contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

3.15 TEST RESULTS:

A. Test documentation shall be provided on disk within three weeks after the completion of the project. The disk shall be clearly marked on the outside front cover with the words “Project Test Documentation”, the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test

equipment.

B. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-A/B including applicable TSB's and amendments. The appropriate Level III tester shall be used to verify Category 6E cabling systems.

C. Test results generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. The structured cabling contractor must furnish this information in electronic form (CD-ROM).

D. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

3.16 AS-BUILT DRAWINGS:

A. The drawings are to include cable routes and outlet locations. Outlet locations shall be identified by their sequential number as defined elsewhere in this document. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Owner will provide floor plans in paper and electronic (DWG, AutoCAD rel. 2002) formats on which as-built construction information can be added. These documents will be modified accordingly by the structured cabling contractor to denote as-built information as defined above and returned to the Owner.

B. The Contractors shall annotate the base drawings and return a hard copy (same plot size as originals) and electronic (AutoCAD DWG) form.

3.17 WARRANTY:

A. The manufacturer shall provide a 25 year extended product warranty with a 25 year applications assurance warranty. Manufacturer shall provide the warranty directly to the end user.

B. An Extended Product Warranty shall be provided which warrants functionality of all components used in the system for 25 years from the date of registration. The Extended Product Warranty shall warrant the installed horizontal copper and the backbone optical fiber portions of the cabling system.

C. The Application Assurance Warranty shall cover the failure of the wiring system to support current or future applications that are designed for the link/channel specifications of ANSI/TIA/EIA–568-B.1. These applications include, but are not limited to, 10BASE-T, 100BASE-T, 1000BASE-T, and 155 Mb/s ATM.

D. The contractor shall provide a warranty on the physical installation.

3.18 FINAL ACCEPTANCE & SYSTEM CERTIFICATION:

A. Completion of the installation, in-progress and final inspections, receipt of the test and as-built documentation, and successful performance of the cabling system for a two week period will constitute acceptance of the system. Upon successful completion of the installation and subsequent inspection, the end user shall be provided with a numbered certificate, from the manufacturer, registering the installation.

END OF SECTION 271000

SECTION 275100

SOUND SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. The contractor shall provide and install a complete sound system as specified herein and as shown on the plans together with all equipment and accessories required to provide a complete operating system.

B. Equipment manufacturer name and model numbers specified are provided to establish quality of equipment and system operational features.

C. Any proposed substitution of equipment from that specified must be approved by the Architect within ten (10) days prior to bid date and shall submit system block diagram equipment rack layout and complete list and data sheets for all equipment. The sound contractor as well as the equipment must be approved. Sound contractors seeking approval shall submit five (5) projects completed within the past three years with references.

D. The entire system shall be guaranteed for a period of one (1) year from the date of final acceptance of the installation and the contractor shall repair or replace defective equipment, during this period, at no cost to the owner.

E. All sound equipment shall be installed by a qualified sound technician in the employ of the sound contractor, who shall be factory authorized contractor for the equipment manufacturer. Contractor shall have, and have had for the past 5 years, a service department and must be within 60 miles of the job site.

F. Upon completion of the installation, the entire system shall be inspected and tested in the presence of the architect or his designated representative. The sound contractor shall provide all equipment and personnel necessary for the test. Upon completion of test, a certificate shall be submitted by the sound contractor stating that:
1. Systems were installed by him as stated above.
2. Systems are in correct operating condition.
3. Systems are in accordance with specifications.

G. Completed systems shall be operated and explained to Owner's designated representative by the sound contractor. Owner shall be provided with complete operating/instruction manual.

H. Where cable is shown not in conduit, it shall be installed in accessible areas (above lay-in ceiling,etc.) and shall be run in conduit in walls,above non-layin ceiling, and other non-accessible areas.

1.2 SYSTEM DESCRIPTION

A. The sound system shall consist of microphones, mixers, amplifiers, equalizers, hearing assistance system, speakers, and all associated items required to provide a complete operating system.

PART 2 - PRODUCTS

2.1 MICROPHONES

A. Provide four (4) SHURE SM-58-S microphones with MS10C floor stands and 25 ft. microphone cables.

B. Microphone floor boxes shall be MYSTERY FMCA1003 w/BB-1000 junction box.

2.2 CONSOLE

A. The sound system console shall be SPIRIT Model LX7-24 with 24 input channels.

2.3 EQUALIZER PANEL

A. The equalizer shall be dual-channel digital equalizer-processor and shall be SABINE Model GRQ3102-S-U.

2.4 POWER AMPLIFIER

A. The power amplifier shall be dual-channel and shall be CROWN Model CTS-600. Three (3) required.

2.5 CD-TAPE DECK

A. The CD-Tape deck shall be rack mounted and shall be MARANTZ Model PMD-351.

2.6 HEARING ASSISTANCE SYSTEM

A. The hearing assistance system shall be TELEX SM-1 with four (4) personal receivers, antenna, and rack mount.

2.7 EQUIPMENT CABINET

A. The equipment rack shall be ATLAS-SOUNDOLIER WA200-61B with locking front and rear doors.

2.8 SPEAKER SYSTEMS

A. The main stage speaker system shall consist of two (2) COMMUNITY Model CLP42-94W with Omnimounts.

B. Ceiling mounted speaker systems shall be SOUNDOLIER CF883AT87 Speaker, 164-8 baffle and 191-78-8" enclosure and shall be connected for time delay as required.

2.9 STAGE MONITOR SPEAKER SYSTEMS

A. Stage monitor speakers shall be COMMUNITY Model XLT41E and shall be supplied with 50 ft. Cables with connectors. Two (2) required.

2.10 CABLE

A. Microphone cable shall be West Penn No. 25454.

B. Speaker cable shall be West Penn No. 25226B.

C. Refer to Specification Section 270500 for additional requirements.

2.11 DOCUMENTATION

A. Shop Drawings: The contractor shall furnish bound equipment descriptive literature submittals, and complete technical descriptive drawings for review and approval by the Architect prior to installing any equipment on site.

B. Any equipment not so approved by the Architect shall be removed from the project and replaced with equipment as specified and approved. Shop drawing literature shall be provided with an index identifying each item furnished and the specification paragraph which it satisfies. Literature not so identified will be returned to the contractor unreviewed or rejected.

C. Technical drawings will include system single line diagrams, equipment rack elevations, conduit and box schedules and risers, and details of any custom fabricated equipment or panels. The contractor shall furnish sufficient copies of all shop drawings to provide for distribution to the contractor chain of command, but not more than six(6) copies. At the contractor's option, technical drawings may consist of one reproducible set and two bluelines, with the reproducible set being the return set.

PART 3 - EXECUTION

3.1 SYSTEMS PERFORMANCE VERIFICATION

A. The contractor shall provide all test equipment necessary for verification of system performance. Test equipment shall consist of the following as a minimum requirement
1. A one third 1/3 octave real time audio spectrum analyzer as manufactured by White Instruments, Crown, Hewlett Packard or approved equal.
2. A calibrated reference microphone.
3. A pink noise source.
4. A sound pressure level meter as manufactured by General Radio, Brueland Kjaer or approved equal.
5. Impedance meter as manufactured by Sennheiser.
6. Volt/Ohm meter.
7. A high quality digitally recorded musical program source and program material, compact disk or digital audio tape.

B. The system shall be equalized and balanced in accordance with industry standard response curves, as adjusted by live listening tests. Each system channel shall be independently tested and balanced. Response curves shall be flat from approximately 125 Hertz to around 3000 Hertz, +/-1.5 dB with appropriate roll-offs above and below those points.

C. The contractor shall furnish the owner with recorded response measurements of the entire system and a written description of the entire equalization procedure.

D. Final responsibility for testing, balance, and equalization remains with the contractor, except that the owner reserves the right to have their representative present during the equalization procedure. Provide a minimum of one week's notice to the owner, prior to the scheduling of the test procedure, and if the owner so requests, perform the procedure on premium time, i.e., on Saturday or during the evening. All systems must be completely operational and ready for testing prior to scheduling the test. Failure to be in a position for proper testing of the systems

at the scheduled test time may result in a back charge to the contract for the owner's representative's time.

END OF SECTION 275100

SECTION 283100

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. The Contractor shall extend the existing automatic and manual fire alarm system as specified herein and indicated on the drawings.

B. The system shall include a central control panel, power supply, signal initiating devices, audible and visual alarm devices, a conduit and wiring system and all necessary accessories required to provide a complete operating system.

C. The system shall be completely addressable.

D. The system shall comply with the applicable provisions of the National Fire Protection Association Standard Number 72 (National Fire Alarm Code) for fire alarm systems; N.E.C. Article 760; and meet all requirements of the local authorities having jurisdiction.

E. The system shall be provided by a local service organization located within 50 miles of the job site.

1.2 DESCRIPTION OF SYSTEM

A. Conduit, outlet boxes, cabinets, devices and wiring installation for complete fire detection and alarm system.

B. Each and every item of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriter's Laboratories, Inc. (UL), and shall bear the "UL" label. All control equipment shall be listed under UL category UOBZ as a single control unit. Partial listing shall not be acceptable. System controls shall be UL listed for Power Limited Applications per N.E.C. Article 760. All circuits shall be marked in accordance with N.E.C. 760-23.

C. Wiring shown is diagrammatic to define system and is not intended to show every wire. Review drawings prior to bidding and inform Contractor of any additional wiring necessary for installation of systems. Wiring shall comply with pathway survivability requirements defined in NFPA 72. Include cost of all wiring in bid.

D. After completion of work, submit one set of record mylar sepias with items for Owner described above. Typical type drawings will not be accepted.

E. Manufacturer's trained technical representative shall supervise installation, connections and tests. The authority having jurisdiction shall be notified prior to installation or alteration of equipment or wiring. Before acceptance, manufacturer's representative will test and certify in writing that system is installed and functioning properly as intended by drawings and specifications. Test includes operation of all devices in entire system.

F. Guarantee entire system in writing for one year from date of acceptance by Owner. Guarantee

will cover completely all components, equipment, wiring, etc. Repair any defects found in the system within the guarantee period without cost to owner.

G. Submit with bid a guaranteed price for complete maintenance and service of system for one year beginning at expiration of guarantee period. Price shall be guaranteed for acceptance by Owner until date of substantial completion of system.

1.3 SUBMITTALS

A. Submit complete shop drawings of system for review per minimum requirements of NFPA 72 and local AHJ including the following:

B. Product data cutsheets for all propose equipment with complete descriptive information on each item of equipment including UL listing for all system components

C. Fire alarm NICET designer information and fire alarm contractor permit information

D. Legend, notes, sheet index, wiring schedule

E. To-scale floor plans showing all devices and room names

F. Terminal-to-terminal connection diagrams for system components and associated equipment interfaces. Identify color code and terminal numbers on shop drawings.

G. System input/output matrix

H. Unique device identification numbers

I. Conduit diagrams

J. Battery calculations and voltage drop calculations

K. Typical device installation details

L. Any other information required by Architect to describe system.

1.4 SYSTEM OPERATION

A. Actuation of any alarm initiating device shall cause all audible alarm signals to sound, all visual indicating appliances to flash, activate an alarm LED and local tone-alert at control panel/annunciator, cause an LCD read-out of point in alarm including type of alarm (smoke detector, manual station, etc.), provide a signal to the mechanical controls to shut down or re-route air handling systems according to established plans. This shall include a suitable addressable relay at each air handling unit to shut down all air handlers in a given zone when system goes into alarm.

B. The general alarm devices may be silenced by authorized personnel only, by entering a locked cabinet and operating the proper silencing switch. A subsequent zone alarm shall reactivate the signals. Operation of the silencing switch shall be indicated by a trouble light and audible signal.

C. Operation of any sprinkler monitoring switch, power failure, opens, grounds, or any

disarrangement of the system wiring or components shall be indicated by a visual and audible trouble signal. The audible trouble signal may be silenced; however, the trouble LED shall remain lit until the system has been returned to normal operating condition.

D. Analog Smoke Sensor Operation
1. The smoke sensor shall be a smoke density measuring device having no self contained alarm set-point. The alarm decision for each sensor shall be determined by the control panel. The control panel shall determine the condition of each sensor by comparing the sensor value to stored values.
2. The control panel shall maintain a moving average of the sensors smoke chamber value. Systems that do not automatically maintain a constant smoke obscuration sensitivity for each sensor by compensating for environmental factors and are deemed unacceptable.
3. The system shall automatically indicate when an individual sensor needs cleaning. When a sensor's average value reaches a predetermined value, a "Dirty Sensor" trouble condition shall be audibly and visually indicated at the control panel for the individual sensor. Additionally, the LED on the sensor base shall glow steady giving a visible indication at the sensor location.
4. If a "Dirty Sensor" is left unattended, and its average value increases to a second predetermined value, an "Excessively Dirty Sensor" trouble condition shall be indicated at the control panel for the individual sensor.
5. The control panel shall automatically perform a daily self-test on each sensor. Checking the electronics in the sensor's base ensures the accuracy of the values being transmitted to the control panel. A sensor which fails the self-test will cause a "Self Test Abnormal" trouble condition at the control panel. A sensor self-test which must be manually initiated by the operator shall not be acceptable.

1.5 SYSTEM FEATURES

A. The fire alarm system shall include the following features as a minimum:
1. Supervision of all field wiring.
2. Microprocessor based solid state modular construction.
3. Ground fault detection and ground fault isolating & supervising circuitry.
4. 80 character LCD display to indicate alarms, supervisory service conditions and troubles.
5. Simultaneous test of all LED's and LCD's from a central point.
6. "Dead Front" design control panel/annunciator with field programmable LED alarm, status and trouble indicators, and all control switches located behind a locked tempered glass door.
7. Fully automatic battery charger and lead alkaline batteries. Batteries shall have capacity to maintain system operation for 24 hours in normal supervisory mode and shall have sufficient capacity remaining to operate in alarm mode for 15 minutes at conclusion of supervisory period. Batteries shall be supervised for connection to the system and for low voltage threshold. Ammeter and voltmeter shall be provided to indicate battery voltage and charging current.
8. Two (2) sets of 2 amp form C auxiliary alarm contacts fused with feedback.
9. One (1) set of 2 amp form C auxiliary trouble contacts.
10. System shall be field programmable for offsite monitoring by remote station reverse polarity, local energy master box or shunt master box types.
11. System shall be field programmable for signal circuit type of operation; march time code, temporal code, selective code, zone code, general alarm, time limit cutout and alarm silence inhibit.
12. System shall be field programmable for waterflow/sprinkler supervisory operation on distinct zones as required.

13. Transient suppression protection shall be provided on the system power supply and on the municipal protection circuit to comply with UL 864 requirements. Additionally, surge suppression shall be provided within the control panel on all circuits that extend outside the building (including to roof-mounted HVAC units).
14. Supervised remote annunciator connection circuit.
15. System shall incorporate an alarm/trouble walk test.
16. Resident non-volatile programmable operating system memory for all operating requirements.

B. Control panel shall be furnished with one-way voice communication and tone generating capabilities.
1. A central audio control shall be provided for the necessary alarm message/tone generation, main and remote microphone connections and mixer/pre-amplifier circuits. Continuous supervision shall be provided. Audio outputs shall have individual gain control.
2. A hand held, push-to-talk microphone shall be provided recessed within a protective panel mounted enclosure. The microphone shall be a dynamic communication type with a frequency range of 200HZ to 4000Hz and shall be equipped with a self-winding five foot coiled cable. An LED indicator shall be provided to indicate microphone push-to-talk button has been pressed and speaker circuits are ready for transmission. Microphone shall be supervised from disconnection.
3. An audio control switch module shall be furnished to provide manual switches to the audio functions. Switches and associated LED indicators shall be supervised for disarrangement or failure.
4. Audio power amplifiers shall be furnished with self-contained filtered 24VDC power supply, transformer and amplifier monitor circuits. Amplifiers shall provide a 25VRMS output with a frequency response of 120 Hz to 12KHz. Provide a sufficient quantity of amplifiers to operate all system speakers simultaneously plus ten (10) percent space capacity. Amplifiers shall be sized to accommodate all speakers tapped at two watts. Provide one (1) back-up amplifier capable of automatically replacing any failed amplifier.
5. Speaker circuits shall be supplied which are capable of supplying audio signals at 25VRMS supplied by the system amplifiers. Supervision for open, short or ground fault conditions shall be provided. Individual and distinct trouble indications shall be provided for each fault.
6. Digitized tones for alarm or auxiliary requirements shall be provided.
7. A remote microphone/annunciator (LCD type) command location as shown on plans shall be provided to duplicate the manual voice transmission capability of the fire alarm control panel.
8. The system shall be configured to allow selective voice paging. If any manual control switches are activated, the control panel operator shall be able to make announcements via the paging microphone over the pre-selected speakers. Facility for total building evacuation and paging shall be provided to allow for activation of speakers. This shall be accomplished by an “All Call” switch.

PART 2 - PRODUCTS

2.1 FIRE ALARM CONTROL PANELS/ANNUNCIATORS

A. The control panel for this project is existing. Furnish all material and labor as required to expand or modify existing panel to accommodate new devices. If the existing panel cannot be modified to accommodate the new devices, the existing control panel shall be replaced with a

new control panel and all existing circuits shall be reconnected to the new panel as required.

2.2 MANUAL ALARM STATIONS

A. Manual alarm stations shall be addressable break glass (double-action). The station body shall be so constructed that chips and scratches will not expose metal. All stations shall be master keyed with the control equipment. When actuated, the "Pull Lever" shall remain at right angle to the station body until reset. Furnish stations with institutional covers where so indicated on plans.

B. Boxes:
1. Recessed, two-gang outlet boxes with red, semi-flush trim plates shall be used where possible.
2. Where surface-mount outlet boxes are required, boxes shall be red, cast aluminum .

2.3 PHOTOELECTRIC SMOKE SENSOR

A. The smoke sensors shall be of the photoelectric addressable type and shall communicate actual smoke chamber values to the system control panel. The smoke sensors shall operate on the light scatter principle. For maximum maintenance free service and low power requirement, light source for detection chamber and visual alarm indication shall be solid state photodiode.

B. Each sensor base shall be visually and electrically supervised.

C. The sensors shall be listed to UL Standard 268 and shall be documented compatible with the control equipment to which they are connected. The sensors shall be listed for both ceiling and wall mount applications.

D. Each sensor base shall contain integral addressable electronics and an LED that will flash each time it is scanned by the control panel (once every 4 seconds). The control panel shall be responsible for drift compensation. When the control panel determines that a sensor is in an alarm or a trouble condition, the control panel shall command the LED on that sensor's base to turn on steady indicating the abnormal condition. Sensors which do not provide a visible indication of an abnormal condition at the sensor location shall not be acceptable. Sensor bases shall be compatible with detachable photoelectric, ionization and heat sensors so that these various sensor types can be easily interchanged to meet specific location requirements. Sensor base shall be addressable type as required.

E. Where required, sensor bases shall be provided with a relay driver output and supervised relay, which are to be controlled either automatically or manually from the control panel.

F. Each sensor base shall be scanned by the control panel for its type identification to prevent inadvertent substitution of the wrong sensor type. The control panel shall operate with the installed device but shall initiate a "Wrong Device" trouble condition until the proper type is installed or the programmed sensor type is changed.

G. Each sensor shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location.

H. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.

I. Cover all smoke detection devices with plastic bags immediately after installation to maintain

cleanliness, if field conditions so require.

J. Provide a U.L. listed sensor guard for sensors in areas subject to tampering. The guard shall be suitable for ceiling or sidewall mounting and hinged for easy access. The guard shall be securely mounted with tamper-proof screws.

2.4 PHOTOELECTRIC DUCT DETECTOR

A. The detector shall be an addressable, non-polarized 24VDC type, which is compatible with the Fire Alarm Control Panel and obtains its operating power from the supervisory current in the fire alarm detection loop. It shall be of the same analog type as the ceiling smoke detectors. Detectors shall be of the solid state photoelectric type and shall operate on the light scattering, photodiode principle. To minimize nuisance alarms, detectors shall have an insect screen and be designed to ignore invisible airborne particles or smoke densities that are below the factory set alarm point. No radioactive material shall be used.

B. The detector head shall be directly interchangeable with an ionization detector type. The 24VDC detector may be reset by actuating the control panel reset switch.

C. Detector construction shall have a mounting base with a twist-lock detecting head that is lockable. The locking feature must be field removable when not required. Contract between the base and head shall be of the bifurcated type utilizing spring type, self-wiping contacts. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control panel.

D. Sampling tubes sized to match duct size as recommended by equipment manufacturer shall be provided with duct detectors as required.

E. Detector design shall provide compatibility with other normally open fire alarm detection loop devices (heat detectors, pull stations, etc.). It shall be possible to alarm the duct housing by using a test switch. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housings front cover.

F. To minimize false alarms, voltage and RF transient suppression techniques shall be employed as-well-as smoke signal verification circuit and an insect screen.

G. Separate auxiliary SPDT relays for fan shutdown shall be provided with each duct detector for fan shutdown, smoke evacuation or other purposes as indicated on plans.

H. Remote key operated test stations with LED alarm indicators shall be installed in an accessible, inconspicuous location for each duct detector.

I. Duct detectors shall be installed for the equipment as indicated on plans as follows (locations shown on plans are diagrammatical only):
   1. A minimum of six duct widths downstream from bends or inlets to avoid air turbulence.
   2. On the downstream side of filters to detect fires in the filters.
   3. In return ducts, ahead of mixing areas.
   4. Upstream of air humidifier and cooling coil.
   5. With accessibility for test and service.

J. The following duct detector locations shall be avoided:

1. Where dampers closed for comfort control would interfere with airflow.
2. Next to outside air inlets (unless the intent is to monitor smoke entry from that area).
3. In return air damper branch ducts and mixing areas where airflow may be restricted.

K. Where duct detectors are installed in exterior or wet locations, weatherproof duct housing enclosures shall be provided to protect the detectors. Enclosures shall be located to be in shaded areas rather than direct sunlight. Entire installation shall be as directed by the equipment manufacturer.

2.5 HEAT SENSORS

A. Heat sensors shall be U.L. listed, addressable type. They shall provide rate-of-rise temperature sensing, fixed temperature sensing (135 degrees F) and utility temperature sensing (32 degrees F to 155 degrees F range).

B. Each sensor base shall be visually and electrically supervised.

C. The sensors shall be listed to UL Standard 268 and shall be documented compatible with the control equipment to which they are connected. The sensors shall be listed for both ceiling and wall mount applications.

D. Each sensor base shall contain integral addressable electronics and an LED that will flash each time it is scanned by the control panel (once every 4 seconds). The control panel shall be responsible for drift compensation. When the control panel determines that a sensor is in an alarm or a trouble condition, the control panel shall command the LED on that sensor's base to turn on steady indicating the abnormal condition. Sensors which do not provide a visible indication of an abnormal condition at the sensor location shall not be acceptable. Sensor bases shall be compatible with detachable photoelectric, ionization and heat sensors so that these various sensor types can be easily interchanged to meet specific location requirements. Sensor base shall be addressable type as required.

E. Where required, sensor bases shall be provided with a relay driver output and supervised relay, which are to be controlled either automatically or manually from the control panel.

F. Each sensor base shall be scanned by the control panel for its type identification to prevent inadvertent substitution of the wrong sensor type. The control panel shall operate with the installed device but shall initiate a "Wrong Device" trouble condition until the proper type is installed or the programmed sensor type is changed.

G. Each sensor shall contain a magnetically actuated test switch to provide for easy alarm testing at the sensor location.

H. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.

I. Heat sensor shall be automatically restorable.

2.6 MAGNETIC DOOR HOLDERS

A. Provide magnetic door holders as required where shown on plans.

2.7 ALARM SIGNALS (AUDIBLE)

A. Speakers:
1. The speakers shall be polarized and shall be operated by 25VRMS. Each speaker assembly shall include separate wire leads for in/out wiring for each leg of the associated signal circuit. T-tapping of signal device conductors to signal circuit conductors shall NOT be accepted. Where speakers are shown as a combination audible-visual assembly, they shall be mounted as a combination unit in a single back box. Speakers shall be capable of producing 88dB and shall be tapped for 2 watt connection.

B. Devices required to be surface mounted shall be furnished with surface mounting box and adaptor plate.

C. Devices installed in areas subject to mechanical damage (ie. gymnasiums) shall be furnished with suitable wire guards as indicated on plans.

2.8 ALARM SIGNALS (VISUALS)

A. Visual Flashing Lamps (Xenon Strobe):
1. Furnish and install per plans and specs visible appliance for fire alarm system notification. The appliance shall be 1HZ synchronized (15cd, 30cd, 110cd) with polar distribution or 75 cd illumination as required by the Americans with Disabilities Act (ADA). The appliance shall be U.L. listed to Standard 1971 and have a circumpolar light output allowing mounting in either vertical or horizontal positions or on the ceiling.
2. The light unit shall be of ABS polycarbonate and the lens of high grade, optical quality LEXAN. For optimized light distribution, the xenon flash tube shall be installed perpendicular to the appliance's back plane. A special compound reflector shall be utilized to maximize and best distribute the light pattern in key axis directions.
3. The effect of the illuminated visible appliance shall be observable in a circumpolar pattern. The visible appliance shall be labeled with the word "FIRE" in a contrasting color and the height of each character shall be a minimum of 5/8 inches. In its quiescent state, the word "FIRE" shall be visible.
4. Mounting heights of visual appliances shall in all respects comply with the Americans with Disabilities Act.
5. Visual indicating appliances shall be comprised of a Xenon flashtube and be entirely solid state. These devices shall be U.L. listed and be capable of either ceiling or wall mounting. The LEXAN lens shall be pyramidal in shape to allow better visibility. Visual units shall be of the stand alone type.

2.9 REMOTE MICROPHONE/ANNUNCIATOR

A. Where shown on the plans, provide and install an LCD annunciator. The annunciator(s) shall have a stainless steel finish and shall provide the same functionality as the main control panel front panel display. The annunciator shall communicate to the control panel over one twisted shielded pair of wire and operating power shall be 24VDC and be fused at the control panel. Point-wired annunciators will not be considered as equal.

B. The serial annunciator shall provide a common alarm and trouble circuit consisting of:
1. Control push-button switches – for alarm silence, trouble silence, system reset and manual evacuation duplicating the control panel switches. A key "enable" switch shall be provided to activate or deactivate the control switches.
2. Tone Alert – Duplicates the control panel tone alert during alarm and trouble conditions.
3. System trouble LED.
4. Power on LED.

C. To accommodate and facilitate job site changes the control switches shall have the capability to be programmed on site to provide for manual switch input operation other than their standard purpose.

2.10 SPRINKLER FLOW SWITCHES

A. Sprinkler flow switches and supervisory switches are provided under another section of these specifications. This contractor shall be responsible for electrical connection of these devices to the fire alarm system.

2.11 SMOKE DAMPERS

A. Smoke dampers are provided under another section. This contractor shall be responsible for supplying a source of power and connecting them to the fire alarm system to close on alarm.

2.12 SYSTEM RECORD DOCUMENT CABINET

A. Furnish and install a documentation cabinet at the system control unit or other approved location. All final record documentation shall be stored in the cabinet. Cabinet shall be labeled as “SYSTEM RECORD DOCUMENTS”. Cabinet shall include a 4 gigabyte digital flash drive interface with USB connector loaded with a digital copy of all system documentation including shop drawings and product data.

2.13 OFF SITE MONITORING

A. Furnish all material and labor to accomplish and coordinate with local company or fire department as necessary for off site monitoring of the Fire Alarm System. Transmission method(s) shall be as required by applicable codes and Authority Having Jurisdiction (AHJ). Off site monitoring shall be in operation prior to final acceptance. Exact type of off site monitoring (basic reporting or advanced reporting as described below) shall be provided by the contractor per the owner’s direction.

B. Furnish and install serial digital alarm communicating transmitter (DACT), capable of reporting specific alarm points to the central station. DACT shall be universal in that it can be utilized to either provide basic reporting (alarm, trouble, supervisory conditions) or more advanced reporting (point-to-point reporting of specific alarm conditions) DACT shall be mounted integral to or beside fire alarm control panel.

2.14 FIRE ALARM CABLING

1. All fire alarm cabling shall:
   a. Have red outer insulation/jacket with ripcord.
   b. Be listed and labeled for the intended use in Fire Alarm systems.
   c. Where Level 2 or Level 3 pathway survivability is required by NFPA 72, cabling shall be 2-hour fire rated circuit integrity (CI) type.
   d. Be manufactured by West Penn, Allied, Belden or Superior Essex.

2.15 FIRE ALARM SYSTEM MANUFACTURER

A. All equipment shall be listed by UL. All panels and peripheral devices shall be the standard equipment of a single manufacturer and shall display the manufacturer's name on each component. Manufacturer's numbers specified in this section are those of Simplex Time Recorder Company to denote type, quality, material and desired operating features to be furnished.

B. All new equipment shall be compatible, listed, and tested for use with the existing system in accordance with NFPA 72..

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations.

B. The contractor shall provide 120VAC power to all remote booster power supplies, control panels, transponder cabinets or other similar items as required. Where the project is provided with emergency power from an emergency generator, all power supplies shall be connected to an emergency source. Dedicated branch circuit(s) shall be provided to supply primary power to the fire alarm system. The associated branch circuit breakers shall be furnished with lock-on hardware and shall be identified with red marking as a fire alarm circuit. The location of the circuit disconnecting means shall be permanently identified at the fire alarm control unit.

C. All wiring shall be installed in strict compliance with all the provisions of NEC - Article 760 Parts I and III, Power-Limited Fire Protective Signaling Circuits or if required may be reclassified as non-power limited and wired in accordance with NEC-Article 760 Parts I and II.

D. All wiring shall be installed in strict compliance with pathway survivability requirements of applicable codes including NFPA 72.

E. Upon completion, the contractor shall so certify in writing to the owner and general contractor.

F. Front surface of all junction box covers in concealed areas (such as above lay-in ceilings) or within mechanical/electrical rooms (and other similar areas where appearance of boxes is not an issue) shall be sprayed red and labeled "Fire Alarm" or “F/A”. Covers in exposed areas shall be labeled “F/A” on interior of front cover. Wiring color code shall be maintained throughout the installation.

G. All fire alarm wiring shall be installed in conduit. Conduit shall be sized per manufacturer’s recommendations, but in no case shall conduit be smaller than 3/4”.

H. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.

I. All raceways shall be concealed unless specifically shown or approved otherwise.

J. The contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation.

K. Install System Record Document cabinet adjacent to control panel unless alternate location is approved.

L. The manufacturer's authorized representative shall provide on-site supervision of installation and shall provide all system setup and programming services.

M. The manufacturer’s authorized representative shall have as a minimum, a NICET LEVEL III

certification. The fire alarm contractor shall have a technician with a minimum Nicet Level III certification working in a position of responsibility. All technicians working for the certified contractor shall have a minimum Nicet Level II certification. Any fire alarm contractor wishing to bid on the fire alarm work shall show evidence of certifications at the pre-bid conference.

N. The fire alarm contractor shall be licensed as a certified fire alarm contractor by the state in which the work is to be performed in compliance with all requirements of state fire marshall or other AHJ's as applicable.

O. The drawing/specifications included herein are to indicate contract intent only. The Fire Alarm contractor shall provide final design documents to include plans specifying exact device types/locations, circuitry, battery calculations, circuit/voltage drop calculations, etc. in accordance with all applicable code requirements. These final design documents shall be prepared under the supervision of an engineer licensed in the state where the work is to be performed, engaged/employed by the Fire Alarm contractor, and must bear the engineer's licensure seal with signature and date.

3.2 TESTING

A. The completed fire alarm system shall be fully tested in accordance with NFPA-72H by the contractor in the presence of the owner's representative and the Local Fire Marshal. Upon completion of a successful test, the contractor shall so certify in writing to the owner and general contractor, and shall submit final testing results with O&M documentation..

B. The contractor shall test and demonstrate proper operation of all smoke detection equipment and associated HVAC controls to the satisfaction of the authority-having-jurisdiction and fire marshal.

3.3 WARRANTY

A. The contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.

B. The equipment manufacturer shall make available to the owner a maintenance contract proposal to provide a minimum of two (2) inspections and tests per year in compliance with NFPA-72H guidelines.

3.4 CERTIFICATION & ACCEPTANCE

A. A factory trained representative of the manufacturer shall supervise final testing of the system in accordance with N.F.P.A. Standard 72H-1984 in the presence of a representative of the authority having jurisdiction. Manufacturer's representative shall be NICET trained and shall have a level III NICET certificate. It shall be subject to the approval and acceptance of the responsible engineer. On completion of the acceptance tests, the Owner or his representative shall be instructed in the operation and testing of the system.

B. The fire alarm system shall be free from defects in workmanship and materials, under normal use and service, for a period of one year from the date of acceptance or beneficial occupancy whichever is earlier. Any equipment shown to be defective in workmanship or material shall be repaired, replaced, or adjusted free of charge.

C. The equipment manufacturer shall be represented by a local service organization, and the name of this organization shall be furnished to the Architect and Owner. The service organization shall be located within 50 miles of the job site. The service organization shall furnish, gratis to the Owner, a one year maintenance warranty contract, effective from the date of final acceptance.

END OF SECTION 283100

SECTION 287800

EMERGENCY RESPONDER RADIO COVERAGE SYSTEM

PART 1 - GENERAL

1.1 INITIAL RADIO SIGNAL SURVEY (INCLUDE IN BASE BID)

A. Include all costs in base bid for the Fire Alarm Contractor to conduct a radio signal survey immediately after building structure is complete, and prior to ceiling installation to determine signal coverage and strength of the municipality's emergency responder radio (public safety) system inside the project facility.

B. Conduct a survey using a RF Spectrum Analyzer, a calibrated, system-compatible radio or another suitable instrument with traceable certificate of calibration to analyze the RF signal strength. Both inbound and outbound signal strength shall be determined, measured, calculated and documented as required by code and AHJ. Survey shall be performed by FCC GROL certified technicians. Survey shall include measurements at a minimum of 20 readings per floor or 1,600SF if the floor area exceeds 32,000SF and in all critical areas or as otherwise directed by AHJ.

C. Survey report and drawing indicating measurements at each frequency band of interest shall be submitted to the AHJ for review. The report shall clearly indicate all areas that do not meet a minimum of -95dBm nominal uplink or downlink signal at 100% or a Delivered Audio Quality (DAQ) of 3.0.

D. If measured levels determined to be insufficient, a complete Emergency Responder Radio Coverage (ERRC) system shall be provided in accordance with these specifications below. Cost for the system and installation will be paid through allowance.

E. Contractor shall be responsible for scheduling survey so that all of the following is completed prior to the installation of ceilings:
1. Conduct initial survey
2. Submit survey results and report to the AHJ for review and determination of system requirements
3. Provide system design and submit shop drawings to architect and AHJ for review

1.2 SCOPE (SEE ALLOWANCES)

A. The contractor shall design, furnish, install, and warranty a complete Emergency Responder Radio Coverage (ERRC) system. The installed system shall include all hardware, bi-directional amplifiers, band-pass filters, surge suppressors, lightning protection, UPS, transmission lines, power cabling, antennas, and other components necessary for a complete operational system as specified and as acceptable to the local authorities having jurisdiction.

B. Equipment manufacturer name and model numbers specified are provided to establish quality of equipment and system operational features. Any proposed substitution of equipment from that specified must be approved by the Architect within ten (10) days prior to bid date.

C. The entire system shall be guaranteed for a period of one (1) year from the date of final acceptance of the installation and the Contractor shall repair or replace defective equipment,

during this period, at no cost to the owner.

D. Entire system shall be verified and approved by local AHJ to comply with all emergency responder radio network requirements including signal strength and frequency range.

1.3 DEFINITIONS

A. BDA: Bi-Directional Amplifier is a two-way signal booster that is used to amplify band-selective or multi-band RF signals in the uplink, to the base station and in the downlink from the base station to subscriber devices for enhanced signals and improved coverage.

B. DAS: Distributed Antenna System is a network of separate antenna nodes connected to a common transport medium.

C. ERRC: Emergency Responder Radio Coverage System is a complete in-building radio communication system that brings wireless signals into a structure from outside, amplifies those signals with a signal booster (BDA), and then evenly distributes the amplified signals throughout a structure via a Distributed Antenna System (DAS). The system also amplifies signals originating inside the building and transmits them outside.

D. Donor Antenna: Antenna that receives and transmits signal to radio system outside of facility.

1.4 STANDARDS

A. The system shall comply with all requirements of the latest edition of each of the following codes and standards. The latest edition of these codes and standards form a part of this specification:
1. U.L. Standard 2524.
2. International Fire Code Section 510
3. NFPA 1225
4. NFPA 72
5. All requirements of local Fire Department, Building Department and all other authorities having jurisdiction (AHJ)

1.5 SUBMITTALS

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

B. Shop Drawings: For headend and distribution system. Include plans, elevations, sections, details and attachments to other work.
1. Show fabrication and installation details for equipment.
2. Functional Block Diagram: Show single-line interconnections between components for headend and distribution system. Show cable types and sizes.
3. Dimensioned Plan and Elevations of Headend Equipment: Show access and workspace requirements.
4. Wiring Diagrams: For power, signal, and control wiring and transmission cable, include cross connects, taps, and other connections cords.

C. Design Calculations: Calculate signal attenuation budget and show calculated line and equipment losses for the system based on the functional block diagram, to show that proposed system layout can be expected to perform up to specification. Calculate signal strength from sources to endpoints. Allowable losses between components and user interface shall be used to

determine size and type of cable.

D. Coordination Drawings: Include dimensioned plan and elevation views of components and enclosures. Show access and workspace requirements.

E. Equipment List: Include each piece of equipment and include model number, manufacturer, serial number, location, and date of original installation. Insert testing record of each piece of adjustable equipment, listing name of person testing, date of test, and description of as-left set points.

F. Field quality-control reports.

G. Operation and Maintenance Data: For headend and distribution system to include in emergency, operation, and maintenance manuals.

H. Contract shall submit set of all drawings and product data to permitting agencies as required. These final design documents shall be prepared under the supervision of an engineer licensed in the state where the work is to be performed, engaged/employed by the system vendor, and must bear the engineer's licensure seal with signature and date.

I. Any permits necessary for the installation of the work shall be obtained prior to the commencement of the work. All permit costs and inspection fees shall be included.

PART 2 - PRODUCTS

2.1 RADIO FREQUENCY (RF) BDA-BASED SIGNAL BOOSTER SYSTEMS

A. In-building signal booster systems shall receive and re-transmit the entire uplink/downlink frequency band utilized by the regional emergency service provider(s)**.** The contractor shall confirm with the regional emergency service provider(s) as to the specific frequencies used by the various agencies. This system shall be state-of-the-art, operating bi-directionally and in full duplex. The system shall be fully compatible with and function on Locality's Public Safety Radio System.

B. BDA shall be capable of providing in building coverage for all the cellular networks as identified by the owner.

C. Signal boosters (BDA)
1. Shall have NEMA Type 4 enclosure
2. Shall be UL2524 listed
3. Shall be FCC certification.
4. Provide standby battery system capable of maintaining the system operational for a minimum of 12 hours or 2 hours if supplied by emergency generator circuit. Batteries system shall be completely enclosed in NEMA Type 4 enclosure.
5. Signal Boosters shall have oscillation suppression circuitry to protect the public safety radio system in case of system malfunction or other causes. The oscillation suppression circuit shall not disable the system operation. Systems that automatically disable the signal booster upon oscillation detection shall not be allowed
6. Signal Boosters shall have uplink noise suppression function to eliminate uplink noise while in standby (i.e. no radio transmission from within a building).
7. Include relays as required for monitoring system with fire alarm system.

D. DAS Antennas shall be architectural, dome or flush type where located in public areas. Stick type antennas are acceptable where located in back-of-house spaces. Finish shall be white unless directed otherwise by architect in submittal review.

E. A dedicated annunciator panel shall be provided next to the fire alarm panel / annunciator or other location as designated by AHJ to annunciate the status of all signal booster locations. The annunciator panel shall provide visual and labeled indication of the following for each signal booster:
1. Normal AC power
2. Loss of normal AC power
3. Battery charger failure
4. Low-battery capacity (i.e., to 70 percent depletion)
5. Signal source malfunction
6. Active RF-emitting device malfunction
7. Active system component malfunction

F. The communications link between the dedicated annunciator and the Emergency Responder Radio Coverage (ERRC) system shall be monitored for integrity.

G. Completed installations (including cabling) shall comply with all applicable codes and standards, including County Building and Electrical Codes, NFPA, ANSI, NEC, OSHA, EIA, IEEE, R-56, etc., as well as the FCC Rules and Regulations, as applicable. Equipment provided shall be UL listed and FCC type accepted for this specific application. Compliance to codes and standards shall extend to include proper grounding, bonding and surge.

H. All cabling shall be plenum rated.

I. All vertical riser cabling shall be 2-hour rated (Dragonskin or equal).

2.2 DESIGN REQUIREMENTS:

A. The system shall provide digital signal strength coverage over 95% area on each floor/level of the equipped building, or in specific areas defined by Locality in a Scope of Work document for a particular building or site. Critical areas shall have 99% floor area coverage.

B. Systems shall provide a minimum digital and analog overage of Circuit Merit (CM) 3 and Delivered Audio Quality (DAQ) 3.0, with a reliability factor of 95%.

C. Antenna isolation shall be maintained between the donor antenna and all inside antennas (D.A.S.) to a minimum of 20dB under all operating conditions

D. A Coverage Acceptance Test shall be executed prior to final acceptance of an installed system. Coverage acceptance testing shall be based on audio quality performance in evenly spaced test grids in the defined service areas. A minimum of 20 tests will be taken per floor/level. Total number of test grids will be determined by the Owner, based on the size of the space per floor/level.

E. Design and appearance will be of “finished” construction, i.e. shall be concealed and/or unobtrusive in finished areas. DAS antennas shall be located in back-of-house areas where possible. If required to be located in visible public aeras, antennas shall be architectural, low-profile type and located in corridors where possible. Unless indicated otherwise, wire mold and

surface conduit installations will not be acceptable unless approved in writing by the Architect in advance.

2.3 MANUFACTURER

A. Equipment shall be as manufactured by Simplex, Notifier or EST or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Wiring shall be in strict accordance with the National Electrical Code and all state and local regulations. Wiring shall be installed in accordance with manufacturer's wiring diagrams and shall test free from ground, opens and short circuits.

B. All connections shall be made under the direct supervision of a qualified technician.

C. Contractor shall provide dedicated power circuits as required for system operation. Where an emergency distribution system is provided, radio coverage system power shall be connected to the emergency branch.

D. All vertical riser cabling shall be installed in conduit within a 2-hour fire rated enclosure.

E. All copper circuits routed between or outside of buildings shall be provided with a surge protection device at each end.

F. Securely mount donor antenna on roof and aim towards direction of public safety city repeater antenna. All mounting and penetrations shall be coordinated with roofing contractor.

G. Contractor shall provide all devices and cabling as required to monitor system with building Fire Alarm System in accordance with NFPA 1225 and all other applicable code requirements. At a minimum the fire alarm system shall monitor the following:
1. Signal source malfunction.
2. Active RF-emitting device failure.
3. Low-battery capacity indication when 70 percent of the 12-hour operating capacity has been depleted.
4. Active system component failure.
5. Loss of normal AC power.
6. Failure of battery charger.
7. The communications link between the fire alarm system and Emergency Responder Radio Coverage (ERRC) system shall be monitored for integrity.
8. Oscillation of active RF-emitting devices.

H. Refer to Specification Section 270500 for additional installation requirements.

I. During initial installation, each system shall be optimized to perform in accordance with the specifications set forth in the system design, manufacturer's specifications, and FCC regulations. The contractor shall ensure that uplink and downlink levels are properly set and consistent with design expectations. The contractor shall further ensure that noise and spurious products are held within limits set forth in the system design, manufacturer's specifications, and FCC regulations. Prior to system acceptance, for each active BDA, booster amplifier, etc., the

contractor shall submit a Proof of Performance certification, that lists the design expectations, actual measurements, and if applicable, FCC specifications for the following parameters:

1. Worst case BDA uplink input level, in dBm.
2. Worst case BDA uplink output level, in dBm.
3. BDA downlink input level, in dBm.
4. BDA downlink output level, in dBm.
5. Noise and spurious products, BDA uplink output, in dBc.
6. Noise and spurious products, BDA downlink output, in dBc.

J. The original Proof of Performance report shall be submitted to Owner's project manager, and a copy of the Proof of Performance report shall be affixed to its associated equipment.

3.2 WARRANTY

A. The contractor shall provide a full one-year warranty to cover installation and all equipment, software, and components; the warranty shall commence upon the Owner's final acceptance of the facility. Under warranty coverage, the successful contractor shall provide same business day response time for system malfunctions.

B. The contractor shall perform optimization of each system during the initial warranty period, sixty (60) to ninety (90) days prior to warranty expiration. This optimization task is separate from the initial optimization performed during system installation. The contractor shall include pricing for annual system optimization to be included as part of post-warranty maintenance. Actual scope of work for annual optimization and maintenance will vary on a case-by-case basis, but typically will consist of the following:

1. Optimize the system to perform in accordance with the specifications set forth in the system design, manufacturer's specifications, and FCC regulations.
2. Ensure that uplink and downlink levels are properly set and are consistent with design specifications.
3. Ensure that noise and spurious products are held within limits set forth in the system design, manufacturer's specifications, and FCC regulations.

C. Update the Proof of Performance records for the system, listing the design expectations, actual measurements, and if applicable, FCC specifications for the following parameters:

1. Worst case BDA uplink input level, in dBm.
2. Worst case BDA uplink output level, in dBm.
3. BDA downlink input level, in dBm.
4. BDA downlink output level, in dBm.
5. Noise and spurious products, BDA uplink output, in dBc.
6. Noise and spurious products, BDA downlink output, in dBc.

D. The updated Proof of Performance report shall be submitted to the Owner, and a copy of the updated Proof of Performance report shall be affixed to its associated equipment.

E. Visually inspect outside antenna installation. Correct any issues found with the antenna mounting hardware, grounding system, or outside cabling.

F. Visually inspect inside BDA or booster amplifier equipment installation. Correct any issues found with RF cabling, electrical connection, or equipment mounting.

G. Clean equipment fans, filters and other ventilation system components.

H. Inspect and replace any defective indicator lights.

I. Test battery system performance for proper fallback to battery power and the duration of battery operation.

J. Test fault reporting system for proper operation and reporting of system faults.

K. Submit a written Preventive Maintenance Report to the Owner, listing the results of the optimization and preventive maintenance effort. The report shall include the Proof of Performance report for active RF components, and details of any other discrepancies found and corrective actions taken.

L. All as-built drawings shall be submitted to the Owner at completion, which shall include antenna system layout and all associated hardware, along with specification sheets. Include RF measurements taken.

END OF SECTION 287800

SECTION 31 3116
TERMITE CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Soil-applied chemical treatment.

1.2 RELATED REQUIREMENTS

A. Section 31 2200 - Grading.

1.3 RELATED REQUIREMENTS

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

B. Related work specified elsewhere includes:
   1. Section 03 3100 - Concrete.
   2. Section 31 2000 - Earth Moving.

1.4 DESCRIPTION OF WORK

A. Work described in this section includes soil treatment for termite control, for use and application below any new on-grade interior floor slabs, and also where any existing slabs may be opened or removed for any new, repair, replacement, or other subgrade work at interior of building and/or within interior perimeter exterior walls.

1.5 REFERENCE STANDARDS

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 2022.

1.6 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.
   1. Include the EPA-Registered Label for termiticide products

C. Manufacturer's Instructions: Indicate caution requirement.

D. Qualification Data: For Installer of termite control products.

E. 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.

F. Submit completed forms for required warranties, guarantees, and bonds for acceptance, prior to beginning work.

G. Executed warranty.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of type specified, with minimum 3 years of documented experience.

B. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work, including preparation of substrate and application.

C. Source Limitations: Obtain termite control products through one source and from a single manufacturer for each product.

D. Use only termiticides which bear a Federal registration number of the U.S. Environmental Protection Agency.
   1. Formulate and apply termiticides according to the EPA-Registered Label.

E. Mix treatment solution on site, in presence of Contractor's Superintendent, using clean potable water and new termiticide delivered to site in undamaged, original, unopened, and factory-sealed containers.

1.8 REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for application, application licensing, and authority to use toxicant chemicals, and comply with EPA regulations.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of toxicants where required.

1.9 SEQUENCING

A. Apply toxicant immediately prior to installation of vapor barrier under slabs-on-grade.

1.10 JOB CONDITIONS

A. Restrictions: Do not apply soil treatment solution until excavating, filling and grading operations are completed, except as otherwise required in construction operations.

B. Environmental Limitations: To insure 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.

1.11 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Soil Treatment 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, including Formosan termites (Coptotermes formosanus). 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.

C. Wood Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied wood termiticide treatment will prevent infestation of subterranean termites, including Formosan termites (Coptotermes formosanus). If subterranean termite damage is discovered during warranty period, repair or replace damage caused by termite infestation and treat replacement wood.
   1. Warranty Period: 12 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Soil-Applied Chemical Treatment:

1. Toxicant: Comply with Title 7, United States Code, 136 through 136y.
2. Color: Synthetically dyed for visual identification of treated soil.
3. Diluent: Recommended by toxicant manufacturer.
4. Manufacturers:
    a. Bayer Environmental Science Corp: www.bayer.com/en/agriculture/environmental-science/#sle.
    b. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that soil surfaces are unfrozen and dry to absorb toxicant, ready to receive treatment.

B. Verify final grading is complete; see Section 31 2200.

C. Verify utility trenches are wide enough to receive application.

D. 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 - CHEMICAL TREATMENT

A. Comply with requirements of U.S. EPA and applicable state and local codes.
    1. Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

B. 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.

C. Apply toxicant at following locations:
    1. Under Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment.
        a. Under slab-on-grade structures, treat soil before concrete footings and slabs are placed, using the following rates of application (unless manufacturer recommends otherwise):

1) Apply four (4) gallons of chemical solution per ten (10) linear feet to soil in critical areas under slab, including entire inside perimeter inside of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers.
2) Apply one (1) gallon of chemical solution per ten (10) square feet as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallons of chemical solution to areas where fill is washed gravel or other coarse absorbent material.
3) Apply four (4) gallons of chemical solution per ten (10) linear feet of trench, for each foot of depth from grade to footing, along outside edge of building. Dig a trench six (6) inches to eight (8) inches wide along outside of foundation to a depth of not less than twelve (12) inches. Punch holes to top of footing on not more than twelve (12) inches on center and apply chemical solution. Mix chemical solution with the soil as it is being replaced in trench

2. In Crawl Spaces: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
   a. In crawl-space and basement structures, treat soil along exterior and interior walls of foundations with shallow footings as specified above for exterior of slab-on-grade structures. Treat soil under or around crawl-space structures using the following rates of application (unless manufacturer recommends otherwise):
      1) Apply four (4) gallons of chemical solution per ten (10) linear feet of trench along inside of foundation walls, along both sides of interior partitions, and around piers and plumbing. Do not apply an overall treatment in crawl spaces.
      2) Apply four (4) gallons of chemical solution per ten (10) linear feet of trench, for each foot of depth from grade to footing, along outside of foundation walls.
      3) Apply one (1) gallon per ten (10) square feet of soil surface as an overall treatment, where attached concrete structures are on fill or ground.
3. Foundations: At Both Sides of Foundation Surface: 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.
4. At hollow masonry foundations or grade beams:
   a. Treat voids at rate of two (2) gallons per ten (10) linear feet (unless manufacturer recommends otherwise), poured directly into the hollow spaces.
5. Masonry: Treat voids.
6. At expansion joints, control joints, and areas where slabs will be penetrated:
   a. Apply at rate of four (4) gallons per ten (10) linear feet of penetration (unless manufacturer recommends otherwise).
7. Soil Within 10 feet of Building Perimeter For a Depth of 1 foot .

D. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

E. 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.

F. Re-treat disturbed treated soil with same toxicant as original treatment.
   1. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

G. Post signs in areas of application warning workers that soil termiticide treatment has been applied. Remove signs when areas are covered by other construction.

3.4 PROTECTION

A. Do not permit soil grading over treated work.

B. Protect applications from damage after completion. Repair disturbances according to manufacturer's written instructions.

END OF SECTION

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SECTION 32 3113
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Posts, rails, and frames.

B. Wire fabric.

C. Manual gates with related hardware.

1.2 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete anchorage for posts.

1.3 REFERENCE STANDARDS

A. CLFMI CLF-SFR0111 - Security Fencing Recommendations; 2014.

B. FS RR-F-191/1D - Fencing, Wire and Post Metal (Chain-Link Fence Fabric); 1990.

C. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components. See CLFMI CLF-SFR0111 for planning and design recommendations.

D. Field Inspection Records: Provide installation inspection records that include post settings, framework, fabric, barbed wire, fittings and accessories, gates, and workmanship.

1.5 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Line Posts: 1.9 inch diameter.

B. Corner and Terminal Posts: 2.38 inch diameter.

C. Fabric: 2 inch diamond mesh interwoven wire, 6 gauge, 0.1920 inch thick, top selvage knuckle end closed, bottom selvage twisted tight.

D. Tension Wire: 6 gauge, 0.1920 inch thick steel, single strand.

E. Tie Wire: Aluminum alloy steel wire.

2.2 MATERIALS

A. Posts, Rails, and Frames: _____:
   1. Line Posts: Type I round in accordance with FS RR-F-191/1D.
   2. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round in accordance with FS RR-F-191/1D.

B. Wire Fabric: _____:

END OF SECTION

SECTION 32 3500
SITE SCREENING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site screening devices. Modular and pre-formed panels and support framing for site screening including the following:
   1. Plankwall PVC (Polyvinyl Chloride).
   2. PlankArt® PVC planks with printed content.
   3. Powder coated metal.
   4. Painted metal.
   5. Natural wood.
   6. Operable access gates.

B. Related Work:
   1. Section 09 90 00 - Touch-up painting required for scratches and screw heads and field painting of prime painted screens.

1.2 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

C. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.

D. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric)

E. ASTM B 209 - Aluminum and Aluminum Alloy Sheets and Plates.

F. ASTM B221 - Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire Profiles, and Tubes.

G. ASTM F436 - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions

H. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

I. The Aluminum Association, Inc. (AA): AA ADM - Aluminum Design Manual.

J. American Society of Civil Engineers (ASCE): ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data:
   1. Manufacturer's data sheets on each product to be used.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Typical installation methods.

C. Verification Samples: Two representative units of each panel type.
   1. Color Selection: Submit paint chart with full range of colors available for client’s selection. Custom color samples available upon purchase.

D. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing profiles, sections of components, finishes, and fastening details. Include plan elevation pages to clearly outline screen wall or enclosure locations.

E. Color Charts: Color charts showing manufacturer's full range of colors from standard line

F. Closeout Submittals: Warranty documents, issued and executed by manufacturer, countersigned by Contractor.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum two years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

B. Storage and Handling: Protect materials and finishes during handling and installation to prevent damage.

C. Protection: Protect from damage due to weather, excessive temperature, and construction operations.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

B. Field Measurements: Take measurements of supporting paving, footings, or piers. Indicate measurements on shop drawings fully documenting any field condition that may interfere with the screen system installation.

1.7 COORDINATION

A. Installer for work under this Section shall be responsible for coordination of panel and framing sizes and required options with the Contractor's requirements.
   1. Request information on sizes and options required from the Contractor.

B. Submit shop drawings and obtain written approval of shop drawing prior to fabrication.

C. Confirm size, type, and location of supporting construction as adequate to resist column supports.

1.8 WARRANTY

A. Warranty: Provide manufacturer's standard limited warranty, starting from the date of substantial completion of the project.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Covrit Gates and Screening System by CityScapes International Inc; 4200 Lyman Ct., Hilliard, OH 43026; Toll Free: 877-SCREENS; Phone: 614-850-2549; Email: contact@cityscapesinc.com; www.cityscapesinc.com.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Division 01.

2.2 PERFORMANCE AND DESIGN REQUIREMENTS

A. Regulatory Requirements: Comply with requirements of building authorities having jurisdiction in Project location.

B. Design Criteria: Manufacturer is responsible for the structural design of all materials, assembly, and attachments to resist snow, wind, suction, and uplift loading at any point without damage or permanent set

C. Framing: Designed in accordance with the Aluminum Design Manual to resist the following loading:
   1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers.

2.3 MATERIALS

A. Paneling: To be selected by client from Manufacturer's standard panel selections.

B. Operable Access Gates: To be selected by client from Manufacturer's standard selections.

C. Framing: Aluminum Plate, Shapes and Bar: ASTM B221, Alloy 3003-H14, 6005-T5, 6061-T5, 6061-T6 or 6061-T5.

D. Wall and Gate Infill: Woodgrain Cellular PVC or ATM B221, Alloy 3003-H14 or 6063-T6.

E. Threaded Fasteners: Screws, bolts, nuts and washers to be zinc plated or stainless steel.

F. Mounting: Determined by site conditions and/or engineering recommendations
   1. Post Embedment: As detailed on the Drawings.
   2. Surface Mount Anchoring: Anchor bolts
      a. Carbon and Alloy Steel Nuts: ASTM A563.
      b. Carbon Steel Washers: ASTM F436.
      c. Carbon Steel Threaded Rod: ASTM F1554 grade 55, zinc-plated.
      d. Epoxy HILTI HVU2 or Epoxy HILTI HIT-HY 270

2.4 FABRICATION

A. Factory-Formed Panel Systems: Continuous interlocking panel connections and indicated or necessary components.
   1. Form components true to shape, accurate in size, square and free from distortion or defects. Cut panels to precise lengths indicated on approved shop drawings.

B. Fabricate products in accordance with Contractor approved shop drawings.

C. Framing: Fabricate and assemble components in largest practical sizes, for delivery to the site.
   1. Construct corner assemblies to required shape with joints tightly fitted.
   2. Supply components required for anchorage of framing. Fabricate anchors and related components of material and finish as required, or as specifically noted.

D. Gate Hardware: Provide manufacturer's adjustable standard of size required to fit support pipe provided.

2.5 FINISHES

A. Alumunim Framing: Manufacturer's standard powder coating system, factory applied.

B. Panel Coating: Manufacturer's standard powder coating system, factory applied.
   1. Color: Selected from full range of manufacturer's standard colors.

2. Color: Custom color paint as selected and approved by client.

PART 3 EXECUTION

3.1 EXAMINATION

A. Installer's Examination: Examine conditions under which construction activities of this section are to be performed.
   1. Submit written notification to client and Screen manufacturer if such conditions are unacceptable.
   2. Beginning erection constitutes installer's acceptance of conditions.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install units in accordance with the manufacturer's instructions and approved shop drawings. Keep perimeter lines straight, plumb, and level. Provide brackets, anchors, and accessories necessary for complete installation.

B. Fasten structural supports to/into paving, footings, or piers at spacing as indicated on approved shop drawings.

C. Where aluminum materials would contact dissimilar materials, insert rubber grommets at attachment points, thus eliminating where dissimilar metals would otherwise be in contact.

D. Do not cut or abrade finishes which cannot be restored. Return items with such finishes to shop for required alterations.

3.4 ERECTION TOLERANCES

A. Tolerances: Maximum misalignment from true position 1/4 inch.

3.5 CLEANING AND PROTECTION

A. Remove protective masking from material immediately after installation.

B. Protection:
   1. Ensure that finishes and structure of installed systems are not damaged by subsequent construction activities.
   2. If minor damage to finishes occurs, repair damage in accordance with manufacturer's recommendations; provide replacement components if repaired finishes are unacceptable to client.

C. Prior to Substantial Completion: Remove dust or other foreign matter from component surfaces; clean finishes in accordance with manufacturer's instructions.

END OF SECTION

SECTION 32 8400
IRRIGATION WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements apply to the work specified in this Section.

B. Section 32 9100 - Planting Soils and Preparation

C. Section 32 9300 - Plants

1.2 DESCRIPTION OF WORK:

A. Furnish all labor, materials, equipment and services necessary for the complete installation of the landscape irrigation system as drawn and specified. The work includes, but is not limited to:

1. Trench, backfill and compaction for irrigation lines prior to final topsoil placement.
2. Automatically controller landscape irrigation system; master valve; piping and sleeves under paving; repair of paving, main and lateral lines; electrical vaves and wiring; valve boxes and controller; sprinklers; couplings; connectors; and fittings.
3. Water source for new irrigation system will be from existing wells.
4. Test all systems and make operative.
5. Submit Record Drawings and Maintenance Manual.
6. One-year Guarantee Period.
7. Maintain and operate for 30 days beyond Date of completion of Substantial Completion punch list.

1.3 QUALITY CONTROL:

A. Installer Qualifications: Firm shall hold Alabama General Contractors License for Specialty Construction, Subclassification - Landscaping or Other Specialty Construction (specified as Irrigation). Firm experienced in the successful installation of a minimum of five (5) projects within the past five (5) years similar in scope, quality, and contract value to that indicated for this project. Firm shall have sufficient manpower, equipment and financial resources to complete the Work of this Section.

B. The Owner and the Landscape Architect reserve the right to reject any and all materials and workmanship, which they deem to be not in accordance with Drawings and Specifications. Rejected materials and work shall be removed from site immediately and replaced with that of the specified quality.

C. Applicable Standards:

1. ASTM:
   a. D1785: Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40.
   b. D2464: Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Threaded, Schedule 40.
   c. D2466: Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Socket Type, Schedule 40.
   d. D2564: Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

D. Applicable Codes:

1. Most current edition of Uniform Plumbing Code.
2. Applicable Building Code.
3. All applicable local codes and ordinances.

4. National Electrical Code.
5. Should Specification's requirements differ from local requirements, consider Contract Document requirements to be the minimum acceptable and comply with any more stringent local requirements.

E. Permits and Fees:
1. Obtain all permits and pay required fees to any agency having jurisdiction over the work.
2. Arrange inspections required by local ordinances during the course of construction.
3. Upon completion of the work, furnish satisfactory evidence to show that all work has been installed in accordance with the ordinances and code requirements.

F. Testing:
1. Perform testing and inspections required by specifications and by regulating authorities.
2. Give 24-hours notice that such tests are to be conducted.

1.4 SUBMITTALS:

A. Qualification data for firms specified in "Quality Control" article to demonstrate their capabilities and experience. Include a list of a minimum of 5-similar projects completed within the last 5-years with project name, address, names of Landscape Architects and Owners, overall description of scope of work and contract value.

B. Shop Drawings:
1. Submit with Shop Drawings manufacturer's catalog sheet showing full specifications of each type sprinkler proposed including discharge of GPM, minimum allowable operating pressure at sprinkler, maximum allowable spacing and distance of throw (coverage).

C. Record Drawings:
1. Prepare and submit a reproducible and/or digital Record Drawing showing deviations from the Contract Documents made during construction affecting the main line pipe, controller location, control wire path, valve locations, and all sprinkler head locations. Record Drawings shall also indicate and show approved substitutions of size, material, and manufacturer's name and catalog number and name.
2. Provide Decoder ID for each valve and sensor.
3. Deliver Record Drawings with request for inspection and acceptance.
4. Deliver one (1) set of record drawings, reduced in size and laminated. Drawings should be suitable for mounting adjacent to irrigation controller.

D. Maintenance Manual:
1. Prepare and submit irrigation system maintenance and operating instructions, with relevant manufacturer's literature. Include complete parts list covering all operating equipment.
2. Submit in a hardcover, 3-ring binder.
3. Include full name, address, and telephone number of Installer.

1.5 COORDINATION:

A. Coordinate and cooperate with the Landscape Architect and other contractors and trades to enable the work to proceed as rapidly and efficiently as possible, and to be completed on schedule.

B. Anticipate last minute delays, which may necessitate overtime work to complete the work on schedule. Sleeves under paving shall be placed by Site Contractor. Coordinate with other trades on site for sequencing of work.

1.6 SITE INSPECTION:

A. Become familiar with all site conditions.

B. Should utilities not shown on plans be found during excavations, promptly notify the Landscape Architect for instructions as to further action.

C. Make necessary adjustments in the layout as may be required:
   1. To connect to existing stubouts (should such stubs not be located exactly as shown); or
   2. To work around existing work. Such adjustments shall be made with no increase in cost to the Owner.
   3. To avoid existing utilities.

1.7 PROTECTION OF EXISTING CONDITIONS:

A. Take necessary precautions to protect site conditions to remain.

B. Should damage be incurred, repair the work to its original condition at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 PVC PIPE - (POLYVINYL CHLORIDE PIPE):

A. PVC pipe shall be manufactured in accordance with standards noted herein.

B. Marking and Identification: PVC pipe shall be continuously and permanently marked with the following information:
   1. Manufacturer's name, pipe, size, type of pipe and material, SDR number, ASTM standard number and NSF (National Sanitation Foundation) seal.

C. Irrigation Water Piping:
   1. Main Lines: ASTM D-1785, Schedule 40, 200 psi.
   2. Lateral Lines: ASTM D-1785, Class 200, 200 psi.
   3. Irrigation Sleeves: ASTM D-1785, Schedule 40, 200 psi.

D. This Contractor is responsible for determining if sleeves were installed prior to submitting a bid. If not installed, boring under paving, and/or hand excavation is required.

2.2 PIPE FITTINGS:

A. PVC: Meeting specified standards, Schedule 40, Standard Weight, at PVC pipe; joints solvent welded as recommended by manufacturer, except swing joints and riser to head, which shall be threaded with Teflon Tape. Swing joints shall be Schedule 80.

2.3 SOLVENT CEMENT:

A. Meeting ASTM D-2564 and of proper consistency.

2.4 ELECTRIC WIRING:

A. 120 Volt AC Wiring: 120 volt service to controller shall consist of three wires: one black, one white, and one ground. Electrical service to be provided by Contactor.

B. Splices in the field control wiring shall be waterproof UL listed for 600 volts.
   1. Acceptable Manufacturers:
      a. 3M
      b. Paige

C. Control wiring shall be 600 volt solid single conductor wire UL approved for direct vurial in ground. Minimum wire size: 14 gauge. Control wiring an dwiring connections from the controller to the valves is included in this Contract.

1. Acceptable Manufacturers:
   a. Paige Electric Co.
   b. King Wire and cable

2.5 WATER SOURCE CONNECTION:

A. Irrigation Water Wells: Water source will be from two existing water wells on campus.
   1. Existing irrigation main line shown on plans is approximate, verify location of where connection can be made.
   2. Contractor to connect new irrigation system to existing system, extend existing main line as necessary for connection.

2.6 MASTER VALVES:

A. Valves for isolation purposes shall be brass body construction, slow closing with preinstalled one-piece solenoid compatible with two-wire controller.

B. Provide lightning and surge protection as per manufacturer's recommendation.

2.7 CONTROL VALVES:

A. Manufacturer's standard control valves for irrigation zones, of type and size indicated, and as follows:
   1. Valve to have preinstalled solenoid for two-wire controller.
   2. One-piece, durable body construction for heavy-duty pressure performance.
   3. Slow closing to prevent water hammer.
   4. Low flow operating capacity.

B. Acceptable Manufacturers:
   1. Rain Bird
   2. Hunter Industries

C. Provide lightning and surge protection as per manufacturer's recommendation.

2.8 VALVE BOXES:

A. Plastic Valve Boxes: Box and cover, with open bottom and opening for piping, designed for installing flush with grade.
   1. Control Valves: Shall be in a twelve (12) by eighteen (18)-inch standard valve box with non-hinged cover.
   2. Backflow Preventer and 1 1/2", 2" Drip Valve Assemblies: Shall be in a twenty (20) by thirty-four (34)-inch valve box with non-hinged cover.
   3. Isolation Valves, Wire Splices, and Quick Coupling Valves: Shall be in a ten (10)-inch round valve box with cover.

B. All valves boxes are to be green or black with matching colored covers.

C. Acceptable Manufacturers:
   1. Rain Bird
   2. NDS
   3. Carson Industries

2.9 SPRINKLERS:

A. Pop-up Spray Heads: Full or part circle nozzles with matched precipitation rates, pressure regulation, and check valve.

B. Rotor Heads: As specified on drawings.
   1. Pop-up Rotor: matched precipitation rates nozzles, pressure regulation, and check valve.

C. All spray sprinkler bodies are to be produced by the same manufacturer. A mix of product manufacturers is not acceptable.

D. Acceptable Manufactures and Products: subject to compliance with requiremtns, provided products by ond of the following:
   1. Rain Bird
   2. Hunter Industries

2.10 RISERS

A. Spray Heads: use swing pipe or swing joint. Submit sample of joint for approval.

B. Rotor Heads: use swing joint, triple elbow. Submit sample of joint for approval.

2.11 AUTOMATIC CONTROLLER:

A. Connect new irrigation system to existing irrigation controller. Existing controller is located in Lurleen B. Wallace Hall - Student Center.
   1. Verify controller has capacity for new irrigation system, if not provide expansion module to accommodate additional zones.

2.12 RAIN SENSOR:

2.13 LIGHTNING AND SURGE PROTECTION EQUIPMET:

A. Provide lightning and surge protection for all automatic control valves, master valves, and controller. Protection equipment to be installed as per manufacturer's recommendations.

2.14 BACKFILL UNDER PAVING:

A. Crushed stone of the following gradation, placed and compacted to 100%:
   a. 100% passing ½-inch sieve.
   b. 90-100% passing 3/8-inch sieve.
   c. 60-85% passing #4 sieve.
   d. 40-70% passing #8 sieve.
   e. 10-25% passing #50 sieve.
   f. 1-5% passing #200 sieve.

2.15 PIPE MARKING TAPE:

A. Blue Metallic Marker Tape shall be used for marking newly installed irrigation main line pipe. The Marker Tape shall have a minimum thickness of 5 mil, shall be marked "CAUTION WATER MAIN BUIRED BELOW", and shall be buried 4 to 6-inches above the crown of the carrier pipe. All costs associated wtih Marker Tape shall be included in the total price bid.

PART 3 - EXECUTION

3.1 GENERAL:

A. Verify existing and proposed locations of all site utilities (i.e. gas, water, electric, telephone) prior to any trenching and laying of pipe.

B. Coordinate all irrigation work with that of all other site work trades and contractors.

C. All piping to be installed directly behind curb where possible and in all cases to be routed around existing or proposed site elements, including root balls of proposed trees and shrubs. Refer to the landscape planting Drawings for approximate tree locations and closely coordinate work and schedule with grading and planting work.

D. Contractor is responsible for full and complete coverage of all areas designated on the Drawings to be irrigated and shall make any necessary adjustments at any time, at no additional cost to the Owner.

E. Exact location and configuration of islands and other features may vary from that shown on these Drawings. Verify location and configuration at the site prior to trenching for sleeves and piping under paving, and make any minor adjustments to irrigation systems layout. Notify Landscape Architect of substantial changes.

F. Maintain all warning signs, barricades, bracing, flares, and red lanterns as required by safety regulations and local ordinances.

3.2 INSTALLATION:

A. General:
   1. Lay out according to site coordinates and actual field dimensional controls; verify piping and sleeve locations before trenching.

B. Excavating and Trenching:
   1. Perform all excavation required for installation of the work included under this Section, including shoring and bracing of earth banks to prevent cave-in.
   2. Restore all surfaces and existing underground installations damaged or cut as a result of the excavations, to their original condition and in a manner approved by the Owner.
   3. All excavation shall be unclassified. Trenches shall be 4-inches wide and to the depth required as specified herein and shown in the Drawings.
   4. Over-excavation shall be backfilled at the Contractor's expense with cushion sand. Remove all unsuitable or excess material from the site.
   5. Dewater excavations as required for dry work including both surface and ground water.
   6. Trenches shall have sides as nearly vertical as possible and bottoms shall be shaped to provide continuous bedding of each section of pipe along its entire length in undisturbed soil or thoroughly compacted fill.
   7. Trenches for piping shall be of sufficient depths to provide 12-inches minimum cover for pipes from finished grade. In Public Right-Of-Way, provide 18-inches minimum cover over top of main and lateral lines, or greater depth if required by local authorities.

C. Pipe Installation:
   1. Pipe installation includes all irrigation piping required for water and electrical wiring to complete the automatic irrigation system.
   2. Provide firm, uniform bearing for entire length of each pipeline to prevent uneven settlement. Wedging or blocking of pipe will not be permitted. Remove foreign matter or dirt from inside of pipe before joining and keep piping clean by approved means during and after laying of pipe.
   3. Assemble pipe and solvent weld. Clean joint thoroughly of dust, dirt, and moisture before applying solvent with non-synthetic bristle brush.
   4. Install tracer wire indication on all main lines, coordinate with Facilities Manager.
   5. Provide Irrigation Sleeve Medallions, two (2) inch aluminum medallion to be placed in pavement/curb where irrigation sleeves are place for sleeve location.
   6. Install all pipe and wiring under paving in sleeves as specified, whether or not shown on Drawings. Pressure test all piping under paving prior to paving. All mains and piping under pavement to be pressure tested and activated immediately.

D. Pipe Fitting:
   1. Solvent: Use only solvent recommended by manufacturer to make solvent welded joints. Thoroughly clean pipe and fittings of dirt, dust and moisture before applying solvent.
   2. PVC to Metal Connection: Work metal connection first. Use a TEFLON pipe fitting tape on threaded PVC to metal joints. Use only light wrench pressure.

3. Threaded PVC Connections: Where required, use threaded PVC adapters into which pipe may be welded.

E. Irrigation Heads:
1. Prior to installation, verify configuration of planting areas and tree locations, and stake head layout accordingly. Obtain approval of staked head locations from Landscape Architect before proceeding.
2. Rotor and Pop-up Spray Heads: Attach sprinkler as specified. Adjust riser height after planting.
3. All irrigation heads shall be installed plumb, with top flush with finished grade or no more than 1/2" bleow finished grade

F. Wiring:
1. Supply #14 UL listed single strand U.F. direct burial wire from automatic controllers to the valves in accordance with the Specifications. Use PVC conduit for all locations of wire under paving; in landscaped areas, the Contractor may add conduit for wires at his option, in lieu of tucking wire under main lines and lateral lines.
2. Secure all wire-to-wire connections by approved means.
3. All wire from controllers to valves shall be tucked under piping.
4. Test wires prior to backfilling to ensure continuity from valve location to controller location. Any wire not indicating continuity shall be repaired or replaced immediately.

G. Controller:
1. Controller is existing, coordinate with Owner for connecting new irrigation system to existing controller.
2. If necessary, add expansion module to accommodate additional zones from new irrigation system.

H. Electrical Valves: Supply and install in accordance with the materials list and the manufacturer's recommendations; set in a level position.

I. Valve Boxes: Set flush with finish grade (adjust as necessary); set over all valves. Provide riser as necessary.

J. Drainage: Place a minimum 12-inches depth of crushed stone under each box containing either water meter, pressure regulator, valve or backflow preventer.

3.3 TESTING:

A. Conduct test in presence of Landscape Architect. Notify Landscape Architect 48-hours in advance of testing date and time, test and approval prior to finished grade.
1. Thoroughly flush out all water lines before installing heads and valves.
2. Operational Test: After backfilling and adjusting heads to final positions, show that system meets coverage requirements and controls function properly. Adjust heads to be flush or 1/2" below finished grade after sod is installed.

3.4 BACKFILL AND COMPACTING:

A. Do not backfill until pipe systems have been hydrostatic tested and approved.

B. After system is operating and required tests and inspections have been made, backfill excavations and trenches as follows:
1. Backfill Under Paving:
a. Backfill for full depth of excavation with the specified crushed stone. Compact in lifts. Backfill shall be free of debris, large clods, roots or other deleterious material.

b. Place backfill material evenly in lifts not to exceed 6-inched and compact to 100-percent of maximum density.
c. Contractor is responsible for establishing compaction in trenches equal to or exceeding overall compaction of paving base. Leave top of trench ready for asphalt by others.

2. Backfill in Landscape Areas:
a. Backfill trenches with material removed during excavation and compacted to 85-percent except where rock is encountered. In this case lay pipe in a cushion sand bed surrounding the pipe, a minimum of 4-inches deep.
b. Compact all excavation to prevent settling. Hand rake excavation areas and adjoining areas to leave grade at the previous elevation and in a good or better condition than before installation. Compact using vibratory trench compaction. Water-floor compaction will not be permitted.
c. Repair settled areas throughout Guarantee Period, including repair of affected landscape work.

3.5 FINAL ADJUSTMENT:

A. After planting and irrigation installation has been completed, make final adjustment to irrigation system prior to the Landscape Architect's final inspection.

B. After finished grade is completed prior to sod installation or mulch, the system shall be completely flushed to remove any and all debris from the lines by removing nozzles from all heads on ends of lines and turning on the system.

C. Check all heads for correct operation, alignment, and direction of throw.

D. Check each section of spray heads for operating pressure, and balance in relation to all other sections by use of the flow adjustment on top of each valve.

E. Check nozzles for complete coverage. Prevailing wind or other conditions may indicate the arc or angle of spray should be other than as shown on plan. In this case, revise nozzle degree to provide correct coverage, at the Contractor's expense.

F. Adjust head and valve heights plumb and flush to finished grade. Make any other adjustments determined necessary by the Landscape Architect to provide complete and uninterrupted coverage.

3.6 CLEAN-UP:

A. Keep site clean on a daily basis by removing trash and debris resulting from construction operation. Do not bury wire, pipe, glue or primer, or pipe fittings in trenches thta are considered trash.

B. Keep all walks, roads, and circulation routes free from debris, materials, and equipment at all items.

C. Upon completion of the irrigation work, clean up all work and storage areas by removing trash piles, surplus material, or other material from site.

D. Restore pavement, curbs, ground, and any other disturbed surface to its original condition.

3.7 MAINTENANCE AND COMPLETION OF THE WORK:

A. Complete the irrigation system as specified and operate and maintain same from time of installation until Substantial Completion and for a period of 1-year beyond Substantial Completion.

B. Instruct Owner's personnel in complete operation and maintenance of irrigation system.

3.8 SUBSTANTIAL COMPLETION:

A. Submit request for inspection for Substantial Completion to the Landscape Architect at least 24-hours prior to anticipated date of inspection and testing (refer to Paragraph 3.3 TESTING, herein).

B. Submit Record Drawings and Maintenance Manual to the Landscape Architect with request for inspection (refer to Paragraph 1.4 SUBMITTALS, C. and D., herein).

C. Review the work jointly with the Owner and Landscape Architect for Substantial Completion.

D. Upon completion of repairs and replacements found necessary at time of review, the Owner and Landscape Architect will confirm the date of Substantial Completion of the work.

E. The date of completion of repairs and replacements found necessary at time of Substantial Completion, will constitute the beginning date of the 1-Year Guarantee.

3.9 GUARANTEE:

A. Guarantee all work, products, equipment, and materials for 1-year, beginning at date of completion of punch list from Substantial Completion.

B. During the period of the Guarantee, replace immediately, with no additional compensation, all work not functioning correctly; make adjustments as necessary to maintain complete coverage; make good any other damage, loss, destruction, or failure. Repairs and replacements shall be done promptly and at no additional cost to the Owner.

C. Repair damage to grade, plants, and other work or property as necessitated due to irrigation defects, repairs, replacement, or adjustment.

D. If the replacement is not acceptable during or at the end of the Guarantee Period, the Owner may elect either subsequent replacement or credit. Replacement products shall have a similar 1-year guarantee from time of replacement.

E. Guarantee applies to all losses with the exception of those due to Acts of God, Vandalism, or Owner neglect, as determined by the Landscape Landscape Architect.

3.10 FINAL INSPECTION AND ACCEPTANCE:

A. At end of Guarantee Period and upon request for inspection, jointly review all guaranteed work for Final Acceptance.

B. Submit written request for inspection for Final Acceptance to the Landscape Architect at least 2-weeks prior to anticipated date of inspection; include list of work provisionally accepted and list of work replaced during Guarantee Period.

C. Upon completion by the Contractor of all required repairs and replacements; the Owner and the Landscape Architect will confirm the date of Final Acceptance of the Work.

END OF IRRIGATION WORK

END OF SECTION

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SECTION 32 9100
PLANTING SOILS AND PREPARATION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Existing Soil Modifications

B. Planting Soil Mixes

C. Fine Grading

1.2 RELATED SECTIONS

A. 32 8400 - Irrigation Work

B. 32 9300 - Plants

1.3 REFERENCES

A. US Composting Council - www.compostingcouncil.org

B. Methods of Soil Analysis, published by the Soil Science Society of America - www.soils.org

1.4 DEFINITIONS

A. Modified Existing Soil: on-site soil that shall be used as Planting Soil after specified modifications.

B. Subgrade: surface or elevation of subsoil remaining after completion of excavation, or top surface of a fill or backfill, before placing Planting Soil.

C. Topsoil: naturally produced and harvested soil from the A horizon or upper layers of the pedosphere that have been stockpiled on site or imported.

D. Planting Soil (Planting Soil Mix): soil mixes described in PART 2 and Modified Existing Soils that will be used to support the life and health of plants after installation.

1.5 SUBMITTALS

A. Submit all product submittals eight weeks prior to the start of the soil work.

B. Submit 1-gallon samples of each Planting Soil Mix, Coarse Sand, and Compost detailed below to the Landscape Architect. Label each sample with the product/soil type name, characteristics, and locations in the Work. Samples shall be submitted at the same time as the analysis and report of that material.

C. Submit manufacturers or supplier’s product data and certified analysis for standard products and bulk materials, complying with testing requirements and referenced standards and specific requested testing.

1. For each Compost product submit the following analysis by a recognized laboratory:
   a. pH
   b. Moisture content %, wet weight basis
2. For Coarse Sand product submit the following analysis by a recognized laboratory:
   a. pH
   b. Particle size distribution.

D. Soil Testing Reports

1. Submit soil test analysis for all Topsoils and Planting Soil Mixes included in Part 2 of this Section as well as for existing soils at the site.
   a. If tests fail to meet the specifications, obtain other sources of material, retest and resubmit until accepted by the Landscape Architect.

b. Soil testing will be at the expense of the Contractor.

2. Provide the following soil properties:
   a. Particle size analysis (% dry weight) and USDA soil texture analysis.
   b. USDA gradation of gravel, coarse sand, medium sand, fine sand, silt, and clay.
   c. pH and buffer pH.
   d. Percent organic content by oven dried weight.
   e. Nutrient levels by parts per million including: phosphorus, potassium, magnesium, manganese, iron, zinc, and calcium. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil.

1.6 QUALITY ASSURANCE

A. The installer shall be a firm having at least five years of experience in projects similar in scope and location (within Hardiness Zones 8a-9a) to that required for the Work. The installer of the Work in Section 32 9300 will be the same firm installing the Work in this section.
   1. There shall be an experienced full-time supervisor, who can communicate in English, on site during the installation of this Section's Work.

B. Soil testing laboratory shall be an independent laboratory, with experience and capability to conduct indicated testing and that specializes in USDA agricultural soil testing, soil mix testing, and other tests to be performed. Geotechnical engineering testing labs shall not be used.

C. Planting Soils shall conform to the approved submittal's sample color, texture and approved test analysis.
   1. The Landscape Architect may request samples of delivered or installed soil to be for testing to confirm Planting Soils' conformity to approved material.
   2. Testing shall be performed by the same soil testing laboratory that performed the original soil testing.
   3. Testing results shall be within 10% of values measured in approved Planting Soil Mixes.

D. Test soil compaction with a penetrometer following installation or modification of Planting Soil. Have a soil penetrometer and moisture meter on site at all times.

1.7 PRE-CONSTRUCTION MEETING

A. Schedule a pre-construction meeting with the Landscape Architect at least two weeks before beginning work to discuss the Work, administrative procedures during construction, and project schedule.

1.8 PERMITS AND REGULATIONS

A. Acquire all permits related to the Work. If a conflict exists between permit requirements and the work outlined in the contract documents, promptly notify the Landscape Architect in writing including a description of any necessary changes and the resulting changes to the contract price.

B. Adhere to all Federal, State, and local laws and ordinances bearing on the operation or conduct of the work as drawn and specified. This includes, but is not limited to all regulations relating to the inspection for disease and insect control.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not mix, deliver, place or grade soils when frozen or with moisture above field capacity.

B. Protect soil and soil stockpiles, including the stockpiles at the soil blender's yard, from wind, rain and washing that can erode soil or separate fines and coarse material, and contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage. Cover stockpiles with plastic sheeting or fabric at the end of each workday.

C. Coordinate bulk material delivery and storage with Landscape Architect and confine materials to neat piles in areas acceptable to Landscape Architect.

PART 2 PRODUCTS

2.1 COMPOST

A. Blended and ground leaf, wood and other plant-based material.
   1. Commercially prepared and meets the US Compost Council STA/TMECC criteria.
   2. Complies with the following parameters:
      a. pH: 5.5-8.0
      b. Soluble Salt Concentration: Maximum 10 dS/m.
      c. Moisture Content: 30 -60%
      d. Particle Size: 98% pass through ¾ inch screen or smaller.
      e. Stability: <8 mg CO2-C per g OM per day
      f. Maturity: Minimum 80%
      g. Physical Contaminants: < 1%
      h. Chemical Contaminants: Meet or exceed US EPA Class A standard, 40CFR § 503.13, Tables 1 and 3.
      i. Biological Contaminants: Meet or exceed US EPA Class A standard, 40CFR § 503.32(a) levels.

2.2 COARSE SAND

A. ASTM C-33 Fine Aggregate, with a Fines Modulus Index of 2.8 and 3.2
   1. Clean, sharp, natural coarse sands free of limestone, shale and slate particles with a pH lower than 7.0.
   2. Particle size distribution:

3/8 inch (9.5 mm)	100%
No 4 (4.75 mm)	95-100%
No 8 (3.36 mm)	80-100%
No 16 (1.18 mm)	50-85%
No 30 (0.60 mm)	25-60%
No 50 (0.30 mm)	10-30%
No 100 (0.15 mm)	2-10%
No 200 (0.75 mm)	2-5%

2.3 TOPSOIL

A. Fertile, friable, naturally occurring soil containing less than 5% total volume of the combination of subsoil, refuse, roots larger than 1 inch diameter, heavy clay, stones larger than 2 inches, noxious weeds and seeds, sticks, brush, litter, or any substance that is harmful to plant growth.
   1. Complies with the following criteria:
      a. Soil texture: USDA loam, sandy clay loam or sandy loam with clay content between 15% and 25%. Combined clay/silt content of no more than 55%.
      b. pH value shall be between 5.5 and 7.0
      c. Percent organic matter (OM): 5.0% - 10%, by dry weight.
      d. Soluble salt level: less than 2 mmho/cm.
      e. Soil chemistry suitable for growing the plants specified.
   2. Topsoil existing at the site may be acceptable if it meets the above citeria.

2.4 PLANTING SOIL MIXES

A. PLANTING SOIL MIX 1 - Moderately slow draining soil for trees and shrub beds.
   1. A mix of Imported Topsoil, Coarse Sand, and Compost. The approximate mix ratio shall be:

Imported Topsoil(unscreened)	45-50%
Coarse Sand	40-45%
Compost	10%

   2. *Mix component % by moist volume
   3. Final tested organic matter between 2.75%-4% by dry weight.
   4. Mix Coarse Sand and Compost first, then add Imported Topsoil. Mix with loader bucket, do not over mix. Do not use soil blending machine, do not screen the soil. Clumps of soil, Compost, and Coarse Sand will be permitted in overall mix.
   5. Add fertilizer according to rates recommended by the soil tests at time of final grading.

2.5 FERTILIZER

A. Fertilizer types and rates are determined upon the soil tests results. Recommended fertilizer shall be added to soil mixes prior to final screening and prior to delivery to project site.

2.6 LIME

A. ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
   1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36 mm) sieve and a minimum of 75 percent passing through No. 60 (0.25 mm) sieve.
   2. Form: Provide lime in form of finely ground dolomitic limestone.

PART 3 EXECUTION

3.1 SITE CONDITIONS:

A. Coordinate the Work of this Section with that of other trades.

B. Be aware of all surface and sub-surface conditions, including utilities, and notify the Landscape Architect, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.
   1. Notification of Local Utility Locator Service, 811, is required for all areas within project area: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the Local Utility Locator Service.

C. Prior to installation of Planting
   1. Confirm that surfaces receiving Planting Soils or modifications to existing soils are free of construction debris, refuse, compressible or biodegradable materials, stones and sticks larger than two inches in diameter, soil crusting films of silt or clay that hinders drainage into subsoils, and/or standing water. Remove unsuitable material from site.
   2. Confirm no adverse drainage conditions are present.
   3. Confirm that utility work has been completed as indicated in the Drawings.
   4. Confirm that Irrigation work, which is shown to be installed below prepared soil levels, has been completed.

D. Notify the Landscape Architect immediately of unsatisfactory conditions.

3.2 PLANTING SOIL INSTALLATION

A. Excavate to the proposed subgrade. Do not over excavate compacted subgrades of adjacent pavements or structures. Maintain a supporting 1:1 side slope of compacted subgrade material

along edges of all paving and structures where the bottom of paving or structure is above bottom elevation of excavated planting area.

1. Prior to installing Planting Soil, the Landscape Architect shall approve the condition of the subgrade, subgrade preparation, and subsurface drainage.
2. Slope subgrade elevations approximately parallel to finished grade elevations and/or towards the subsurface drain lines as indicated in the Drawings.
3. Landscape Contractor shall coordinate with General Contractor to verify that all finished grades are correct with proper topsoil and sod.

B. Equipment used to install or grade Planting Soils shall be wide tracked or balloon tire machines rated with a ground pressure of 4 psi or less. All grading and soil delivery equipment shall have buckets equipped with 6-inch teeth to scarify any soil that becomes compacted.

C. Scarify the subgrade material to a depth of 3-6 inches with the teeth of the back hoe, loader buckets, tiller or other suitable device.
   1. If area becomes overly compacted, loosen again prior to installing the Planting Soil.

D. Install Planting Soil in 12-18-inch lifts to required depths. Apply compacting forces to each lift as required to attain required compaction. Scarify the top of each lift 3-6 inches prior to adding another lift.

E. Phase work such that equipment does not have to operate over previously installed Planting Soil.

F. Where possible, place large trees first and fill Planting Soil around root ball.

G. The depths and grades shown on the drawings are the final grades after settlement and shrinkage of the compost material. Install Planting Soil at a higher level to anticipate the reduction of volume.

3.3 COMPACTION REQUIREMENTS FOR INSTALLED OR MODIFIED PLANTING SOIL

A. Soil compaction shall have a density between 75-250 psi as determined by a penetrometer at a soil moisture approximately midway between wilting point and field capacity.
   1. Existing Soil Modifications: compaction measured to depth of modification.
   2. Installed Planting Soil: compaction measured to depth of installation.

B. Maintain moisture conditions within the Planting Soil during installation or modification to allow for satisfactory compaction. Suspend operations if Planting Soil becomes too wet, apply water if the soil is overly dry.

C. Provide adequate equipment to achieve consistent and uniform compaction of the Planting Soils. Use the smallest equipment that can reasonably perform the task of spreading and compaction.

D. Do not pass motorized equipment over previously installed and compacted soil except as authorized below:
   1. Light weight equipment such as trenching machines or motorized wheel barrows.
   2. Follow the requirements of Over Compaction Reduction if work after the installation of the Planting Soil compacts the Planting Soil to levels greater than the above requirements.

3.4 OVER COMPACTION REDUCTION

A. Dig up and reinstall any soil that becomes compacted to a density greater than the specified density. This includes compaction caused by other subcontractors after the Planting Soil is installed and approved.

B. Roto tilling shall not be considered adequate to reduce over compaction at levels six inches or below finished grade.

3.5 FINE GRADING

A. The Landscape Architect shall approve all rough grading prior to the installation of Compost, fine grading, planting, and mulching.
   1. Rough grades should be held at 4-inches below finished grade to allow for topsoil and sod thickness.

B. Grade the finish surface of all planted areas to meet the grades indicated on the Drawings, allowing finished grades to remain higher (10-15% of soil modification depth) than the grades on the grading plan to anticipate settlement over first year.

C. Utilize hand equipment, small garden tractors with rakes, small garden tractors with buckets with teeth for fine grading to keep surface rough without further compaction. Do not use float bottom of loader bucket.

D. Provide for positive drainage from all areas toward inlets, drainage structures, and/or edge of planting beds. Adjust grades as directed to reflect actual constructed field conditions of pavements, walls, and inlet elevations. Notify the Landscape Architect if positive drainage is impossible to achieve.

E. Provide smooth, rounded transitions between slopes of different gradients and direction.

F. Fill all dips and remove any bumps in the overall plane of the slope.

3.6 CLEAN-UP

A. Keep site free of trash, pavements reasonably clean and work area in an orderly condition at end of each day. Remove trash and debris from site no less than once a week.

B. Protect adjacent walls, walks, and utilities from damage or staining by the soil.

C. Wash all soil from pavements and structures after installation is complete and as needed to prevent damage or staining.

D. Make all repairs to grades, ruts, and damage done to the Work.

E. Remove and dispose of excess soils.

3.7 PLANTING SOIL PROTECTION

A. Protect installed and/or modified Planting Soil from damage including contamination and over compaction due to other soil installation, planting operations, and operations by other contractors or trespassers.
   1. Repair or replace damage done by the Contractor to any part of the Work, existing features to remain on site, and features adjacent to the site at no expense to the Owner.

B. Provide temporary erosion control as needed to stop soil erosion until the site is stabilized with mulch, plantings, or turf.

3.8 SUBSTANTIAL COMPLETION ACCEPTANCE

A. The date of Substantial Completion of the Planting Soil is the same as the date of Substantial Completion for Section 32 9300 - Plants.

3.9 FINAL ACCEPTANCE

A. The date of Final Acceptance follows the same criteria as outlined in Section 32 9300 - Plants in addition to the following:
   1. Restore any soil settlement and or erosion areas to the grades shown on the drawings. Remove plants and mulch before adding soil and then restore planting. Do not add soil over the root balls of plants or on top of mulch.

END OF SECTION

SECTION 32 9300
PLANTS

PART 1 GENERAL

1.1 SUMMARY/SECTION INCLUDES

A. Tree, shrub, ornamental grass, perennial, and groundcover installation.

B. Post-planting fertilization.

C. Landscape bed edging and mulch.

D. Tree staking and guying.

E. Interim landscape management.

1.2 RELATED SECTIONS

A. 32 8400 - Irrigation Work

B. 32 9100 - Planting Soil and Preparations

1.3 REFERENCES

A. When the following referenced standards are in conflict with this specification, the requirements of this specification shall prevail.
   1. ANSI Z60.1 - *American Standard for Nursery Stock*, most current edition.
   2. ANSI A 300 - *Standard practices for Tree, Shrub and other Woody Plant Maintenance*, most current edition and parts.
   3. Reference the following documents for interpretation of plant names and descriptions. Botanical names take precedence over common names. Names not listed in the above standards shall comply with those most commonly used in the trade. Where the names or plant descriptions disagree between the several documents, the most current document shall prevail.
      a. *Manual of Woody Landscape Plants*; Michael Dirr; Stipes Publishing, Champaign, IL, most current edition.
      b. *Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada*, MacMillan Publishing Company, Inc., New York 1976 Edition.

1.4 SUBMITTALS

A. Submit Proof of Contractor Qualifications as specified in “Quality Assurance” article of this Section including a list of the five completed projects with project name, address, names of Architects and Owners, overall description of scope work, and contract value.

B. Submit list of plant materials and unit prices demonstrating source and availability within ten days of award of Contract.
   1. Include name and address of nurseries. Include quantities, botanical names, common names, and sizes of plant materials.
   2. Substitutions are not permitted unless proof is submitted to the Landscape Architect that the plant is unavailable as specified. Request for substitution shall be accompanied with a list of contacted nurseries and sources of potential substitutions that may be of a different size, habit, species and/or cultivar.

C. Deliver all certificates of inspection to the Landscape Architect.

D. Submit fertilizer manufacturer's product literature, instructions, and guaranteed analysis data.

1.5 QUALITY ASSURANCE

A. Hold an Alabama General Contractor's License for Classification S - Specialty Construction, Subclassification 4 - Landscaping. Firm experienced in the successful installation of a minimum of five projects within the last five years similar in scope, quality, contract value, and location (within Hardiness Zones 8a-9a) to that indicated for this project. Firm shall have sufficient manpower, equipment and financial resources to complete the Work of this Section.

B. Use adequate numbers of skilled workmen trained and experienced in the Work and familiar with requirements and methods needed for performance of the Work. Have a person knowledgeable in horticultural practices as an onsite superintendent at all times.

C. Observation of the Work:
   1. The Landscape Architect may observe the work at any time and shall be notified prior to the start of planting, at the completion of plant layout, and at the completion of the planting.
   2. The Landscape Architect shall be given the opportunity to tag and review trees in the field or nursery prior to digging. Provide written request to tag trees at least 3 months prior to date of install. If tagging is not undertaken by Landscape Architect, pictures of each tree may be requested to document tree quality prior to install.
   3. The Landscape Architect may review all plants for quality, character, form, and overall health. All plant material is subject to inspection and rejection at any time before, during, or after planting.
   4. Attach secure, durable, legible waterproof labels, stating correct botanical and common name to at least one plant of each plant variety.
   5. Approval is for visual qualities only and does not relieve the Contractor of his obligation to provide materials and workmanship in full compliance with the requirements of the Contract Documents.

D. Re-execute any work that fails to conform to the requirements of the contract and remedy defects due to faulty materials or workmanship upon written notice from the Landscape Architect, at the soonest possible time that can be coordinated with other work and seasonal weather demands.

1.6 PRE-CONSTRUCTION MEETING

A. Landscape Pre-Construction Meeting: Schedule a meeting with the Landscape Architect and ACCS Representative at least two weeks before beginning work to review any questions the Contractor may have regarding the work, administrative procedures during construction and project work schedule.

B. Sod Installation Pre-Construction Meeting: Schedule a meeting with the Landscape Architect and ACCS Representative when subgrade has been prepared for sod installation to review and approve subgrade.

1.7 SELECTION, OBSERVATION AND APPROVAL OF PLANTS

A. Purchase trees from the growing nursery. Do not use re-wholesale plant suppliers for trees unless the Contractor can certify that the required trees are not directly available from a growing nursery. Refer to Drawings for pre-approved nurseries.

B. Remove all rejected plants from the site within five days and provide acceptable replacement plants at no expense to the Owner.

1.8 DEFINITIONS

A. End of Warranty Final Acceptance: The date when the Landscape Architect accepts that the plants and Work in this section meet all the requirements of the warranty. It is intended that the materials and workmanship warranty for Planting, Planting Soil, and Irrigation work run concurrent with each other.

B. Healthy: Plants that are growing in a condition that expresses leaf size, crown density, color, and with annual growth rates typical of the species' and cultivar's horticultural description.

C. Plants or plant materials: Any living, vegetative organism listed in the Plant Schedule within the Drawings.

D. Planting Soil: Refer to Section 32 9100 Planting Soils and Preparation.

E. Root ball: The mass of roots including any soil or substrate that is shipped with the tree within the root ball package.

F. Root ball package. The material that surrounds the root ball during shipping. The root package may include the material in which the plant was grown, or new packaging placed around the root ball during shipping.

G. Substantial Completion Acceptance: The date at the end of the Planting, Planting Soil, and Irrigation installation where the Landscape Architect accepts that all work in these sections is complete and the Warranty period has begun. This date may be different than the date of substantial completion for the other sections of the project.

1.9 PERMITS AND REGULATIONS

A. Acquire all permits related to the Work. If a conflict exists between permit requirements and the work outlined in the contract documents, promptly notify the Landscape Architect in writing including a description of any necessary changes and the resulting changes to the contract price.

B. Adhere to all Federal, State, and local laws and ordinances bearing on the operation or conduct of the work as drawn and specified. This includes, but is not limited to, all regulations relating to the inspection for disease and insect control.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Provide necessary protective covering during transport and delivery.

B. Deliver packaged materials (non-plant materials) in manufacturer's original containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at the site.

C. Deliver plants after preparations for planting have been completed and approved, and plant immediately.

D. Deliver and store all materials in a manner that prevents loss, damage, deterioration, or contamination.

E. Store all materials in approved locations to prevent loss, damage, deterioration, or contamination.

1.11 PLANT WARRANTY

A. Plants are warrantied to meet all the requirements for plant quality at installation in this specification. Defective plants shall be defined as plants not meeting these requirements and will be replaced by the Contractor.

B. Plant Warranty Period shall begin on the date of Substantial Completion Acceptance and will continue for one year.

C. Plants determined to be defective during Plant Warranty Period shall be removed immediately upon notification by the Landscape Architect and replaced at no cost to the Owner, as soon as weather conditions permit and within the specified planting period.

D. Any work required by this specification or the Landscape Architect during the progress of the work, to correct plant defects including the removal of roots or branches, or planting plants that have been bare-rooted during installation to observe for and correct root defects will not be considered grounds to void any conditions of the warranty. In the event the Contractor decides that such remediation work may compromise future health of the plant, the plant in question shall be rejected and replaced with plants that do not contain defects that require remediation or correction.

E. The Contractor is exempt from replacing plants, after Substantial Completion Acceptance and during the Plant Warranty Period, that are removed by others, lost or damaged due to occupancy of project, lost or damaged by a third party, vandalism, or any natural disaster.

F. The Contractor is exempt from warrantying plants that are not irrigated, including trees that have watering bags on them.

1.12 SITE MAINTENANCE

A. Keep roads, paving, and structures adjacent to maintenance operations clean and free of obstructions, mud, and debris at all times.

B. Do not permi flushing of roads or disposal of dirt or debris into sewers or dainage ditches.

C. Control dust from maintenance operations.

PART 2 PRODUCTS

2.1 PLANTS: GENERAL

A. Provide plants of quantity, size, genus, species, and variety and/or cultivar as indicated in the Plant Schedule. Plants are to adhere to the recommendations outlined in ANSI Z60.1 and trees shall be sourced from nurseries listed in the Drawings.

B. Provide healthy stock, grown in a nursery or greenhouse and reasonably free of die-back, disease, insects, eggs, bores, and larvae. Plants are to have a root system, stem, and branch form that will not restrict normal growth, stability and health for the expected life of the plant.
   1. Plant quality above the soil line:
      a. Trees shall have one central leader unless specified as multi-trunk.
      b. Main branches are to be distributed along the central leader not clustered together. They shall form a balanced, proportional crown appropriate for the cultivar/species.
      c. The attachment of the largest branches (scaffold branches) shall be free of included bark.
      d. The tree trunk shall be free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, fungal fruiting bodies, wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or mechanical injury.
   2. Plant quality at or below the soil line:
      a. Roots shall be reasonably free of scrapes, broken or split wood, and free of injury from biotic agents.
      b. The root collar shall be within the upper two inches of the substrate/soil.
      c. The root system shall be reasonably free of stem girdling roots over the root collar or kinked roots from nursery production practices.

2.2 PLANTS: ROOT BALL PACKAGE OPTIONS

A. The following root ball packages are permitted for trees, shrubs, ornamental grasses, perennials, and groundcovers. Specific root ball packages shall be required where indicated in the Plant Schedule located in the Drawings. Root ball packaging is to conform to the standards of ANSI Z60.1 unless otherwise indicated.
   1. BALL AND BURLAPPED(B&B):
      a. B&B plants shall be field grown, and the root ball packaged in a burlap and twine and/or burlap and wire basket package.
      b. Twine and burlap used for wrapping the root ball packages shall be natural, biodegradable material.
   2. CONTAINER PLANTS (BOXES AND PLASTIC POTS):
      a. Container plants may be permitted for trees only when indicated in the Plant Schedule, in this specification, or as approved in writing by the Landscape Architect.
      b. Plants shall be established and well rooted in removable containers.

2.3 PLANTS: SOLID SOD

A. Obtain solid sod from sources having growing conditions similar to the area to be planted. Sod is to be:
   1. True to name and type of species indicated in the Plant Schedule and contains no other grasses.
   2. Sod shall be 100 percent of the type specified and shall contain no other grasses.
   3. Well cultivated and weed, disease and insect-free, of good texture, and free from extraneous roots, stones and other foreign material. The presence of weeds shall be cause for rejection and replacement prior to Substantial Completion, or during the Guarantee Period.
   4. Sod shall be supplied in 42" big rolls (preferably) or 2.5 feet wide minimum, except as required by site conditions.
   5. Sod shall be machine cut with uniform minimum soil thickness of 5/8-inch plus thickness of top growth and thatch. Farm maintained and mowed per specs.
   6. Contractor shall lay sod within 24-hours of harvesting. Contractor shall not lay sod if dormant or if ground is frozen or muddy.
   7. Sod shall be sourced from approved turf farms listed in the Drawings.

2.4 SOIL AND SOIL AMENDMENTS

A. Refer to Section 32 9100 - Planting Soils and Preparation for soil types and definitions.

2.5 POST PLANTING AMENDMENTS

A. Slow Release Fertilizer Tablets
   1. Manufacturers
      a. 20-10-5 Planting Tablets
         A.M. Leonard, Inc.
         PO Box 816
         Piqua, OH 45356
         937.773.2694
      b. Approved equal.

2.6 MULCH

A. All mulch types to be free from leaves, twigs, insects, grasses, weeds, plants and their seeds, other foreign materials and any substances harmful to plant growth. Types include:
   1. Pine straw - Longleaf Pine (P. palustris) needles.

a. Unless otherwise indicated, use on slopes greater than 3:1
2. Shredded Pine Bark.

B. Owner to select final mulch types.

2.7 TREE STAKING AND GUYING MATERIAL

A. Manufacturers:
1. Tree staking & guying to utilize the ArborBrace Tree Guying System (www.treestaking.com):
a. Trees up to 4 inch caliper: ATG-R/ATG-HD
b. ¾-inch polypropylene guy lines, olive drab in color.
c. Nickel plated spring cam-lock tension clips.
d. Arrowhead Anchors(4-inch by 3-3/4-inch)
e. Trees 4 - 7-inch caliper: ATG-J
f. 1 inch polypropylene guy lines, olive drab in color.
g. Nickel plated spring cam-lock tension clip(1500 lb breaking strength)
h. Arrowhead Anchors(5-1/2-inch by 4-1/2-inch)
2. Approved equal.

PART 3 EXECUTION

3.1 SITE CONDITIONS

A. Coordinate the Work of this section with that of other trades.

B. Be aware of all surface and sub-surface conditions, including utilities, and notify the Landscape Architect, in writing, of any circumstances that would negatively impact the health of plantings. Do not proceed with work until unsatisfactory conditions have been corrected.
1. Notification of Local Utility Locator Service, 811, is required for all areas within project area: The Contractor is responsible for knowing the location and avoiding utilities that are not covered by the Local Utility Locator Service.

C. Section 32 9100 - Planting Soils and Preparation and Section 32 8000 - Irrigation work to be completed and accepted prior to the installation of any plants.

D. Perform planting during those periods when weather and soil conditions are suitable for planting in accordance with locally accepted horticultural practices and as approved by the Landscape Architect.
1. Do not install plants into saturated or frozen soils. Do not install plants during inclement weather, such as rain or snow or during extremely hot, dry, cold or windy conditions.

3.2 SOIL PROTECTION DURING PLANT DELIVERY AND INSTALLATION

A. Protect soil from compaction during the delivery of plants to the planting locations, the digging of planting holes, and the installing of plants.
1. Where possible deliver and plant trees that require the use of heavy mechanized equipment prior to final soil preparation and tilling.
2. Till to a depth of 6 inches, all soil that has been driven over during the installation of plants.

3.3 LAYOUT AND PLANTING SEQUENCE

A. Notify the Landscape Architect one week prior to layout. Layout all individual tree and shrub locations. Place plants above surface at planting location or place a labeled stake at planting location. Layout bed lines with paint. Adjust plant layout as directed by the Landscape Architect.

B. Do not begin planting installation until given approval by the Landscape Architect.

C. When applicable, plant trees before other plants are installed.

3.4 PLANTS: GENERAL INSTALLATION

A. No more plants shall be distributed about the planting bed area than can be planted and watered on the same day.

B. Excavate the Planting Soil as indicated in the Landscape Details.
   1. For trees and shrubs planted in soil areas that are NOT tilled or otherwise modified to a depth of at least 12 inches over a distance of more than 10 feet radius from each tree, or 5 feet radius from each shrub, the soil around the root ball shall be loosened as defined below.
      a. The area of loosening shall be a minimum of 3 times the diameter of the root ball at the surface sloping to 2 times the diameter of the root ball at the depth of the root ball.
      b. Loosening is defined as digging into the soil and turning the soil to reduce the compaction. The soil does not have to be removed from the hole, just dug, lifted and turned. Lifting and turning may be accomplished with a tracked mini excavator, or hand shovels.
      c. Remove extraneous matter 1-2-inch or larger in any dimension from top 4-inches of placed topsoil.
   2. If an auger is used to dig the initial planting hole, the soil around the auger hole shall be loosened as defined above for trees and shrubs planted in soil areas that are NOT tilled or otherwise modified.
   3. The measuring point for root ball depth shall be the average height of the outer edge of the root ball after any required root ball modification.
   4. Uniformly grade areas including adjacent transistion areas to line and grade +/- 1/2-inch or as directed by Landscape Architect.

C. Set top outer edge of the root ball at the average elevation of the proposed finish unless otherwise indicated in the Planting Details. Set the plant plumb and upright in the center of the planting hole. The tree graft, if applicable, shall be visible above the grade. Do not place soil on top of the root ball.

D. The Landscape Architect may request that a plant's orientation be rotated when planted based on the form of the plant.

E. Brace root ball by tamping soil around the lower portion of the root ball. Place additional soil around base and sides in six-inch lifts. Lightly tamp each lift using foot pressure or hand tools to settle backfill, support the tree and eliminate voids. Do not over compact the backfill or use mechanical or pneumatic tamping equipment.
   1. When the planting hole has been backfilled to three quarters of its depth, water shall be poured around the root ball and allowed to soak into the soil to settle the soil. Do not flood the planting space. If the soil is above field capacity, allow the soil to drain to below field capacity before finishing the planting. Air pockets shall be eliminated and backfill continued until the planting soil is brought to grade level.
   2. When backfilled to within 6-8 inches of finished grade, install slow-release planting tablets as directed by the manufacturer's directions.

F. All trees to recieve (2) total slow release fertilizer tablets (1 on opposite sides), just outside the root ball within the tree hole, buried 3-inches below grade.

G. Thoroughly water the root ball and planting pit immediately after planting.

H. Remove all nursery plant identification tags, ribbons, ties, and trunk protection after planting is accept as described in Quality Assurance of this specification section.

I. Prune plants only as directed by the Landscape Architect.

3.5 PLANTS: ROOT BALL PACKAGES AND ADDITIONAL REQUIREMENTS

A. The following are additional planting requirements for the previously specified root ball packaging types and are to be followed during the planting process in addition to the above Plants: General Installation.

B. BALLED AND BURLAPPED PLANTS
   1. Remove all webbing, twine, and burlap from the top of the root ball after the root ball has been backfilled. Do not fold burlap down into the planting soil.
   2. Remove the top 6-8 inches of the wire baskets prior to the final backfilling of the tree.

C. CONTAINER PLANTS
   1. Shave and scarify the root ball after removing the container.
   2. Remove all substrate at the bottom of the root ball that does not contain roots.

3.6 PLANTS: SOLID SOD

A. Preparation of Sod Bed:
   1. Spread and scarify amended topsoil as specified.
   2. Rake and otherwise manipulate to form smooth-draining grades, remove all stones and clay lumps 1-inch in diameter or larger.
   3. Leave the surface of the topsoil 1-1/2-inches below finished grade.Lay sod within 24 hours of harvesting. Contractor shall not lay sod if dormant or if ground is frozen or muddy.
   4. So not move heavy objects over areas to be sodded after the soild has been prepared. Planting in compacted areas will not be permitted.
   5. The finished of the areas to be sodded shall be approved by the Landscape Architect prior to sod placement.

B. Sod Placement:Lay sod within 24 hours of harvesting. Contractor shall not lay sod if dormant or if ground is frozen or muddy.
   1. Lay sod within 24 hours of harvesting. Contractor shall not lay sod if dormant or if ground is frozen or muddy.
   2. Immediately upon approval of bed preparation, lay sod smoothly, edge-to-edge, with staggered joints.
   3. Press firmly into contact with sod bed by tamping or rolling by approved means to eliminate all air pockets, providing a true and even surface, and assuring knitting.
   4. Fill cracks between sod blocks with strips of living sod, topsoil, or humus.
   5. Water thoroughly by use of sprinkler or spray, without erosive force.
   6. Roll sod with approved 72" turf roller in a minimum of three directions.

3.7 STAKING AND GUYING

A. Do not stake or guy trees unless specifically required by the Contract Documents, or in the event that the Contractor feels that staking is the only alternative way to keep particular trees plumb.
   1. The Landscape Architect has the authority to require trees are staked or to reject staking as an alternative way to stabilize the tree.

B. Remove guy lines after one full growing season or at other times as required by the Landscape Architect.

C. Utilize the tree staking and guying materials specified. Tie in such a manner as to prevent girdling. Refer to Planting Details for installation.

3.8 STRAIGHTENING PLANTS

A. Maintain all plants in a plumb position throughout warranty period. Straighten all trees that move out of plumb including those not staked. Plants to be straightened shall be excavated and the root ball moved to a plumb position, and then re-backfilled.

B. Do not straighten plants by pulling the trunk with guys.

3.9 INSTALLATION OF FERTILIZER AND OTHER CHEMICAL ADDITIVES

A. Do not apply any soluble fertilizer to plants during the first year after transplanting unless soil test determines that fertilizer or other chemical additives is required. Apply chemical additives only upon the approval of the Landscape Architect.

B. Apply control released fertilizers according to manufacturer's instructions and standard horticultural practices.

3.10 PLANTING BED FINISHING

A. Smooth out grades between plants after planting and before mulching.

B. Separate the edges of planting beds and lawn areas with a smooth, formed edge cut into the turf with the bed mulch level slightly lower than the adjacent turf/sod or as directed by the Landscape Architect.

C. Install metal edging as indicated in the Drawings.

3.11 MULCHING OF PLANTS

A. Apply mulch to the depth indicated in the Planting Details, covering the entire planting bed area unless otherwise directed. Install no more than 1 inch of mulch over the top of root balls. Taper mulch depth down to 2 inches when abutting pavement.

B. For trees planted in lawn areas, the mulch shall extend to a 4-foot radius around the tree or to the extent indicated on the plans.

C. Lift all leaves, low hanging stems, and other green portions of small plants out of mulch if covered.

3.12 WATERING

A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Substantial Completion Acceptance. The Contractor shall adjust the automatic irrigation system, if available, and apply additional water, or adjust for less, using hoses as required.

B. Hand water root balls of all plants immediately after planting to assure that the root balls have moisture above wilt point and below field capacity.

C. The Contractor shall install and maintain self-filling slow release watering bag/mats for each un-irrigated tree for the duration of the warranty period. Filling the bags with water shall be the responsibilty of the ower after Substantial Completion acceptance.
   1. Slow Release Water Bag/Mat: Install water bag/mat in areas indicated on plan where no irrigation is installed. Place water bag/mat at trees according to manufacturer's recommendation. Coordinate work with Owner. Watering bags shall remain the property of the Owner at the completion of the Work.
      a. Acceptable Manufacturer and Product:
         1) TreeDiaper 36 by Zynnovation, LLC or approved equal.

Zynnovation LLC
9424 Atlee Commerce Boulevard, Suite e
Ashland, VA 23005
540-300-1465
info@treediaper.com

3.13 PROTECTION DURING CONSTRUCTION

A. Protect planting and related work and other site work from damage due to planting operations, operations by other Contractors or trespassers. Maintain protection during installation until Substantial Completion Acceptance. Treat, repair or replace damaged work immediately.

B. Damage done by the Contractor, or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain, including those on adjacent property, shall be cleaned, repaired, or replaced by the Contractor at no expense to the Owner. The Landscape Architect shall determine when such cleaning, repair, or replacement is satisfactory.

3.14 CLEAN UP

A. Keep site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.
   1. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.

B. Wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site.
   1. Tags mentioned in Quality Assurance Article of this Section are to remain until End of Warranty and Final Acceptance.

C. Make all repairs to grades, ruts, and damage by the plant installer to the work or other work at the site.

D. Remove and dispose of all excess planting soil, subsoil, mulch, plants, packaging, and other material brought to the site by the Contractor.

3.15 INTERIM PLANT MANAGEMENT

A. Maintain all plants and planted areas during the project work period and prior to Substantial Completion Acceptance.
   1. Maintenance during the period prior to Substantial Completion Acceptance shall consist of pruning, watering, cultivating, weeding, mulching, removal of dead plant material, repairing/replacing/tightening of tree guying materials, resetting plants to proper grades and upright position, and furnishing and applying such sprays as are necessary to keep plantings reasonably free of damaging insects and disease, and in healthy condition. The threshold for applying insecticides and herbicides shall follow established Integrated Pest Management (IPM) procedures. Mulched areas shall be kept reasonably free of weeds and grass.

3.16 SUBSTANTIAL COMPLETION ACCEPTANCE

A. Upon written notice from the Contractor, the Landscape Architect shall review the work and decide if the work is substantially complete.
   1. Notify the Landscape Architect at least 7 days prior to the requested review date.
   2. The Landscape Architect may develop a “punch list” that describes the work to be completed or amended before Substantial Completion is granted. After the Contractor has

completed the items on the punch-list, the Contractor may request another review by the Landscape Architect.

B. The date of Substantial Completion of the planting shall be the date when the Landscape Architect accepts that all work in the following sections are complete:
   1. 32 8000 - Irrigation
   2. 32 9100 - Planting Preparation & Soils
   3. 32 9300 - Planting

C. The Plant Warranty Period begins at the date of written notification of Substantial Completion from the Landscape Architect. The date of Substantially Completion for the Sections listed above may be different than the date of Substantial Completion for the other Sections of the Work.

3.17 END OF WARRANTY & FINAL ACCEPTANCE

A. Contractor is responsible for contacting the Landscape Architect at the end of the Plant Warranty Period to schedule final inspection. Should the contractor fail to contact the Landscape Architect, the Plant Warranty Period is automatically extended until he/she does so.

B. At the end of the Plant Warranty Period, submit request for inspection for Final Acceptance to Landscape Architect at least one week prior to anticipated date of inspection; include list of Work substantially accepted and list of Work replaced during Warranty Period.

C. Upon request for inspection, jointly review with Landscape Architect all guaranteed Work for Final Acceptance.

D. Remove tree guying apparatus and saucers from all trees, unless otherwise directed; replace mulch to specified thickness.

E. Upon completion by the Contractor of all required repairs and replacements, the Landscape Architect will confirm the date of Final Acceptance of the Work.

END OF SECTION

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Appendix A

Hazardous Materials Survey

Enterprise State Community College –Lolley Gym

600 Plaza Drive

Enterprise, AL 36330



Submitted to:
Alabama Community College Systems (ACCS)
135 South Union Street
Montgomery, Alabama 36130

Attention: Mr. Mark Salmon

Prepared by:
Goodwyn Mills Cawood, LLC.
2400 5th Avenue South, Suite 200
Birmingham, Alabama 35233

GMC Project No.: EBHM250042

January 13, 2026

Goodwyn Mills Cawood

2400 5th Avenue South
Suite 200
Birmingham, AL 35233

T (205) 879-4462

www.gmcnetwork.com

January 13, 2026

Alabama Community College Systems
1350 South Union Street
Montgomery, AL 36130

Attention: Mr. Mark Salmon

RE: Hazardous Materials Survey
Enterprise State Community College – Lolley Gym
600 Plaza Drive
Enterprise, Coffee County, Alabama 36330
GMC Project No.: EBHM250042

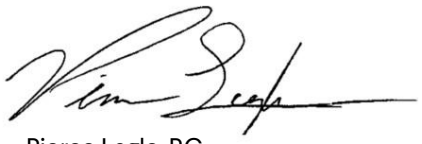
Mr. Salmon:

Goodwyn Mills Cawood, LLC (GMC) Environmental Department has prepared the attached Hazardous Materials Survey at the request of Alabama Community College Systems (ACCS) for the Enterprise State Community College – Lolley Gym.

We appreciate the opportunity to work with ACCS on this project. If there are any questions. Please contact GMC at 205-879-4462.

Sincerely,

Goodwyn Mills Cawood, LLC.



Pierce Lagle, P.G.

Geologist/Certified Asbestos Inspector

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Figure 3 ACM First Floor Sample Location
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Appendix A Analytical Results and Chain of Custody
Appendix B Photo Pages
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1.0 Project Characteristics

1.1 Property Details

The Subject Building is located at 600 Plaza Drive in Enterprise, Alabama. The Subject Building, referred to as Enterprise State Community College – Lolley Gym. Approximately 30,000 square feet of the gym building were surveyed. The only exclusion was the actual gym floor area indicated in red hatching on Figure 2. Figure 1 shows the building location. Figure 2 depicts the property layout. Additionally, sample locations are included on Figures 3-5.

1.2 Purpose

This survey was conducted for the sole purpose of identifying suspect materials prior to renovation activities at the Subject Building. Suspect materials are considered those that may contain asbestos and other regulated materials (ORM), such as fluorescent lighting ballasts, HVAC systems gases, mercury containing thermostats, etc. This survey is for informational purposes and an asbestos specification will be created in conjunction with this report.

1.3 Scope of Work

GMC has provided the following services as a part of this survey:

- Conducted a visual inspection of the Subject Building to document and identify any readily apparent and suspect asbestos-containing materials (ACMs), Lead Containing Paints (LCPs) and any other regulated material (ORMs).
- Collected physical samples of the suspect ACMs and LCPs, then provide a description of the materials in the building.
    - Field ID numbers for ACM samples were assigned based on homogeneous area (**HA4**), and sample of homogeneous area (**-1**). Therefore, an example sample number would be HA1-1, indicating that this sample collected is the 1st sample of the 4th homogenous area of this project
    - Field ID numbers for LCP samples were assigned based on homogeneous area (**PA4**), and sample of homogeneous area (**-1**). Therefore, an example sample number would be HA1-1, indicating that this sample collected is the 1st sample of the 4th homogenous area of paint for this project
    - Acronyms used: HA (Homogeneous Area), PA (Paint)
- Transported the samples taken from the buildings to be analyzed for asbestos content by Polarized Light Microscopy (PLM) and dispersion staining techniques in accordance with the Environmental Protection Agency's (EPA) Bulk Analysis Method 600/R-93/116.
- Sample collection was limited to items located within the building envelope due to the current renovation schedule. If any items associated with the building envelope are included in the renovation schedule in the future, those suspect materials shall be sampled at that time for an additional fee.

- Conducted a visual inspection of the Subject Building to document and identify any readily apparent and suspect asbestos-containing materials (ACMs), Lead Containing Paints (LCPs), and any other regulated material (ORMs).

- Reporting:
  - The confirmation of the presence of ACMs, LCPs and ORMs
  - Sample diagrams showing the locations of positive ACM sampled materials are included in Figures 3-5
  - Photographs showing the identified ACMs and LCPs
  - Options and recommendations for the remediation of existing ACMs and LCPs
  - Credentials for the sampling inspector

1.4 Sampling Methodologies

On October 10th and November 17th, 2025, qualified personnel conducted a visual inspection at the Subject Building to identify suspect ACMs LCPs, and ORMs. Suspect materials observed were sampled by carefully extracting representative sections, with each sample assigned a unique identification number to track its type and origin. These bulk samples were securely placed in appropriate storage containers and transported to a laboratory accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) for analysis, ensuring compliance with applicable federal and state regulations.

2.0 Limitations and Liabilities

2.1 Limitations of the Assessment

This report presents findings and observations by qualified personnel from a limited asbestos and hazardous materials sampling event conducted at the Subject Building on October 10th and November 17th, 2025. The assessment targeted specific, accessible homogeneous areas—defined by uniformity in material type, structure, appearance, color, texture, and approximate date of construction or application—to identify potential ACMs, LCPs, and ORMs.

The findings reflect conditions observed at the time of the inspection. Hidden or inaccessible materials, such as those behind walls, above ceilings, or within sealed systems, were not evaluated. Changes in property use, condition, or modifications may render the information outdated. Users are responsible for ensuring that any newly discovered materials are assessed by qualified professionals prior to disturbance to comply with federal, state, and local regulations, including those of the U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA). This report must be reviewed in its entirety, as excerpts may not accurately represent the overall findings.

2.2 Disclaimer of Liability

GMC has exercised due diligence to ensure the accuracy of the data presented, based on conditions observed during the October 10th and November 17th, 2025, inspections. However, GMC, its representatives, employees, and agents disclaim liability for any errors, omissions, or inaccuracies in the report, whether due to oversight, limited access, or other factors beyond our control. This report does not constitute legal, medical, or professional advice, and users should consult appropriately licensed professionals for such guidance.

No warranties, express or implied, including but not limited to merchantability or fitness for a particular purpose, are provided with respect to the data. GMC assumes no responsibility for the use, interpretation, or application of the information by clients, their employees, contractors, or other parties. GMC makes no representations regarding past conditions, future occurrences, or changes to the property that may affect the validity of the findings.

2.3 Liability Limitations

GMC shall not be liable for any special, consequential, incidental, or exemplary damage resulting from the use or misuse of this report or its findings. Users are solely responsible for ensuring compliance with all applicable regulations, including those enforced by the EPA, OSHA, and the U.S. Department of Transportation (USDOT), when managing, handling, or abating ACM, LCPs or other hazardous materials. All such activities must be performed by properly qualified professionals in accordance with federal, state, and local regulations, including those set forth by the EPA and OSHA in order to minimize health and safety risks.

3.0 Asbestos-Containing Materials

This report details the methodology, findings, and recommendations from a limited asbestos assessment and sampling process conducted at the Subject Building. The evaluation was performed by qualified personnel in accordance with federal, state, and local regulations, including those set forth by the EPA and OSHA. The purpose of this assessment was to identify and analyze suspect ACMs and LCPs to ensure safe management and compliance with regulatory standards. All activities were designed to minimize health risks associated with potential asbestos exposure.

3.1 Regulatory

GMC carried out this assessment with the assumption that the Subject Building on the property will be renovated. Current regulations mandate that asbestos-containing materials (ACM) must be removed before any activities that might damage or disturb them, such as demolition or renovation. When working with in-place asbestos, it is crucial to comply with OSHA asbestos regulations (29 CFR 1910 and 1926) and the National Emission Standards for Hazardous Air Pollutants (NESHAPs) regulations (40 CFR Part 61, Subpart M).

NESHAPs (40 CFR Part M, amended November 20, 1990) governs the removal and disposal of ACM, classifying it into three categories based on the material's friability and physical condition:

- Category I non-friable: ACM that includes items such as gaskets, valve packings, resilient vinyl floor coverings (e.g., floor tiles and linoleum), and asphalt roofing material with over one (1) percent asbestos by volume.
- Category II non-friable: ACM that includes any other non-friable material with more than one (1) percent asbestos by volume, such as asbestos-cement board (transite).
- Regulated ACM (RACM):
    - Friable ACM
    - Category I non-friable ACM that has become friable.
    - Category I non-friable ACM subjected to sanding, grinding, cutting, or abrading.
    - Category II non-friable ACM with a high probability of becoming friable or being rendered friable by expected activities.

According to EPA regulations, RACMs must be abated by a licensed contractor before any activities that will disturb these materials, such as renovation or demolition, take place.

3.2 Sampling and Friability Assessment

3.2.1 Determination of Homogeneous Sampling Areas

Prior to sample collection, specific sampling sites and distinct homogeneous sampling areas were identified. A homogeneous sampling area is defined as a region with uniform material characteristics, including type, structure, appearance, color, texture, and approximate date of construction or application. These areas were categorized into three types:

- Surfacing Materials: Applied coatings, such as sprayed-on or troweled-on materials.
- Thermal System Insulation: Materials insulating pipes, boilers, or other thermal systems.
- Miscellaneous Materials: Other materials, such as floor tiles, ceiling tiles, or gaskets.

This classification ensured that sampling was representative and aligned with EPA and OSHA guidelines. Samples were collected systematically from each identified homogeneous material by trained professionals, minimizing disturbance to reduce the potential for asbestos fiber release.

3.2.2 Homogeneous Areas

An ACM homogeneous area is defined as a region within a facility where asbestos-containing materials (ACM) consist of the same material, were installed at the same time, and are in similar condition, enabling uniform assessment and management.

Each suspect ACM was evaluated for condition and friability. Friability is defined as the material's ability to be crumbled, pulverized, or reduced to powder by hand pressure when dry. Friability is a critical factor in assessing the hazard potential of ACM. Non-friable materials may be reclassified as friable if damaged, deteriorated, or disturbed, increasing the risk of releasing airborne asbestos fibers. The EPA and OSHA consider friable ACM more hazardous due to its propensity to release fibers, which may pose health risks if inhaled. The condition of each sampled material was documented to evaluate its potential for fiber release under normal conditions.

3.2.3 Scope and Limitations

The assessment was limited to readily accessible materials within the designated project area. Hidden or inaccessible materials, such as those behind walls, above ceilings, or within sealed systems, were not sampled during this event. It is strongly recommended that any such materials uncovered during future renovation, demolition, or maintenance activities be evaluated by a qualified professional prior to disturbance to ensure compliance and safety. Materials visually identified as non-asbestos (e.g., fiberglass, foam rubber, wood) were excluded from sampling per standard industry practices.

3.3 Laboratory Analysis

All bulk suspect ACM samples were analyzed by a qualified laboratory using Polarized Light Microscopy (PLM) with dispersion staining techniques, as specified in the EPA's Bulk Analysis Method (EPA 600/R-93/116). This process involves mounting a portion of each sample onto a slide with specific refractive index oil and conducting optical tests to identify and quantify asbestos content. For multi-layered samples, each layer was analyzed separately to ensure accurate results.

Materials containing more than 1% asbestos and classified as friable or likely to become friable due to anticipated forces are designated as Regulated Asbestos-Containing Material (RACM) by the EPA. OSHA, however, classifies any material containing asbestos, regardless of percentage, as ACM. All identified ACM must be managed in compliance with EPA, OSHA, U.S. Department of Transportation (USDOT), and other applicable regulations.

3.4 Sampling Results

A total of one hundred and sixty-five (165) sample layers were analyzed from ninety-two (92) asbestos samples were collected from the Subject Building. The results are detailed in the Asbestos Sampling

Results Tables (Tables), which includes sample number, location, material type, asbestos content, friability, and condition. The attached Figures 2-5 show floor diagrams and positive ACM sample location and photographs of positive sample materials are provided in Appendix B. Full Laboratory Analytical Results reports are included in Appendix A. Multi-layered samples were separated and analyzed individually by the laboratory.

According to the analytical results, five (5) of the homogeneous area sampled were identified as containing ACM as they did meet the EPA's criteria of containing more than 1% asbestos. Below are the homogenous areas that were identified to contain ACM:

- A white pipe run and elbow insulation (HA3 and HA4) where an associated white wrap containing between 2% and 3% Chrysotile asbestos was identified on interior water lines running to radiators throughout the subject building. Photo P-3 and P-4 depicts the material.

- A 4" black basecove with brown to tan mastic (HA18) where an associated joint compound like material containing 2% Chrysotile asbestos was identified. The laboratory analysis reported the layer as a joint compound, however, the room in which the sample was collected was constructed with Concrete Masonry Units (CMUs) and not drywall. Nevertheless, the laboratory analysis identified ACM within the homogenous area. Photo P-2 depicts the material.

- A white pipe run and elbow insulation (HA21) where an associated black mastic wrap containing between 5% and 7% Chrysotile asbestos was identified on interior hot water return and supply along with cold water return and supply lines throughout the main floor of the gym. Photo P-1 depicts the material.

- A white pipe joint insulation (HA24) where the joint material containing 3% Chrysotile asbestos was identified on interior hot water return and supply along with cold water return and supply lines throughout the main floor of the gym. The ACM joints were identified on lines that also contain the black ACM wrap from HA-21. Not all ACM joints within HA24 had black mastic wrap, the black mastic wrap should not be used as indicator to which joints are positive. Photo P-5 depicts the material.

The detailed text descriptions above should be reviewed in conjunction with the sample results tables, photo pages, and figures provided in this report. Relying solely on the table may lead to incomplete understanding of the sampled materials. The condition of the materials was assessed at the time of sampling, and changes in condition may alter their friability and associated risks.

4.0 Lead Containing Paints

4.1 Regulatory

Lead containing paint in commercial properties must be managed in accordance with applicable federal and Alabama state regulations, tailored to the specific circumstances of the management approach, whether removal, encapsulation, or abatement. All activities, including sampling, removal, or covering of lead-containing paint, should be performed by certified professionals set by the state of Alabama and EPA. OSHA's Lead Standard for the Construction Industry (29 CFR 1926.62) mandates safe work practices to minimize worker exposure during these activities. Compliance with these standards ensures the protection of workers, occupants, and the environment while addressing lead hazards effectively.

4.2 Sampling Methodology

On October 10th and November 17th, 2025, paint chip sampling for lead-containing paint was conducted at the Subject Building by qualified personnel. The sampling targeted key architectural elements, such as doors frames, flooring, and railings, which may be disturbed during interior demolition. The focus was on homogeneous areas defined by uniform color, texture, and application history. Paint chips were carefully collected from representative surfaces using destructive methods. Each sample was properly labeled, documented, and submitted to an accredited laboratory for analysis using EPA Method SW846 3050B/7000B (Acid Digestion of Sediments, Sludges, and Soils/Flame Atomic Absorption Spectrophotometry). This targeted approach ensured accurate identification of lead-containing paint while adhering to safety protocols to mitigate health risks.

4.3 Sampling Results

During the visual inspection conducted at the Subject Building on October 10th and November 17th, 2025, GMC observed several painted surfaces. These included doors frames, flooring, and railings.

Nine (9) paint samples were taken within the building. The sampling results revealed that lead containing paint exists on the exterior stair railing outside of the subject building and on all interior doorways excluding those associated within the natatorium. Photos P-6 through P-8 depict these materials.

5.0 Other Regulatory Materials

5.1 Overview of Assessment

During the site reconnaissance conducted on October 10th and November 17th, 2025, GMC identified several potential ORMs that may require management prior to renovation activities at the Subject Building. This assessment, performed by qualified personnel, focused on readily observable materials and is not intended to be a comprehensive inventory of all ORMs present. The following subsections outline the identified ORM, their potential hazards, and general management considerations to ensure compliance with applicable federal, state, and local regulations, including those established by the EPA and OSHA. Any materials not observed during this assessment but discovered after this survey which includes during renovation must be evaluated and managed by qualified professionals to mitigate health and safety risks.

5.2 Fluorescent Lighting and Associated Hazards

Fluorescent lighting fixtures, including bulbs and ballasts, were noted as potential sources of regulated materials. Fluorescent bulbs may contain mercury, a hazardous substance, while ballasts may contain polychlorinated biphenyls (PCBs). Although GMC did not assess specific light fixtures during the reconnaissance, all fluorescent bulbs and ballasts should be evaluated on a case-by-case basis prior to disturbance. Ballasts labeled as "No PCBs" and those potentially containing PCBs must be handled, segregated, and disposed of in accordance with EPA and state of Alabama regulations at an appropriate facility. Similarly, mercury-containing bulbs require proper packaging, recycling, or disposal at a licensed facility to prevent environmental contamination and comply with regulatory requirements.

5.3 HVAC Units and Compressed Gases

Centralized heating, ventilation, and air conditioning (HVAC) units servicing common areas, such as corridors, restrooms, and classrooms, were observed during the site reconnaissance. These units are likely to contain compressed gases, such as refrigerants (e.g., Freon), which are regulated under EPA guidelines. Prior to renovation or demolition activities, all HVAC units should be inspected by qualified professionals to confirm the presence of compressed gases. If present, these gases must be recovered, recycled, or disposed of in compliance with federal and state regulations to prevent environmental release and ensure worker safety.

5.4 Mercury-Containing Thermostats

No mercury-containing thermostats were observed during the site reconnaissance. However, if such thermostats are discovered during renovation activities, the mercury components must be carefully removed intact, segregated, and disposed of at a licensed facility in accordance with EPA and state of Alabama regulations. Proper handling by trained professionals is essential to minimize the risk of mercury exposure and ensure regulatory compliance.

5.5 Electrical Transformers

PCBs in electrical transformers pose significant environmental and health risks. Transformers identified within the subject structure should be treated as PCB-containing unless verified otherwise through testing or documentation confirming non-PCB status. During demolition, improper handling of PCB-containing transformers could lead to leaks, spills, or airborne contamination, endangering workers, nearby communities, and the environment. To mitigate these hazards, all transformers

should be assessed prior to demolition. If non-PCB status cannot be confirmed, transformers should be managed as hazardous materials, handled by trained personnel, and disposed of in accordance with regulatory requirements at authorized hazardous waste facilities to prevent environmental contamination and ensure safety.

6.0 Conclusions

GMC understands that renovation is scheduled for the structure located at the Subject Building. This assessment revealed the presence of ACMs, LCPs and the potential for other regulated materials at the Subject Building. The following recommendations are based on the findings of this assessment.

Asbestos Containing Materials:

To ensure safety and regulatory compliance, the following recommendations are provided:

- Future Discoveries: Any previously unidentified or newly identified suspect materials discovered after this survey or during demolition, renovation, and maintenance activities must be tested for asbestos by a qualified professional prior to disturbance to prevent fiber release and ensure regulatory compliance.
- Management of ACM: Based on the sampling results, any materials identified as asbestos containing in each homogenous area should be managed in accordance with the prepared specification.
- Documentation: Maintain detailed records of all sampling, analysis, and management activities to demonstrate compliance with regulatory requirements.

GMC emphasizes that adherence to these recommendations is critical to minimizing potential health and safety risks and ensuring compliance with all applicable regulations.

Lead Containing Paints

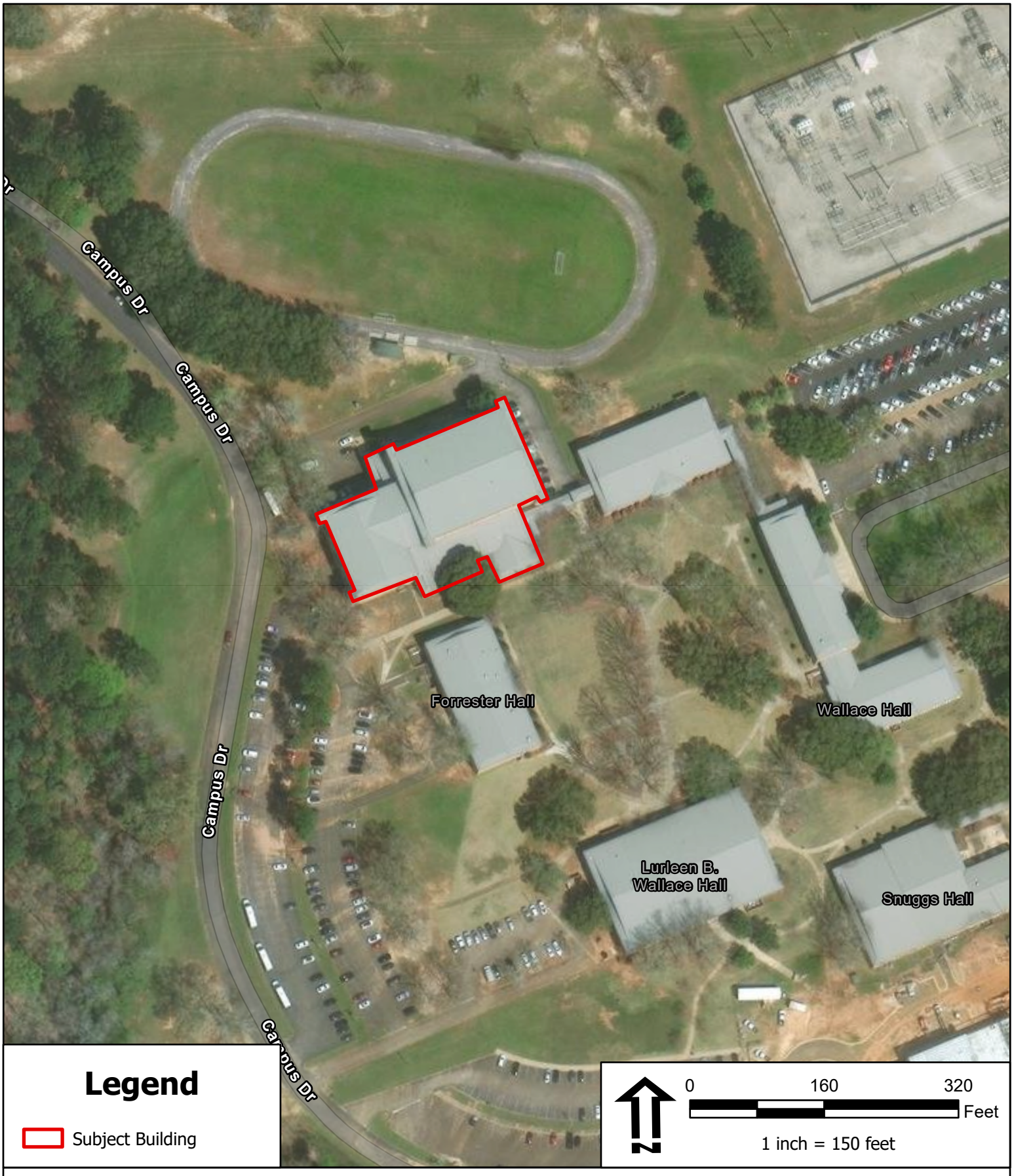
Lead containing paint sampling was conducted in order to know if lead containing paint exists in areas where paint disturbance may occur during demolition activities. If demolition of the areas containing lead containing paint is scheduled, then nothing further is required outside of OSHA worker safety considerations. If the structures that contain lead containing paint are planned refurbishment, then additional abatement consideration may be required.

Other Regulated Materials

Any ORM identified during renovation activities, including those listed above, must be removed intact, segregated, packaged, and either recycled or disposed of at a licensed facility prior to disturbance. These activities should be performed by qualified professionals trained in hazardous material handling to ensure compliance with EPA, OSHA, and other applicable regulations. GMC disclaims liability for any ORM not identified during this limited assessment, and users of this report are responsible for ensuring that all regulated materials are managed appropriately. Changes in property conditions or newly discovered materials may require additional assessments to maintain safety and regulatory compliance.

ATTACHMENTS

FIGURES



REF. SHEET: ESRI WORLD STREETS
DESCRIPTION: HAZARDOUS MATERIALS SURVEY

Enterprise State Community College - Lolley Gym

ENTERPRISE, COFFEE COUNTY, ALABAMA

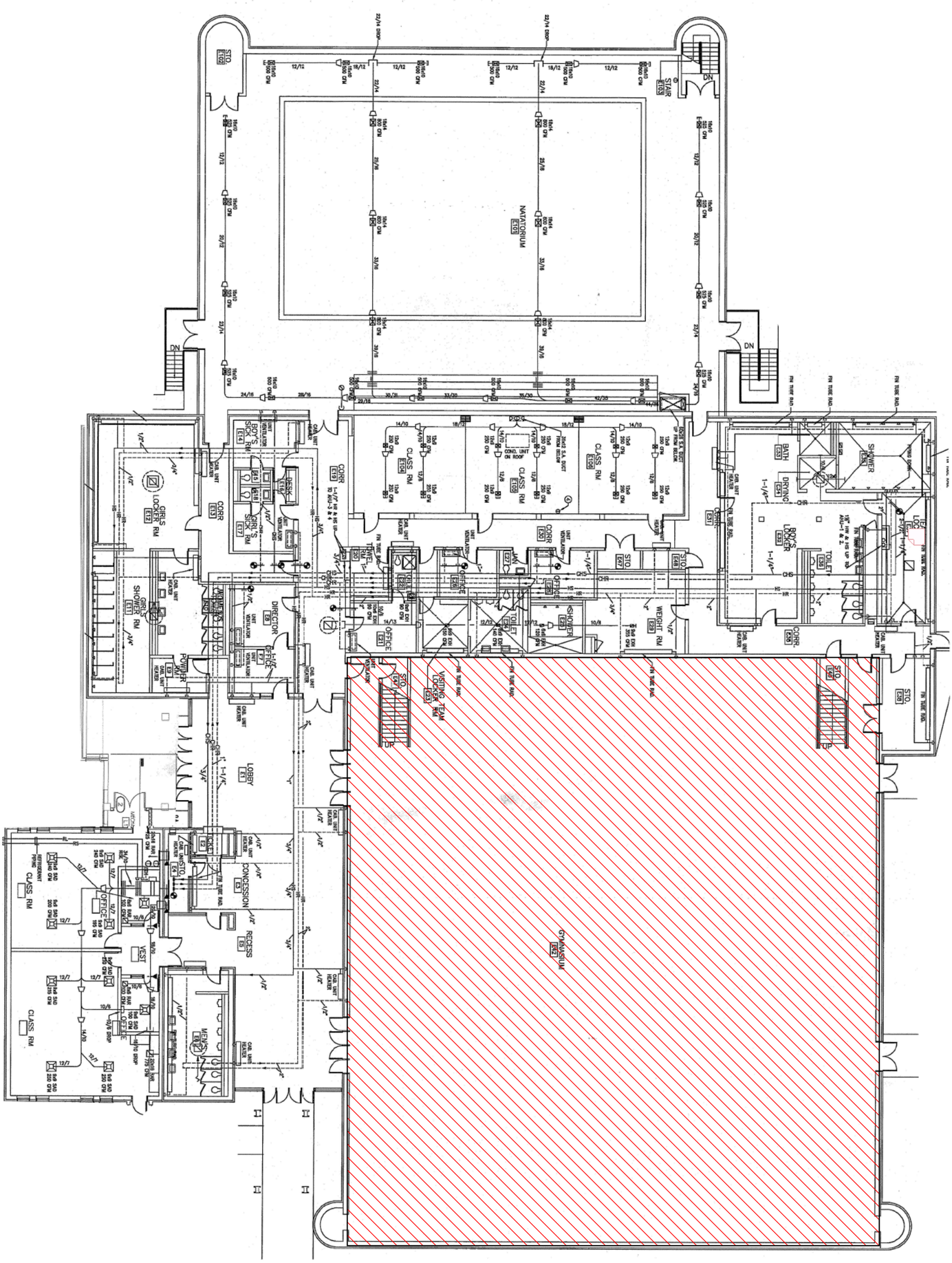
FIGURE 1

BUILDING LOCATION MAP

GMC #EBHM250042
DATE: 1/8/2026
DRAWN BY: EAM

2400 5th Avenue South, Suite 200
Birmingham, AL 35233
T: 205.879.4462
GMCNETWORK.COM

GMC



Area outside of Scope/Area Not Sampled

* not to scale

DESCRIPTION: **Hazardous Materials Report - ACM Sample Locations**

Enterprise State Community College - Lolley Gym

Enterprise, Coffee County, Alabama

FIGURE 2

Building Layout

GMC Project #: EBHM250042

Date: 01/08/2026

DRAWN BY: EAM

2500 5th Avenue South, Suite 200
Birmingham, AL 35233
T 205.879.4462
GMCNETWORK.COM

GMC

ACM Sample Layer

Non-ACM Sample Layer

* not to scale

GMC

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Birmingham, AL 35233
T 205.879.4462
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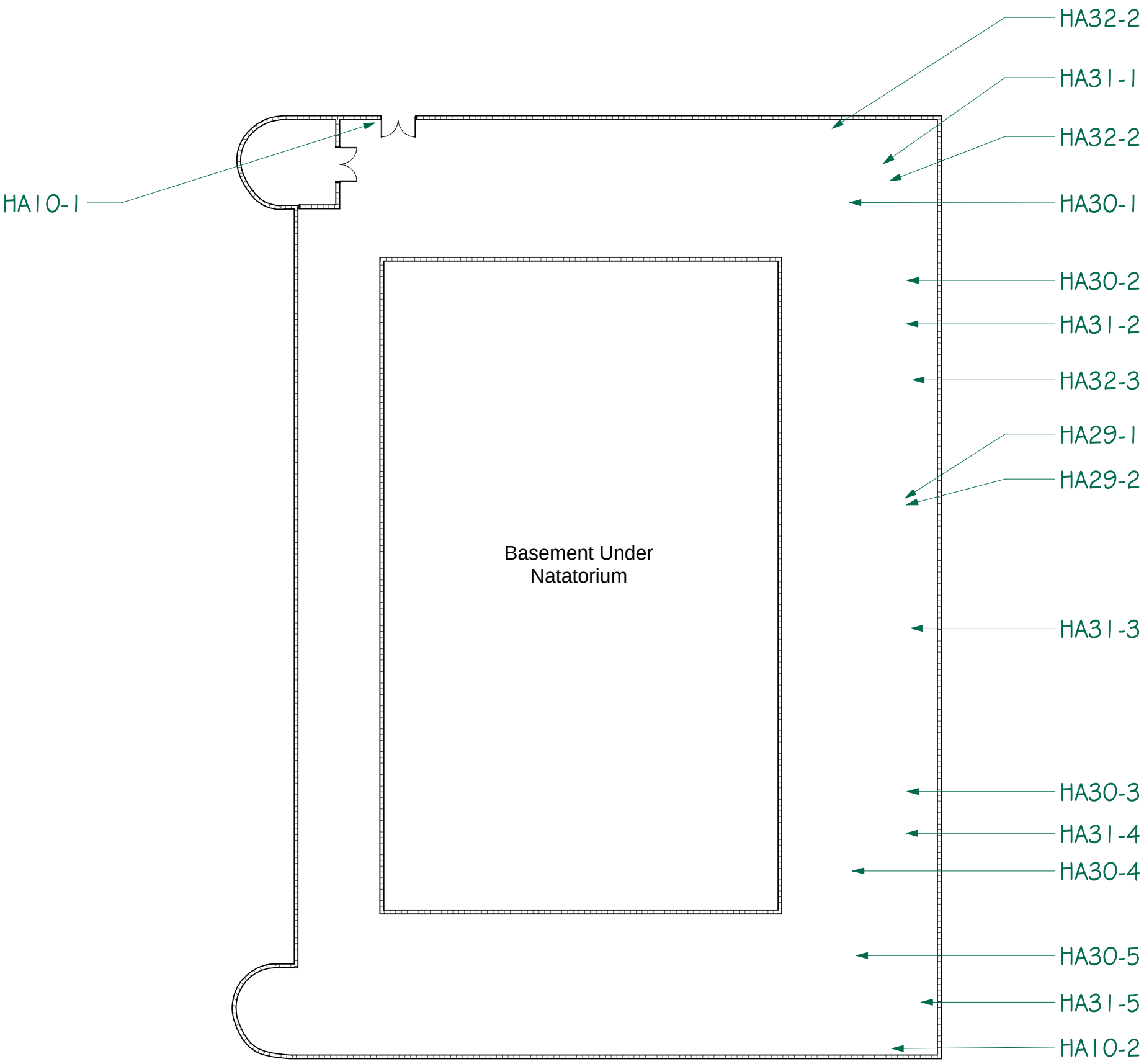
FIGURE 3

ACM Sample Location Layout
GMC Project #: EBHM250042
Date: 01/08/2026
DRAWN BY: EAM

DESCRIPTION: Hazardous Materials Report - ACM Sample Locations

Enterprise State Community College - Lolley Gym

Enterprise, Coffee County, Alabama



ACM Sample Layer

Non-ACM Sample Layer

* not to scale

DESCRIPTION: **Hazardous Materials** Report - **ACM Sample Locations**

Enterprise State Community College - Lolley Gym

Enterprise, **Coffee** County, **Alabama**

FIGURE 4

ACM Sample Location Layout

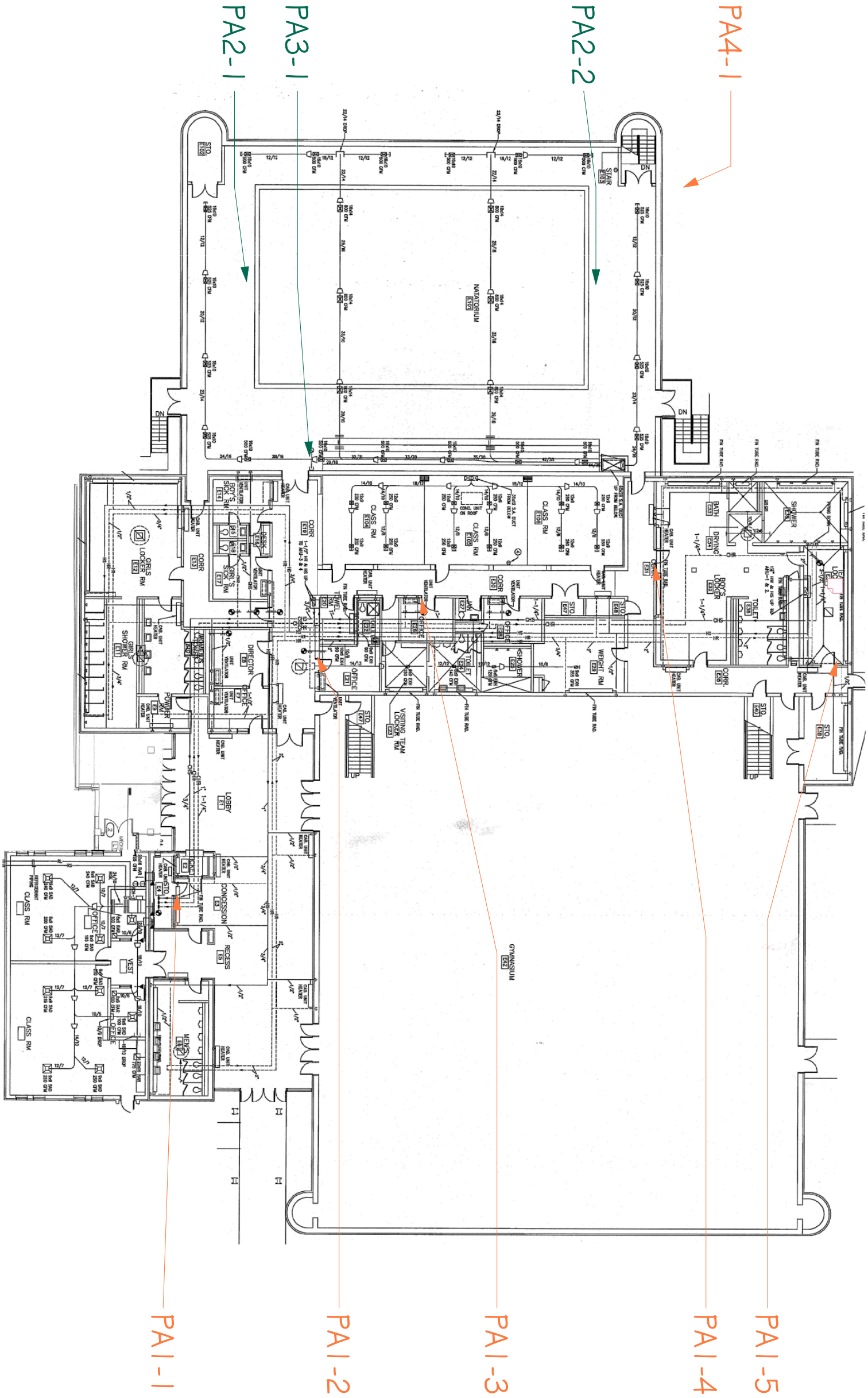
GMC Project #: EBHM250042

Date: **01/08/2026**

DRAWN BY: **EAM**

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ACM Sample Layer

Non-ACM Sample Layer

* not to scale

DESCRIPTION: **Hazardous Materials** Report - **ACM Sample Locations**

Enterprise State Community College - Lolley Gym

Enterprise, **Coffee** County, Alabama

FIGURE 5

ACM Sample Location Layout

GMC Project #: EBHM250042

Date: **01/08/2026**

DRAWN BY: **EAM**

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Birmingham, AL 35233

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TABLES

Table 1 - Asbestos Containing Materials Summary Results

Field Id Number	Sample Description	Sampling Results	Friability Classification	Sample Location
HA1-1	1x1 ceiling tile with figures and pinholes	None Detected	Not Applicable	E1 - Near Eastern Door Outside Men's Restroom
HA1-2	1x1 ceiling tile with figures and pinholes	None Detected	Not Applicable	E1 - Near Southern Door to Covered Walkway
HA2-1	1x1 Ceiling Tile with Large Pinholes and Fissures	None Detected	Not Applicable	E6 Men's Restroom - Back Corner Past Toilets and Sinks
HA3-1	2" White Pipe Run Insulation	None Detected	Not Applicable	E6 Men's Restroom - Back Corner Past Sinks
	Black Tar	None Detected	Not Applicable	
	Silver Wrap	None Detected	Not Applicable	
HA3-2	2" White Pipe Run Insulation	None Detected	Not Applicable	E6 Men's Restroom -Front Corner Just Inside Entrance
	Black Tar	None Detected	Not Applicable	
	Silver Wrap	None Detected	Not Applicable	
HA 3–3	2" White Pipe Run Insulation	None Detected	Not Applicable	E 36 - Next to Sink
	Black Tar	None Detected	Not Applicable	
	Silver Wrap	None Detected	Not Applicable	
HA3-4	2" White Pipe Run Insulation	None Detected	Not Applicable	E20 - Left Side Behind Door
	Silver Wrap	None Detected	Not Applicable	
HA3-5	2" White Pipe Run Insulation	None Detected	Not Applicable	**E3 - Back Left Corner**
	White Wrap	**2% Chrysotile**	**Category 1**	
HA3-6	2 inch white pipe run insulation	None Detected	Not Applicable	E24 - Front Right Corner Above Lockers
	White Wrap	None Detected	Not Applicable	
HA4-1	2" Pipe Elbow Associated with HA3	None Detected	Not Applicable	E6 Men's Restroom - Back Corner Past Sinks
HA4–2	2" Pipe Elbow Associated with HA3	None Detected	Not Applicable	E6 Men's Restroom -Front Corner Just Inside Entrance
HA4–3	2" Pipe Elbow Associated with HA3	None Detected	Not Applicable	E 36 - Next to Sink
HA4-4	2" Pipe Elbow Associated with HA3	None Detected	Not Applicable	**E20 - Left Side Behind Door**
	Wrap Associated with HA3	**3% Chrysotile**	**Category 1**	
HA4-5	2" Pipe Elbow Associated with HA3	None Detected	Not Applicable	**E3 - Back Left Corner**
	Wrap Associated with HA3	**3% Chrysotile**	**Category 1**	
HA4–6	2" Pipe Elbow Associated with HA3	None Detected	Not Applicable	**E24 - Front Right Corner Above Locker**
	Wrap Associated with HA3	**3% Chrysotile**	**Category 1**	
HA 5–1	2" Pipe Run Insulation	None Detected	Not Applicable	E4 - Ceiling Right Side of Room
	Paper Jacketing Associated with Pipe Run	None Detected	Not Applicable	
HA 6–1	Gray/Tan Coating on CMU	None Detected	Not Applicable	E4 - Inside Door to the Right
HA 7–1	4" Maroon Basecove	None Detected	Not Applicable	E4 Concession - From Under Desk in Concession
	Brown Mastic	None Detected	Not Applicable	
HA 8-1	Tan/White Coating on CMU	None Detected	Not Applicable	Natatorium - Far Wall Near Exterior Entrance North
HA 8–2	Tan/White Coating on CMU	None Detected	Not Applicable	Natatorium - Far Wall Near Stairwell, Shallow End of Pool
HA 8–3	Tan/White Coating on CMU	None Detected	Not Applicable	Natatorium - Near Main Entrance Wall Right of Door
HA 9–1	1x1 Ceiling Tile with Large Fissures	None Detected	Not Applicable	E 103 Stairwell - Just Inside Upstairs Door
HA 10–1	Tan Coating on CMU	None Detected	Not Applicable	Basement - Entrance Side to the Left
HA 10–2	Tan Coating on CMU	None Detected	Not Applicable	Basement - Back Corner to the Right
HA 11–1	4" Gray Basecove	None Detected	Not Applicable	E19 - Near Doorway to Natatorium
	White/Tan Mastic	None Detected	Not Applicable	
	Joint Compound	‹1% Chrysotile	Not Applicable	
HA 11–2	4" Gray Basecove	None Detected	Not Applicable	E30 - In Corridor Near E31
	White/Tan Mastic	None Detected	Not Applicable	
	Joint Compound	‹1% Chrysotile	Not Applicable	
HA 12–1	1x1 Ceiling Tile with Fishers and Pinholes	None Detected	Not Applicable	E19 - Above Doorway to Lobby
HA 12–2	1x1 Ceiling Tile with Fishers and Pinholes	None Detected	Not Applicable	E105 - Near Divider between 105 and 106
HA 12–3	1x1 Ceiling Tile with Fishers and Pinholes	None Detected	Not Applicable	E38 - Near Storage E38
HA 13–1	12 X 12 White Floor Tile with Brown Specs	None Detected	Not Applicable	E106 - Near Doorway
	Tan Mastic	None Detected	Not Applicable	
HA 13–2	12 X 12 White Floor Tile with Brown Specs	None Detected	Not Applicable	E105 - Near Doorway
	Tan Mastic	None Detected	Not Applicable	
HA 14–1	4" Maroon Basecove	None Detected	Not Applicable	E105 - Near Doorway
	Yellow Mastic	None Detected	Not Applicable	
HA 14–2	5" Maroon Basecove	None Detected	Not Applicable	E106 - Near Doorway
	Yellow Mastic	None Detected	Not Applicable	
	Joint Compound	None Detected	Not Applicable	
HA 15–1	Drywall	None Detected	Not Applicable	E106 - Inside Doorway to the Right
	Joint Compound	None Detected	Not Applicable	
HA 16 –1	Gray/Beige Coating on CMU	None Detected	Not Applicable	E31 - Near Doorway to E30

Table 1 - Asbestos Containing Materials Summary Results

Field Id Number	Sample Description	Sampling Results	Friability Classification	Sample Location
HA16-2	Gray/Beige Coating on CMU	None Detected	Not Applicable	E19
HA16-3	Gray/Beige Coating on CMU	None Detected	Not Applicable	E30 in the Corridor Near E31
HA16-4	Gray/Beige Coating on CMU	None Detected	Not Applicable	E19
HA 17–1	4" White Basecove	None Detected	Not Applicable	Natatorium - Front Right Corner by Back Hallway
	Tan Mastic	None Detected	Not Applicable	
HA 18–1	4" Black Basecove	None Detected	Not Applicable	**E 29 - Near doorway**
	Brown Mastic	None Detected	Not Applicable	
	Joint Compound	**2% Chrysotile**	**Category 1**	
HA18-2	4" Black Basecove	None Detected	Not Applicable	E7 - Behind Doorway
	Tan Mastic	None Detected	Not Applicable	
HA19-1	2x2 Ceiling Tile with Small Pinholes and Fissures	None Detected	Not Applicable	E12 - Southeast Corner
HA19-2	2x2 Ceiling Tile with Small Pinholes and Fissures	None Detected	Not Applicable	E12 - Northwest Corner
HA19-3	2x2 Ceiling Tile with Small Pinholes and Fissures	None Detected	Not Applicable	E11 - Midway in Room
HA20-1	12x12 Beige Floor Tile with Brown Specs	None Detected	Not Applicable	E7 - Doorway
	Yellow Mastic	None Detected	Not Applicable	
HA20-2	12x12 Beige Floor Tile with Brown Specs	None Detected	Not Applicable	E7 - Back Near Bookshelf
	Yellow Mastic	None Detected	Not Applicable	
HA21-1	White Pipe Run	None Detected	Not Applicable	E47 - Left Side
	White/Silver Wrap	None Detected	Not Applicable	
HA21-2	White Pipe Run	None Detected	Not Applicable	E47 - Right Side
	White/Silver Wrap	None Detected	Not Applicable	
HA21-3	White Pipe Run	None Detected	Not Applicable	E48 - Above Doorway
	White/Silver Wrap	None Detected	Not Applicable	
HA21-4	White Pipe Run	None Detected	Not Applicable	**E47 - Left Side**
	Black Mastic	**5% Chrysotile**	**Category 1**	
	White/Silver Wrap	None Detected	Not Applicable	
HA21-5	White Pipe Run	None Detected	Not Applicable	**E47 - Right Side**
	Black Mastic	**5% Chrysotile**	**Category 1**	
	White/Silver Wrap	None Detected	Not Applicable	
HA21-6	White Pipe Run	None Detected	Not Applicable	**E48 - Above Doorway**
	Black Mastic	**7% Chrysotile**	**Category 1**	
	White/Silver Wrap	None Detected	Not Applicable	
HA21-7	White Pipe Run	None Detected	Not Applicable	E47 - Left Side
	White/Silver Wrap	None Detected	Not Applicable	
HA21-8	White Pipe Run	None Detected	Not Applicable	E47 - Right Side
	Black Mastic	None Detected	Not Applicable	
	White/Silver Wrap	None Detected	Not Applicable	
HA21-9	White Pipe Run	None Detected	Not Applicable	E48 - Above Doorway
	White/Silver Wrap	None Detected	Not Applicable	
HA21-10	White Pipe Run	None Detected	Not Applicable	E19 - Above Ceiling Between Laundry and Womens Locker Room
	White/Silver Wrap	None Detected	Not Applicable	
HA21-11	White Pipe Run	None Detected	Not Applicable	E19 - Above Ceiling Between Laundry and Womens Locker Room
	White/Silver Wrap	None Detected	Not Applicable	
HA22-1	12X12 Grey Floor Tile with Gray and Tan Specs	None Detected	Not Applicable	Classroom 1 - By Side Door
	Yellow Mastic	None Detected	Not Applicable	
HA22-2	12X12 Grey Floor Tile with Gray and Tan Specs	None Detected	Not Applicable	Classroom 1/Classroom 2 Foyer - Near CR2
	Yellow Mastic	None Detected	Not Applicable	
	Leveler	None Detected	Not Applicable	
HA22-3	12X12 Grey Floor Tile with Gray and Tan Specs	None Detected	Not Applicable	Classroom 1 Office - Behind Door
	Yellow Mastic	None Detected	Not Applicable	
	Leveler	None Detected	Not Applicable	
HA23-1	12x12 Tan Floortile with Brown Specs	None Detected	Not Applicable	Classroom 2 - Front Near Door
	Yellow Mastic	None Detected	Not Applicable	
	Leveler	None Detected	Not Applicable	
HA23-2	12x12 Tan Floortile with Brown Specs	None Detected	Not Applicable	Classroom 2 - Back Left Near Exit
	Yellow Mastic	None Detected	Not Applicable	
HA23-3	12x12 Tan Floortile with Brown Specs	None Detected	Not Applicable	Classroom 2 - Far Left Corner
	Yellow Mastic	None Detected	Not Applicable	
	Leveler	None Detected	Not Applicable	

Table 1 - Asbestos Containing Materials Summary Results

Field Id Number	Sample Description	Sampling Results	Friability Classification	Sample Location
HA24-1	**Pipe Joint Associated with HA21**	**3% Chrysotile**	**Category 1**	**E48 - Above Doorway**
	White Mastic	None Detected	Not Applicable	
HA24-2	**Pipe Joint Associated with HA21**	**3% Chrysotile**	**Category 1**	**E48 - Back Left Corner**
	White Mastic	None Detected	Not Applicable	
HA25-1	Black Mastic Associated with Water Lines	None Detected	Not Applicable	E19 - Water Lines Above Ceiling
HA25-2	Black Mastic Associated with Water Lines	None Detected	Not Applicable	E20 - Water Lines Above Ceiling
HA25-3	Black Mastic Associated with Water Lines	None Detected	Not Applicable	E21 - Water Lines Above Ceiling
HA26-1	6'' Tan Basecove	None Detected	Not Applicable	Classroom 1 - Behind Doorway
	Tan Mastic	None Detected	Not Applicable	
HA26-2	6'' Tan Basecove	None Detected	Not Applicable	Classroom 2 - Back Left Near Exit
	Tan Mastic	None Detected	Not Applicable	
HA26-3	6'' Tan Basecove	None Detected	Not Applicable	Classroom 1 Office - Behind Door
	Tan Mastic	None Detected	Not Applicable	
HA27-1	2x2 Ceiling Tile with Pinholes and Fissures	None Detected	Not Applicable	Classroom 1
HA27-2	2x2 Ceiling Tile with Pinholes and Fissures	None Detected	Not Applicable	Classroom 2
HA27-3	2x2 Ceiling Tile with Pinholes and Fissures	None Detected	Not Applicable	Classroom Foyer
HA28-1	CMU Coating	None Detected	Not Applicable	Classroom 1
HA28-2	CMU Coating	None Detected	Not Applicable	Classroom 1
HA28-3	CMU Coating	None Detected	Not Applicable	Classroom 2
HA29-1	White Boiler	None Detected	Not Applicable	E101 - Under Natatorium
HA29-2	White Boiler	None Detected	Not Applicable	E101 - Under Natatorium
HA30-1	Pipe run	None Detected	Not Applicable	E101 - Under Natatorium
	White/Silver Wrap	None Detected	Not Applicable	
HA30-2	Pipe run	None Detected	Not Applicable	E101 - Under Natatorium
	White/Silver Wrap	None Detected	Not Applicable	
HA30-3	Pipe run	None Detected	Not Applicable	E101 - Under Natatorium
	Brown/White/Silver Wrap	None Detected	Not Applicable	
HA30-4	Pipe run	None Detected	Not Applicable	E101 - Under Natatoriion
	Brown/White/Silver Wrap	None Detected	Not Applicable	
	Tan/Clear Mastic	None Detected	Not Applicable	
	Yellow/Clear Mastic	None Detected	Not Applicable	
HA30-5	Pipe run	None Detected	Not Applicable	E101 - Under Natatorium
	White Wrap	None Detected	Not Applicable	
HA31-1	Pipe Joint	None Detected	Not Applicable	E101 - Under Natatorium
	White/Silver Wrap	None Detected	Not Applicable	
HA31-2	Pipe joint	None Detected	Not Applicable	E101 - Under Natatorium
	White/Silver/Yellow Wrap	None Detected	Not Applicable	
HA31-3	Pipe joint	None Detected	Not Applicable	E101 - Under Natatorium
	White/Silver/Yellow Wrap	None Detected	Not Applicable	
HA31-4	Pipe Joint	None Detected	Not Applicable	E101 - Under Natatorium
	White/Silver/Yellow Wrap	None Detected	Not Applicable	
HA31-5	Pipe joint	None Detected	Not Applicable	E101 - Under Natatoriion
HA32-1	White HVAC Mastic	None Detected	Not Applicable	E102 - Under Natatoriion
	Brown/Silver/Yellow Wrap	None Detected	Not Applicable	
HA32-2	White HVAC Mastic	None Detected	Not Applicable	E103 - Under Natatoriion
	Brown/Silver/Yellow Wrap	None Detected	Not Applicable	
HA32-3	White HVAC Mastic	None Detected	Not Applicable	E104 - Under Natatoriion

Notes:
Friability was determined according to the material's condition during sampling.
Friable: Material that can crumbled, crushed, or pulverized under hand pressure
Non-Friable: Materials that do not meet the definition of friable
Category I Non-Friable: Non-friable ACMs such as gaskets, valve packing, resilient vinyl flooring covering (floor tile and linoleum), and asphalt roofing material
Catergory II Non-Friable: Includes all other non-friable ACMs
It should be noted that the condition of the materials sampled is based on the top layer of the sampled materuals only at the time of sampling.
Bold: positive sample layer
(-) Insufficient Material

Orange Highlight Indicated that the Homogenous Area is positive for Asbestos Content above 1%

Table 2 - Lead Containing Paint Summary Results

Field Id Number	Target Level (% wt)	Result (% wt)	Weight (g)	Descripton	Sample Location
PA1-1	**0.50%**	**11%**	**0.0685**	**Doorway**	**E4**
PA1-2	**0.50%**	**9.4%**	**0.0599**	**Doorway**	**E21**
PA1-3	**0.50%**	**8.5%**	**0.0796**	**Doorway**	**E26**
PA1-4	**0.50%**	**3.2%**	**0.0925**	**Doorway**	**From E31 to E32**
PA1-5	**0.50%**	**11%**	**0.0917**	**Doorway**	**E37**
PA2-1	**0.50%**	**‹ 0.0064%**	**0.2652**	**Floor**	**Natarorium**
PA2-2	**0.50%**	**‹ 0.0064%**	**0.2532**	**Floor**	**Natarorium**
PA3-1	**0.50%**	**0.025%**	**0.2509**	**Doorway**	**Natarorium**
PA4-1	**0.50%**	**2.8%**	**0.2524**	**Railing**	**Exterior Door Walkway E28**

Notes:
(% wt): Percent Weight
(g): Grams
PA1-1: Paint Sample ID Number
Bold: positive sample layer

Orange Highlight indicates that the homogeneous area is positive for Lead Containing Paint above the 0.50% weight of Lead.

APPENDICIES

APPENDIX A
Analytical Results and Chain of Custody

EMSL Analytical, Inc.

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EMSL Order:	042523080
Customer ID:	GDWN36A
Customer PO:	EBHM250033
Project ID:	

Attention:	Pierce Lagle	**Phone:**	(205) 533-1174
	Goodwyn Mills Cawood LLC	**Fax:**	
	2400 5th Ave S	**Received Date:**	11/20/2025 9:30 AM
	Suite 200	**Analysis Date:**	11/21/2025 - 11/25/2025
	Birmingham, AL 35233	**Collected Date:**	11/17/2025
Project:	ESCC Lolley Gym		

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA19-1 *042523080-0001*	E12 - 2x2 Ceiling Tile with Small Pinholes and Fissures	Gray/White Fibrous Homogeneous	30% Cellulose 50% Min. Wool	20% Non-fibrous (Other)	None Detected
HA19-2 *042523080-0002*	E12 - 2x2 Ceiling Tile with Small Pinholes and Fissures	Gray/White Fibrous Homogeneous	30% Cellulose 50% Min. Wool	20% Non-fibrous (Other)	None Detected
HA19-3 *042523080-0003*	E11 - 2x2 Ceiling Tile with Small Pinholes and Fissures	Gray/White Fibrous Homogeneous	30% Cellulose 50% Min. Wool	20% Non-fibrous (Other)	None Detected
HA20-1-Floor Tile *042523080-0004*	E7 - 12x12 Beige Floor Tile with Brown Specs	Brown/Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA20-1-Mastic *042523080-0004A*	E7 - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA20-2-Floor Tile *042523080-0005*	E7 - 12x12 Beige Floor Tile with Brown Specs	Brown/Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA20-2-Mastic *042523080-0005A*	E7 - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA18-2-Base Cove *042523080-0006*	E7 - Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA18-2-Mastic *042523080-0006A*	E7 - 4-inch Black Base Cove	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA3-3-Insulation *042523080-0007*	E24 - 2-inch White Pipe Run Insulation	Yellow Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
HA3-3-Wrap *042523080-0007A*	E24 - 2-inch White Pipe Run Wrap	White Fibrous Homogeneous	50% Cellulose 10% Glass	40% Non-fibrous (Other)	**<1% Chrysotile**
HA3-4-Insulation *042523080-0008*	E20 - 2-inch White Pipe Run Insulation	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA3-4-Wrap *042523080-0008A*	E20 - 2-inch White Pipe Run Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 10% Glass	40% Non-fibrous (Other)	**<1% Chrysotile**
HA3-5-Insulation *042523080-0009*	E3 - 2-inch White Pipe Run Insulation	Yellow Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
HA3-5-Wrap *042523080-0009A*	E3 - 2-inch White Pipe Run Wrap	White Non-Fibrous Homogeneous		98% Non-fibrous (Other)	**2% Chrysotile**
HA4-3-Pipe Elbow *042523080-0010*	E24 - 2-inch Pipe Elbow associated with HA3	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected

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Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA4-3-Wrap *042523080-0010A*	E24 - 2-inch Pipe Wrap associated with HA3	White Fibrous Homogeneous		97% Non-fibrous (Other)	**3% Chrysotile**
HA4-4-Pipe Elbow *042523080-0011*	E20 - 2-inch Pipe Elbow associated with HA3	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA4-4-Wrap *042523080-0011A*	E20 - 2-inch Pipe Wrap associated with HA3	White Non-Fibrous Homogeneous		97% Non-fibrous (Other)	**3% Chrysotile**
HA4-5-Pipe Elbow *042523080-0012*	E3 - 2-inch Pipe Elbow associated with HA3	Yellow Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
HA4-5-Wrap *042523080-0012A*	E3 - 2-inch Pipe Wrap associated with HA3	White Non-Fibrous Homogeneous		97% Non-fibrous (Other)	**3% Chrysotile**
HA21-1-Pipe Run *042523080-0013*	E47 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-1-Wrap *042523080-0013A*	E47 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 10% Glass	40% Non-fibrous (Other)	None Detected
HA21-2-Pipe Run *042523080-0014*	E47 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-2-Wrap *042523080-0014A*	E47 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 10% Glass	40% Non-fibrous (Other)	None Detected
HA21-3-Pipe Run *042523080-0015*	E48 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-3-Wrap *042523080-0015A*	E48 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 10% Glass	40% Non-fibrous (Other)	None Detected
HA21-10-Pipe Run *042523080-0016*	E19 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-10-Mastic *042523080-0016A*	E19 - Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA21-10-Wrap *042523080-0016B*	E19 - Wrap	White/Silver Fibrous Homogeneous	60% Cellulose 10% Glass	30% Non-fibrous (Other)	None Detected
HA21-11-Pipe Run *042523080-0017*	E19 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-11-Wrap *042523080-0017A*	E19 - Wrap	White/Silver Fibrous Homogeneous	60% Cellulose 10% Glass	30% Non-fibrous (Other)	None Detected
HA21-4-Pipe Run *042523080-0018*	E47 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-4-Mastic *042523080-0018A*	E47 - Mastic	Black Non-Fibrous Homogeneous		95% Non-fibrous (Other)	**5% Chrysotile**
HA21-4-Wrap *042523080-0018B*	E47 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 10% Glass	40% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA21-5-Pipe Run *042523080-0019*	E37 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-5-Mastic *042523080-0019A*	E37 - Mastic	Black Non-Fibrous Homogeneous		95% Non-fibrous (Other)	**5% Chrysotile**
HA21-5-Wrap *042523080-0019B*	E37 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 10% Glass	40% Non-fibrous (Other)	None Detected
HA21-6-Pipe Run *042523080-0020*	E48 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-6-Mastic *042523080-0020A*	E48 - Mastic	Black Non-Fibrous Homogeneous		93% Non-fibrous (Other)	**7% Chrysotile**
HA21-6-Wrap *042523080-0020B*	E48 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 10% Glass	40% Non-fibrous (Other)	None Detected
HA21-7-Pipe Run *042523080-0021*	E47 - White Pipe Run	Yellow Fibrous Homogeneous	90% Min. Wool	10% Non-fibrous (Other)	None Detected
HA21-7-Wrap *042523080-0021A*	E47 - Wrap	White/Silver Fibrous Homogeneous	45% Cellulose 10% Glass	45% Non-fibrous (Other)	**<1% Chrysotile**
HA21-8-Pipe Run *042523080-0022*	E47 - White Pipe Run	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA21-8-Mastic *042523080-0022A*	E47 - Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA21-8-Wrap *042523080-0022B*	E47 - Wrap	White/Silver Fibrous Homogeneous	40% Cellulose 10% Glass	50% Non-fibrous (Other)	None Detected
HA21-9-Pipe Run *042523080-0023*	E48 - White Pipe Run	Yellow Fibrous Homogeneous	90% Min. Wool	10% Non-fibrous (Other)	None Detected
HA21-9-Wrap *042523080-0023A*	E48 - Wrap	White/Silver/Beige Fibrous Homogeneous	35% Cellulose 10% Glass	55% Non-fibrous (Other)	None Detected
HA24-1-Pipe Joint *042523080-0024*	E48 - Pipe Joint associated with HA23	Yellow Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
HA24-1-Mastic *042523080-0024A*	E48 - Mastic associated with HA23	White Fibrous Homogeneous		97% Non-fibrous (Other)	**3% Chrysotile**
HA24-2-Pipe Joint *042523080-0025*	E48 - Pipe Joint associated with HA23	Yellow Fibrous Homogeneous	90% Min. Wool	10% Non-fibrous (Other)	None Detected
HA24-2-Mastic *042523080-0025A*	E48 - Mastic associated with HA23	White Non-Fibrous Homogeneous		97% Non-fibrous (Other)	**3% Chrysotile**
HA25-1 *042523080-0026*	E19 - Black Mastic associated with Water Lines	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA25-2 *042523080-0027*	E20 - Black Mastic associated with Water Lines	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA25-3 *042523080-0028*	E21 - Black Mastic associated with Water Lines	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA22-1-Floor Tile *042523080-0029*	CR 1 - 12x12 White Floor Tile with Gray and Tan Specs	Gray/Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA22-1-Mastic *042523080-0029A*	CR 1 - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA22-2-Floor Tile *042523080-0030*	CR1/CR2 Foyer - 12x12 White Floor Tile with Gray and Tan Specs	Gray/Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA22-2-Mastic *042523080-0030A*	CR1/CR2 Foyer - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA22-2-Leveler *042523080-0030B*	CR1/CR2 Foyer - 12x1 Leveler	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA22-3-Floor Tile *042523080-0031*	CR Office - 12x12 White Floor Tile with Gray and Tan Specs	Gray/Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA22-3-Mastic *042523080-0031A*	CR Office - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA22-3-Leveler *042523080-0031B*	CR Office - Leveler	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA23-1-Floor Tile *042523080-0032*	CR2 - 12x12 Tan Floor Tile with Brown Specs	Brown/Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA23-1-Mastic *042523080-0032A*	CR2 - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA23-1-Leveler *042523080-0032B*	CR2 - Leveler	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA23-2-Floor Tile *042523080-0033*	CR2 - 12x12 Tan Floor Tile with Brown Specs	Brown/Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA23-2-Mastic *042523080-0033A*	CR2 - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA23-3-Floor Tile *042523080-0034*	CR2 - 12x12 Tan Floor Tile with Brown Specs	Brown/Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA23-3-Mastic *042523080-0034A*	CR2 - Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA23-3-Leveler *042523080-0034B*	CR2 - Leveler	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA26-1-Base Cove *042523080-0035*	CR1 - 6-inch Tan Base Cove	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA26-1-Mastic *042523080-0035A*	CR1 - Tan Mastic	Tan/White Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
Result includes a small amount of inseparable attached material					
HA26-2-Base Cove *042523080-0036*	CR2 - 6-inch Tan Base Cove	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA26-2-Mastic *042523080-0036A*	CR2 - Tan Mastic	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA26-3-Base Cove *042523080-0037*	CR Office - 6-inch Tan Base Cove	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA26-3-Mastic *042523080-0037A*	CR Office - Tan Mastic	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA27-1 *042523080-0038*	CR1 - 2x2 Ceiling Tile with Pinholes and Fissures	Tan/White Fibrous Homogeneous	35% Cellulose 45% Min. Wool	20% Non-fibrous (Other)	None Detected
HA27-2 *042523080-0039*	CR2 - 2x2 Ceiling Tile with Pinholes and Fissures	Tan/White Fibrous Homogeneous	35% Cellulose 45% Min. Wool	20% Non-fibrous (Other)	None Detected
HA27-3 *042523080-0040*	CR Foyer - 2x2 Ceiling Tile with Pinholes and Fissures	Tan/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	20% Non-fibrous (Other)	None Detected
HA28-1 *042523080-0041* *Result includes a small amount of inseparable attached material*	CR1 - CMU Coating	Gray/White Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
HA28-2 *042523080-0042* *Result includes a small amount of inseparable attached material*	CR1 - CMU Coating	Gray/White Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
HA28-3 *042523080-0043*	CR2 - CMU Coating	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA16-2 *042523080-0044*	E19 - Gray Beige Coating on CMU	Gray/Beige Non-Fibrous Homogeneous	2% Fibrous (Other)	98% Non-fibrous (Other)	None Detected
HA16-3 *042523080-0045*	E30 - Gray Beige Coating on CMU	Gray/Beige Non-Fibrous Homogeneous	2% Fibrous (Other)	98% Non-fibrous (Other)	None Detected
HA16-4 *042523080-0046*	E19 - Gray Beige Coating on CMU	Gray/Beige Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA29-1 *042523080-0047*	E101 - Boiler	White Fibrous Homogeneous	20% Cellulose 15% Min. Wool	65% Non-fibrous (Other)	None Detected
HA29-2 *042523080-0048*	E101 - Boiler	White Fibrous Homogeneous	35% Cellulose	65% Non-fibrous (Other)	None Detected
HA30-1-Pipe Run *042523080-0049* *Sample is insulation*	E101 - Pipe Run	Yellow Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
HA30-1-Wrap *042523080-0049A*	E101 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 15% Glass	35% Non-fibrous (Other)	None Detected

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA30-2-Pipe Run *042523080-0050* *Sample is insulation*	E101 - Pipe Run	Yellow Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
HA30-2-Wrap *042523080-0050A*	E101 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 15% Glass	35% Non-fibrous (Other)	None Detected
HA30-3-Pipe Run *042523080-0051* *Sample is insulation*	E101 - Pipe Run	Tan Fibrous Heterogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
HA30-3-Wrap *042523080-0051A*	E101 - Wrap	Brown/White/Silver Fibrous Homogeneous	55% Cellulose 15% Glass	30% Non-fibrous (Other)	None Detected
HA30-3-Mastic *042523080-0051B*	E101 - Mastic	Tan/Clear Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA30-4-Pipe Run *042523080-0052* *Sample is insulation*	E101 - Pipe Run	Tan/Yellow Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
HA30-4-Wrap *042523080-0052A*	E101 - Wrap	Brown/White/Silver Fibrous Homogeneous	55% Cellulose 15% Glass	30% Non-fibrous (Other)	None Detected
HA30-4-Mastic *042523080-0052B*	E101 - Mastic	Tan/Clear Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA30-4-Mastic 2 *042523080-0052C*	E101 - Mastic	Yellow/Clear Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
HA30-5-Pipe Run *042523080-0053* *Sample is insulation*	E101 - Pipe Run	Yellow Fibrous Homogeneous	95% Glass	5% Non-fibrous (Other)	None Detected
HA30-5-Wrap *042523080-0053A*	E101 - Wrap	White Fibrous Homogeneous	40% Cellulose 10% Glass	50% Non-fibrous (Other)	None Detected
HA31-1-Pipe Joint *042523080-0054*	E101 - Pipe Joint	White Non-Fibrous Homogeneous	5% Glass 3% Fibrous (Other)	92% Non-fibrous (Other)	None Detected
HA31-1-Wrap *042523080-0054A*	E101 - Wrap	White/Silver Fibrous Homogeneous	50% Cellulose 15% Glass	35% Non-fibrous (Other)	None Detected
HA31-2-Pipe Joint *042523080-0055*	E101 - Pipe Joint	White Non-Fibrous Homogeneous	5% Glass 3% Fibrous (Other)	92% Non-fibrous (Other)	None Detected
HA31-2-Wrap *042523080-0055A* *Result includes a small amount of inseparable attached material*	E101 - Wrap	White/Silver/Yellow Fibrous Heterogeneous	50% Cellulose 5% Min. Wool 15% Glass	30% Non-fibrous (Other)	None Detected
HA31-3-Pipe Joint *042523080-0056*	E101 - Pipe Joint	White Non-Fibrous Homogeneous	5% Glass 3% Fibrous (Other)	92% Non-fibrous (Other)	None Detected
HA31-3-Wrap *042523080-0056A* *Result includes a small amount of inseparable attached material*	E101 - Wrap	White/Silver/Yellow Fibrous Heterogeneous	50% Cellulose 2% Min. Wool 15% Glass	33% Non-fibrous (Other)	None Detected

Initial report from: 11/25/2025 10:27:36

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200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	042523080
Customer ID:	GDWN36A
Customer PO:	EBHM250033
Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA31-4-Pipe Joint *042523080-0057*	E101 - Pipe Joint	White Non-Fibrous Homogeneous	5% Glass 3% Fibrous (Other)	92% Non-fibrous (Other)	None Detected
HA31-4-Wrap *042523080-0057A* *Result includes a small amount of inseparable attached material*	E101 - Wrap	White/Silver/Yellow Fibrous Heterogeneous	50% Cellulose 2% Min. Wool 15% Glass	33% Non-fibrous (Other)	None Detected
HA31-5 *042523080-0058* *Sample is wrap*	E101 - Pipe Joint	White Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
HA32-11-Mastic *042523080-0059*	E102 - White HVAC Mastic	White Fibrous Homogeneous	6% Cellulose	94% Non-fibrous (Other)	None Detected
HA32-1-Wrap *042523080-0059A*	E102 - White HVAC Wrap	Brown/Silver/Yellow Fibrous Heterogeneous	50% Cellulose 10% Min. Wool 15% Glass	25% Non-fibrous (Other)	None Detected
HA32-2-Mastic *042523080-0060*	E103 - White HVAC Mastic	White Fibrous Homogeneous	6% Cellulose	94% Non-fibrous (Other)	None Detected
HA32-2-Wrap *042523080-0060A* *Result includes a small amount of inseparable attached material*	E103 - White HVAC Wrap	Brown/Silver/Yellow Fibrous Heterogeneous	50% Cellulose 6% Min. Wool 15% Glass	29% Non-fibrous (Other)	None Detected
HA32-2-Mastic *042523080-0060B*	E103 - White HVAC Mastic	Clear Non-Fibrous Homogeneous	5% Cellulose 8% Min. Wool	87% Non-fibrous (Other)	None Detected
HA32-3 *042523080-0061*	E104 - White HVAC Mastic	White Non-Fibrous Homogeneous	5% Cellulose	95% Non-fibrous (Other)	None Detected

Analyst(s)

Brett Teixeira (17)
Giavanna Marcolongo (2)
Jason Simon (38)
Jonathan Bach (31)
Kiara Secula (28)

Samantha Sweeney

Samantha Sweeney, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 “Interim Method”) but augmented with procedures outlined in the 1993 (”final”) version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA LAP, LLC-IHLAP Lab 100194, PA ID# 68-00367, LA #04127

Initial report from: 11/25/2025 10:27:36

042523080

EMSL
ANALYTICAL, INC
Cinnaminson, NJ 08077

PHONE: 1-800-220-3675
E-mail: cs@emsl.com

Asbestos Bulk Building Material

Client P.O # EBHM250033

SEND REPORT TO: Invoice #

Name: Pierce Lagle
Company: Goodwyn Mills Cawood
Address: 2400 5th Avenue S
Birmingham, AL 35233
Phone#: (205)879-4462 Cell # (205)533-11174
E-mail(s): pierce.lagle@gmcnetwork.com PDF: yes no

CLIENT: ACCS

PROJECT NAME/#: ESCC Lolley Gym

SAMPLER(S): (print) Pierce Lagle

Date Collected	Sample ID	Sample Description	Location	Analysis	Turn around
11/7/25	HA19-1	2x2 Ceiling Tiles with small pinholes and fissures	E12	PLM	72 hour
	HA19-2	2x2 Ceiling Tiles with small pinholes and fissures	E12	PLM	72 hour
	HA19-3	2x2 Ceiling Tiles with small pinholes and fissures	E11	PLM	72 hour
	HA20-1	12x12 Beige Floortile with brown specs	E7	PLM	72 hour
	HA20-2	12x12 Beige Floortile with brown specs	E7	PLM	72 hour
	HA18-2	4 Inch black base cove	E7	PLM	72 hour
	HA3-3	2 inch white pipe run insulation	E24	PLM	72 hour
	HA3-4	2 inch white pipe run insulation	E20	PLM	72 hour
	HA3-5	2 inch white pipe run insulation	E3	PLM	72 hour
	HA4-3	2 inch pipe elbow associated with HA3	E24	PLM	72 hour
	HA4-4	2 inch pipe elbow associated with HA3	E20	PLM	72 hour
	HA4-5	2 inch pipe elbow associated with HA3	E3	PLM	72 hour
	HA21-1	WHITE PIPE RUN	E47	PLM	72 hour
	HA21-2	WHITE PIPE RUN	E47	PLM	72 hour
	HA21-3	WHITE PIPE RUN	E48	PLM	72 hour
	HA21-10	WHITE PIPE RUN	E19	PLM	72 hour
	HA21-11	WHITE PIPE RUN	E19	PLM	72 hour
	HA21-4	WHITE PIPE RUN	E47	PLM	72 hour
	HA21-5	WHITE PIPE RUN	E37	PLM	72 hour
	HA21-6	WHITE PIPE RUN	E48	PLM	72 hour
	HA21-7	WHITE PIPE RUN	E47	PLM	72 hour
	HA21-8	WHITE PIPE RUN	E47	PLM	72 hour
	HA21-9	WHITE PIPE RUN	E48	PLM	72 hour
	HA24-1	Pipe joint associated with HA23	E48	PLM	72 hour
	HA24-2	Pipe joint associated with HA23	E48	PLM	72 hour
	HA25-1	BLACK MASTIC ASSOCIATED WITH WATER LINES	E19	PLM	72 hour
	HA25-2	BLACK MASTIC ASSOCIATED WITH WATER LINES	E20	PLM	72 hour
	HA25-3	BLACK MASTIC ASSOCIATED WITH WATER LINES	E21	PLM	72 hour
	HA22-1	12X12 WHITE Floortile with gray and tan specs	CR 1	PLM	72 hour
	HA22-2	12X12 WHITE Floortile with gray and tan specs	CR1/CR2 Foyer	PLM	72 hour
	HA22-3	12X12 WHITE Floortile with gray and tan specs	CR Office	PLM	72 hour
	HA23-1	12x12 Tan Floortile with Brown Specs	CR2	PLM	72 hour
	HA23-2	12x12 Tan Floortile with Brown Specs	CR2	PLM	72 hour
	HA23-3	12x12 Tan Floortile with Brown Specs	CR2	PLM	72 hour
	HA26-1	6 inch Tan base cove with tan mastic	CR1	PLM	72 hour
	HA26-2	6 inch Tan base cove with tan mastic	CR2	PLM	72 hour
	HA26-3	6 inch Tan base cove with tan mastic	CR Office	PLM	72 hour
	HA27-1	2x2 Ceiling Tile with pinholes and fissures	CR1	PLM	72 hour
	HA27-2	2x2 Ceiling Tile with pinholes and fissures	CR2	PLM	72 hour
	HA27-3	2x2 Ceiling Tile with pinholes and fissures	CR Foyer	PLM	72 hour

Relinquished by Sampler: Signed:	Date	Time	Received by: Signed:	Date	Time
	11/19/25	0900	EFT	11/20/25	930
Relinquished by: Signed:	Date	Time	Received by: Signed:	Date	Time
Relinquished by: Signed:	Date	Time	Received in Lab by: Signed:	Date	Time

Turn Around Time
Standard: _____ RUSH: _____ 3-DAY 1-DAY 2-DAY SAME DAY

Remarks:

RECEIVED EMSL CINNAMINSON NJ NOV 20 AM 11:26

OrderID: 042523080

0425123080

EMSL
ANALYTICAL, INC
Cinnaminson, NJ 08077

PHONE: 1-800-220-3675
E-mail: cs@emsl.com

Asbestos Bulk Building Material

Client P.O # EBHM250033

SEND REPORT TO: **Invoice #**

Name: Pierce Lagle
Company: Goodwyn Mills Cawood
Address: 2400 5th Avenue S
Birmingham, AL 35233
Phone#: (205)879-4462 Cell # (205)533-11174
E-mail(s): pierce.lagle@gmcnetwork.com

PDF: yes no

CLIENT: ACCS

PROJECT NAME/#: ESCC Lolley Gym

SAMPLER(S): (print) Pierce Lagle

Date Collected	Sample ID	Sample Description	Location	Analysis	Turn around
11/17/2025	HA28-1	CMU Coating	CR1	PLM	72 hour
11/17/2025	HA28-2	CMU Coating	CR1	PLM	72 hour
11/17/2025	HA28-3	CMU Coating	CR2	PLM	72 hour
11/17/2025	HA16-2	Gray beige coating on CMU	E19	PLM	72 hour
11/17/2025	HA16-3	Gray beige coating on CMU	E30	PLM	72 hour
11/17/2025	HA16-4	Gray beige coating on CMU	E19	PLM	72 hour
11/17/2025	HA29-1	Boiler	E101	PLM	72 hour
11/17/2025	HA29-2	Boiler	E101	PLM	72 hour
11/17/2025	HA30-1	Pipe run	E101	PLM	72 hour
11/17/2025	HA30-2	Pipe run	E101	PLM	72 hour
11/17/2025	HA30-3	Pipe run	E101	PLM	72 hour
11/17/2025	HA30-4	Pipe run	E101	PLM	72 hour
11/17/2025	HA30-5	Pipe run	E101	PLM	72 hour
11/17/2025	HA31-1	Pipe Joint	E101	PLM	72 hour
11/17/2025	HA31-2	Pipe joint	E101	PLM	72 hour
11/17/2025	HA31-3	Pipe joint	E101	PLM	72 hour
11/17/2025	HA31-4	Pipe Joint	E101	PLM	72 hour
11/17/2025	HA31-5	Pipe joint	E101	PLM	72 hour
11/17/2025	HA32-1	White HVAC MAstic	E102	PLM	72 hour
11/17/2025	HA32-2	White HVAC MAstic	E103	PLM	72 hour
11/17/2025	HA32-3	White HVAC MAstic	E104	PLM	72 hour

Relinquished by Sampler: Signed:	Date	Time	Received by: Signed:	Date	Time	*Turn Around Time*
	11/14/25	09a		to 11/20/25		Standard: ____ RUSH: ____ 3-DAY 1-DAY 2-DAY SAME DAY
Relinquished by: Signed:	Date	Time	Received by: Signed:	Date	Time	Remarks:
Relinquished by: Signed:	Date	Time	Received in Lab by: Signed:	Date	Time	

RECEIVED EMSL CINNAMINSON, NJ 2025 NOV 20 A 11:26

OrderID: 042523080

EMSL Analytical, Inc.

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Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	042521734
Customer ID:	GDWN36
Customer PO:	EBHM250042
Project ID:	

Attention:	Pierce Lagle	**Phone:**	(205) 533-1174
	Goodwyn Mills Cawood LLC	**Fax:**	
	PO Box 242128	**Received Date:**	10/30/2025 10:00 AM
	Montgomery, AL 36124	**Analysis Date:**	10/30/2025 - 11/04/2025
		Collected Date:	

Project: EBHM250042 / ACCS / Enterprise State - Lolley Gym

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA 10-1 *042521734-0001*	Basement - Tan Coating on CMU	Tan Non-Fibrous Homogeneous	HA: 10	100% Non-fibrous (Other)	None Detected
HA 10-2 *042521734-0002*	Basement - Tan Coating on CMU	Tan Non-Fibrous Homogeneous	HA: 10	100% Non-fibrous (Other)	None Detected
HA 1-1 *042521734-0003*	E1 - 1x1 Ceiling Tile with Figures and Pen Holes	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool HA: 1	20% Non-fibrous (Other)	None Detected
HA 11-1- Cove Base *042521734-0004*	E19 - 4" Gray Base Cove Base	Gray Non-Fibrous Homogeneous	HA: 11	100% Non-fibrous (Other)	None Detected
HA 11-1- Mastic *042521734-0004A*	E19 - White /Tan Mastic Assoc with Cove Base	Yellow Non-Fibrous Heterogeneous	HA: 11	100% Non-fibrous (Other)	None Detected
HA 11-1-Joint Compound *042521734-0004B*	E19 - Joint Compound	White Fibrous Homogeneous	HA: 11	100% Non-fibrous (Other)	**<1% Chrysotile**
HA 11-2- Cove Base *042521734-0005*	E30 - 4" Gray Base Cove Base	Gray Non-Fibrous Homogeneous	HA: 11	100% Non-fibrous (Other)	None Detected
HA 11-2- Mastic *042521734-0005A*	E30 - White/Tan Mastic Assoc with Cove Base	Yellow Non-Fibrous Homogeneous	HA: 11	100% Non-fibrous (Other)	None Detected
HA 11-2-Joint Compound *042521734-0005B*	E30 - Joint Compound	White Non-Fibrous Homogeneous	HA: 11	100% Non-fibrous (Other)	**<1% Chrysotile**
HA 1-2 *042521734-0006*	E1 - 1x1 Ceiling Tile with Figures and Pen Holes	Gray/White Fibrous Homogeneous	60% Cellulose 20% Min. Wool HA: 1	20% Non-fibrous (Other)	None Detected
HA 12-1 *042521734-0007*	E19 - 1x1 Ceiling Tile with Figures and Pen Holes	Tan/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool HA: 12	20% Non-fibrous (Other)	None Detected
HA 12-2 *042521734-0008*	E18 - 1x1 Ceiling Tile with Figures and Pen Holes	Gray/White Fibrous Homogeneous	50% Cellulose 30% Min. Wool HA: 12	20% Non-fibrous (Other)	None Detected

Initial report from: 11/04/2025 20:28:37

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EMSL Order:	042521734
Customer ID:	GDWN36
Customer PO:	EBHM250042
Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA 12-3 *042521734-0009*	E38 - 1x1 Ceiling Tile with Figures and Pen Holes	Brown/White Fibrous Homogeneous	30% Cellulose 50% Min. Wool HA: 12	20% Non-fibrous (Other)	None Detected
HA 13-1- Floor Tile *042521734-0010*	E106 - 12x12 White Floor Tile with Brown Specs	Tan Non-Fibrous Homogeneous	HA: 13	100% Non-fibrous (Other)	None Detected
HA 13-1- Mastic *042521734-0010A*	E106 - Tan Mastic Assoc with Floor Tile	Yellow Non-Fibrous Heterogeneous	HA: 13	100% Non-fibrous (Other)	None Detected
HA 13-2- Floor Tile *042521734-0011*	E108 - 12x12 White Floor Tile with Brown Specs	Tan Non-Fibrous Homogeneous	HA: 13	100% Non-fibrous (Other)	None Detected
HA 13-2- Mastic *042521734-0011A*	E108 - Tan Mastic Assoc with Floor Tile	Yellow Non-Fibrous Homogeneous	HA: 13	100% Non-fibrous (Other)	None Detected
HA 14-1-Cove Base *042521734-0012*	E108 - 4" Maroon Base Cove Base	Red Non-Fibrous Homogeneous	HA: 14	100% Non-fibrous (Other)	None Detected
HA 14-1-Mastic *042521734-0012A*	E108 - Mastic	Yellow Non-Fibrous Homogeneous	HA: 14	100% Non-fibrous (Other)	None Detected
HA 14-2-Cove Base *042521734-0013*	E106 - 5" Maroon Base Cove Base	Red/Purple Non-Fibrous Homogeneous	HA: 14	100% Non-fibrous (Other)	None Detected
HA 14-2-Mastic *042521734-0013A*	E106 - Mastic	Yellow Non-Fibrous Homogeneous	HA: 14	100% Non-fibrous (Other)	None Detected
HA 14-2-Joint Compound *042521734-0013B*	E106 - Joint Compound	White Non-Fibrous Homogeneous	HA: 14	100% Non-fibrous (Other)	None Detected
HA 15-1-Drywall *042521734-0014*	E106 - Drywall	Brown/White Fibrous Homogeneous	15% Cellulose 3% Glass HA: 15	82% Non-fibrous (Other)	None Detected
HA 15-1-Joint Compound *042521734-0014A*	E106 - Drywall Joint Compound	White Non-Fibrous Homogeneous	HA: 15	100% Non-fibrous (Other)	None Detected
HA 16-1 *042521734-0015*	E31 - Gray Beige Coating on CMU	Gray/Beige Non-Fibrous Homogeneous	HA: 16	100% Non-fibrous (Other)	**<1% Chrysotile**
HA 17-1-Cove Base *042521734-0016*	Natatorium - White 4" Base Cove Base	White Non-Fibrous Homogeneous	HA: 17	100% Non-fibrous (Other)	None Detected

Initial report from: 11/04/2025 20:28:37

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Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	042521734
Customer ID:	GDWN36
Customer PO:	EBHM250042
Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA 17-1-Mastic *042521734-0016A* *Result includes a small amount of inseparable attached material*	Natatorium - Mastic	Tan/White/Yellow Non-Fibrous Heterogeneous	HA: 17	100% Non-fibrous (Other)	None Detected
HA 18-1-Cove Base *042521734-0017*	E29 - Black 4" Base Cove Base	Black Non-Fibrous Homogeneous	HA: 18	100% Non-fibrous (Other)	None Detected
HA 18-1-Mastic *042521734-0017A*	E29 - Mastic	Brown/Yellow Non-Fibrous Homogeneous	HA: 18	100% Non-fibrous (Other)	None Detected
HA 18-1-Joint Compound *042521734-0017B*	E29 - Joint Compound	White Non-Fibrous Homogeneous	HA: 18	98% Non-fibrous (Other)	**2% Chrysotile**
HA 2-1 *042521734-0018*	E6 - Men's Restroom - 1x1 Ceiling Tile Large Fissures and Pin Holes	Tan/White Fibrous Homogeneous	20% Cellulose 60% Min. Wool HA: 2	20% Non-fibrous (Other)	None Detected
HA 3-1-Insulation *042521734-0019*	E6 - Men's Restroom - 2" White Pipe Run Insulation	Tan Fibrous Homogeneous	95% Min. Wool HA: 3	5% Non-fibrous (Other)	None Detected
HA 3-1-Tar *042521734-0019A*	E6 - Men's Restroom - Tar	Black Non-Fibrous Homogeneous	HA: 3	100% Non-fibrous (Other)	None Detected
HA 3-1-Wrap *042521734-0019B*	E6 - Men's Restroom - Wrap	Tan/Silver Fibrous Homogeneous	35% Cellulose 10% Glass HA: 3	55% Non-fibrous (Other)	None Detected
HA 3-2-Insulation *042521734-0020*	E6 - Men's Restroom - 2" White Pipe Run Insulation	Tan Fibrous Homogeneous	95% Min. Wool HA: 3	5% Non-fibrous (Other)	None Detected
HA 3-2-Tar *042521734-0020A*	E6 - Men's Restroom - Tar	Black Non-Fibrous Homogeneous	HA: 3	100% Non-fibrous (Other)	None Detected
HA 3-2-Wrap *042521734-0020B*	E6 - Men's Restroom - Wrap	Tan/Silver Fibrous Homogeneous	35% Cellulose 10% Glass HA: 3	55% Non-fibrous (Other)	None Detected
HA 3-3-Insulation *042521734-0021*	E36 - 2" White Pipe Run Insulation	Tan Fibrous Homogeneous	95% Min. Wool HA: 3	5% Non-fibrous (Other)	None Detected
HA 3-3-Tar *042521734-0021A*	E36 - Tar	Black Non-Fibrous Homogeneous	HA: 3	100% Non-fibrous (Other)	None Detected
HA 3-3-Wrap *042521734-0021B*	E36 - Wrap	Tan/Silver Fibrous Homogeneous	35% Cellulose 10% Glass HA: 3	55% Non-fibrous (Other)	None Detected

Initial report from: 11/04/2025 20:28:37

EMSL Analytical, Inc.
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EMSL Order:	042521734
Customer ID:	GDWN36
Customer PO:	EBHM250042
Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
HA 4-1 *042521734-0022*	E6 - Men's Restroom - 2" Pipe Elbow Assoc with HA3	Tan/White Fibrous Heterogeneous	10% Min. Wool	90% Non-fibrous (Other)	None Detected
Result includes a small amount of inseparable attached material					
			HA: 4		
HA 4-2 *042521734-0023*	E6 - Men's Restroom - 2" Pipe Elbow Assoc with HA3	Tan/White Fibrous Heterogeneous	10% Min. Wool	90% Non-fibrous (Other)	None Detected
Result includes a small amount of inseparable attached material					
			HA: 4		
HA 4-3 *042521734-0024*	E36 - 2" Pipe Elbow Assoc with HA3	Tan/White Fibrous Heterogeneous	10% Min. Wool	90% Non-fibrous (Other)	None Detected
Result includes a small amount of inseparable attached material					
			HA: 4		
HA 5-1- Insulation *042521734-0025*	E4 - 2" Pipe Run Insulation Fiberglass with Paper Jacketing	Tan Fibrous Homogeneous	95% Min. Wool	5% Non-fibrous (Other)	None Detected
			HA: 5		
HA 5-1 Paper Jacketing *042521734-0025A*	E4 - Paper Jacketing Assoc with Pipe Run Insualtion Fiberglass	Tan/White/Silver Fibrous Homogeneous	55% Cellulose 20% Glass	25% Non-fibrous (Other)	None Detected
			HA: 5		
HA 6-1 *042521734-0026*	E4 - Coating on CMU	Gray/Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 6		
HA 7-1- Base Cove *042521734-0027*	E4 - Concession - Maroon 4" Base Cove	Brown/Red Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 7		
HA 7-1- Mastic *042521734-0027A*	E4 - Concession - Cove Base Mastic	Brown/Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 7		
HA 8-1 *042521734-0028*	Natatorium - White Tan, Beige Coating on CMU	Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 8		
HA 8-2 *042521734-0029*	Natatorium - Coating on CMU	Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 8		
HA 8-3 *042521734-0030*	Natatorium - Coating on CMU	Tan/White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
			HA: 8		
HA 9-1 *042521734-0031*	E103 - Stairwell - One by one Ceiling Tile Large Fissures	Gray/White Fibrous Homogeneous	60% Cellulose 20% Min. Wool	20% Non-fibrous (Other)	None Detected
			HA: 9		

Initial report from: 11/04/2025 20:28:37

0425521734

EMSL
ANALYTICAL, INC
Cinnaminson, NJ 08077

PHONE: 1-800-220-3675
E-mail: cs@emsl.com

Bulk Building Material

Client P.O # EBHM250042

SEND REPORT TO: Invoice #

Name: Pierce Lagle
Company: Goodwyn Mills Cawood
Address: 2400 5th Avenue S Suite 200
Birmingham, AL 35233
Phone#: (205)879-4462 Cell # (205)533-11174
E-mail(s): pierce.lagle@gmcnetwork.com PDF: yes no

Page 1 of 1

CLIENT: ACCS

PROJECT NAME/#: Enterprise State - Lolley Gym

SAMPLER(S): (print) Pierce Lagle

RECEIVED EMSL CINNAMINSON, NJ 2025 OCT 30 A 10:43

Date Collected	Sample ID	Sample Description	Location	Analysis	Turn around
	HA 10-1	Tan coating Coating on CMU	Basement	PLM	72-hour
	HA 10-2	Tan coating Coating on CMU	Basement	PLM	72-hour
	HA 1-1	1x1 ceiling tile with figures and pen holes	E1	PLM	72-hour
	HA 11-1	4 inch grey base cove white/tan mastic	E 19	PLM	72-hour
	HA 11-2	4 inch grey base cove white/tan mastic	E3 0	PLM	72-hour
	HA 1-2	1x1 ceiling tile with figures and pen holes	E1	PLM	72-hour
	HA 12-1	1x1 ceiling tile with fishers and pen holes	E19	PLM	72-hour
	HA 12-2	1x1 ceiling tile with fishers and pen holes	E 108	PLM	72-hour
	HA 12-3	1x1 ceiling tile with fishers and pen holes	E 38	PLM	72-hour
	HA 13-1	12 X 12 white floor tile with brown specs and tan mastic	E 106	PLM	72-hour
	HA 13-2	12 X 12 white floor tile with brown specs and tan mastic	E108	PLM	72-hour
	HA 14-1	4 inch maroon Bass Cove	E 108	PLM	72-hour
	HA 14-2	5 inch maroon Bass Cove	E 106	PLM	72-hour
	HA 15-1	Drywall joint compound	E 106	PLM	72-hour
	HA 16-1	Gray beige coating on CMU	E 31	PLM	72-hour
	HA 17-1	White 4 inch base cove	Natatorium	PLM	72-hour
	HA 18-1	Black 4 inch base Cove	E 29	PLM	72-hour
	HA 2-1	1x1 ceiling tile, large, fissures, pen holes	E6 men's restroom	PLM	72-hour
	HA 3-1	2 inch white pipe run insulation	E6 men's restroom	PLM	72-hour
	HA 3-2	2 inch white pipe run insulation	E6 men's restroom	PLM	72-hour
	HA 3-3	2 inch white pipe run insulation	E 36	PLM	72-hour
	HA 4-1	2 inch pipe elbow associated with HA3	E6 men's restroom	PLM	72-hour
	HA 4-2	2 inch pipe elbow associated with HA3	E6 men's restroom	PLM	72-hour
	HA 4-3	2 inch pipe elbow associated with HA3	E 36	PLM	72-hour
	HA 5-1	2 inch pipe, run insulation fiberglass with paper jacketing	E4	PLM	72-hour
	HA 6-1	Coating on CMU	E4	PLM	72-hour
	HA 7-1	A maroon 4 inch base cove with mastic	E4. Concession.	PLM	72-hour
	HA 8-1	White tan, beige Coating on CMU	Natatorium	PLM	72-hour
	HA 8-2	Coating on CMU	Natatorium	PLM	72-hour
	HA 8-3	Coating on CMU	Natatorium	PLM	72-hour
	HA 9-1	One by one ceiling tile large fissures	E 103 stairwell	PLM	72-hour
	PA 1-1	Gray and red paint on doorway	E4	SW 846-7000B	72-hour
	PA 2-1	Blue chipping floor in natatorium	Natatorium	SW 846-7000B	72-hour
	PA 2-2	Blue chipping floor	Natatorium	SW 846-7000B	72-hour
	PA 3-1	Blue paint off doorway to natatorium	Natatorium	SW 846-7000B	72-hour
	PA 4-1	Paint on railing	Exterior door walkway E 38	SW 846-7000B	72-hour

Composite Drywall Samples but report each layer individually as well.

Relinquished by/Sampler: PL Signed:	Date: 10/28/25	Time: 1145	Received by: Sharyn Hewlett Signed: Shewlett EFX	Date: 10/30/25	Time: 1000	
Relinquished by: Signed:	Date	Time	Received by: Signed:	Date	Time	Remarks:
Relinquished by: Signed:	Date	Time	Received in Lab by: Signed:	Date	Time	

(31 ASB 5 PD)

Split ASB/Lead -SAH

36 SAH

Page 1 Of 1

OrderID: 042521734

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	042521734
Customer ID:	GDWN36
Customer PO:	EBHM250042
Project ID:	

Analyst(s)

Giavanna Marcolongo (21)
Hunter Kelly (31)

Samantha Sweeney, Laboratory Manager
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 “Interim Method”) but augmented with procedures outlined in the 1993 (”final”) version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA LAP, LLC-IHLAP Lab 100194, PA ID# 68-00367, LA #04127

Initial report from: 11/04/2025 20:28:37

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:cs@emsl.com
www.emsl.com

EMSL Order ID: 012540663
LIMS Reference ID: AD40663
EMSL Customer ID: GDWN36A

Attention: Pierce Lagle
Goodwyn Mills Cawood LLC [GDWN36A]
2400 5th Ave S, Suite 200
Birmingham, AL 35233
(205) 533-1174
pierce.lagle@gmcnetwork.com

Project Name: Enterprise State - Lolley Gym

Customer PO: EBHM250042
EMSL Sales Rep: Gillian Egiazarov
Received: 10/30/2025 10:00
Reported: 11/05/2025 18:13

Analytical Results

Analyte	Results	RL	Weight(g)	Prep Date & Tech	Prep Method	Analysis Date & Analyst	Analytical Method	Q	DF
Client Sample ID: PA 1 - 1/Gray and Red Paint on Doorway - E4									**Date Sampled: 10/28/25**
Matrix: Chips									**LIMS Reference ID: AD40663-01**
Lead	11 % wt	0.58 % wt	0.0685	11/05/25 D.W.	SW-846 3050B	11/05/25 PMx	SW846-7000B	D	25
Sample Comments:									
Client Sample ID: PA 2 - 1/Blue Chipping Floor in Natorium - Natatorium									**Date Sampled: 10/28/25**
Matrix: Chips									**LIMS Reference ID: AD40663-02**
Lead	<0.0064 % wt	0.0064 % wt	0.2652	11/05/25 D.W.	SW-846 3050B	11/05/25 PMx	SW846-7000B		1
Sample Comments:									
Client Sample ID: PA 2 - 2/Blue Chipping Floor - Natorium									**Date Sampled: 10/28/25**
Matrix: Chips									**LIMS Reference ID: AD40663-03**
Lead	<0.0064 % wt	0.0064 % wt	0.2532	11/05/25 D.W.	SW-846 3050B	11/05/25 PMx	SW846-7000B		1
Sample Comments:									
Client Sample ID: PA 3 - 1/Blue Paint off Doorway to Natorium - Natorium									**Date Sampled: 10/28/25**
Matrix: Chips									**LIMS Reference ID: AD40663-04**
Lead	0.025 % wt	0.0064 % wt	0.2509	11/05/25 D.W.	SW-846 3050B	11/05/25 PMx	SW846-7000B		1
Sample Comments:									
Client Sample ID: PA 4 - 1/Paint on Railing - Exterior Door Walkway E 38									**Date Sampled: 10/28/25**
Matrix: Chips									**LIMS Reference ID: AD40663-05**
Lead	2.8 % wt	0.063 % wt	0.2524	11/05/25 D.W.	SW-846 3050B	11/05/25 PMx	SW846-7000B	D	10
Sample Comments:									

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
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www.emsl.com

EMSL Order ID: 012540663
LIMS Reference ID: AD40663
EMSL Customer ID: GDWN36A

Attention: Pierce Lagle
Goodwyn Mills Cawood LLC [GDWN36A]
2400 5th Ave S, Suite 200
Birmingham, AL 35233
(205) 533-1174
pierce.lagle@gmcnetwork.com

Project Name: Enterprise State - Lolley Gym

Customer PO: EBHM250042
EMSL Sales Rep: Gillian Egiazarov
Received: 10/30/2025 10:00
Reported: 11/05/2025 18:13

Certified Analyses included in this Report

Analyte	Certifications
SW846-7000B in Chips	
Lead	AIHA LAP

List of Certifications

Code	Description	Number	Expires
NJDEP	New Jersey Department of Environmental Protection	03036	06/30/2026
AIHA LAP	American Industrial Hygiene Association (AIHA LAP, LLC)	100194	04/01/2027
NYSDOH	New York State Department of Health ELAP	10872	04/01/2026
California ELAP	California Water Boards	1877	06/30/2026
A2LA	A2LA Environmental Certificate	2845.01	07/31/2026
21-A2LA	A2LA Food Chem/Mat Sci	2845.15	07/31/2026
PADEP	Pennsylvania Department of Environmental Protection	2845.25	11/30/2025
MADEP	Massachusetts Department of Environmental Protection	M-NJ337	06/30/2026
CTDPH	Connecticut Department of Public Health	PH-0270	06/30/2026

Please see the specific Field of Testing (FOT) on www.emsl.com <http://www.emsl.com> for a complete listing of parameters for which EMSL is certified.

Notes and Definitions

Item	Definition
D	Analyte was reported from a dilution run.
(Dig)	For metals analysis, sample was digested.
[2C]	Reported from the second channel in dual column analysis.
DA	Direct Analysis
DF	Dilution Factor
MDL	Method Detection Limit.
ND	Analyte was NOT DETECTED at or above the detection limit.
NR	Spike/Surrogate showed no recovery.
Q	Qualifier
RCS	Respirable Crystalline Silica
RL	Reporting Limit For paint chips, the RL is 0.008% by wt. (equiv. to 80 mg/kg, or ppm) based upon a minimum sample weight of 0.25 grams. For soils, the RL is 40 mg/kg (ppm) based upon a minimum sample weight of 0.5 grams. For dust wipes, the RL is 10 µg/wipe; reporting units of µg/sq. ft. are not validated by the lab based upon data provided by non-lab personnel.
Wet	Sample is not dry weight corrected.

Measurement of uncertainty and any applicable definitions of method modifications are available upon request. Per EPA NLLAP policy, sample results are not blank corrected.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:cs@emsl.com
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EMSL Order ID: 012540663
LIMS Reference ID: AD40663
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Attention: Pierce Lagle
Goodwyn Mills Cawood LLC [GDWN36A]
2400 5th Ave S, Suite 200
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pierce.lagle@gmcnetwork.com

Project Name: Enterprise State - Lolley Gym

Customer PO: EBHM250042
EMSL Sales Rep: Gillian Egiazarov
Received: 10/30/2025 10:00
Reported: 11/05/2025 18:13



Owen McKenna Laboratory Manager or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. QC sample results are within quality control criteria and met method specifications unless otherwise noted. All results for soil samples are reported on a dry weight basis, unless otherwise noted.

Analysis following EMSL SOP for the Determination of Environmental Lead by FLAA. The laboratory has a reporting limit of 0.0064% by wt., based upon a minimum sample weight of 0.25g submitted to the lab, and is not responsible for any result or reporting limit provided in mg/cm2 since it is dependent upon an area value provided by non-lab personnel. A "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty and definitions of modifications are available upon request. Results in this report are not blank corrected unless specified.

AD406663

EMSL ANALYTICAL, INC Cinnaminson, NJ 08077 PHONE: 1-800-220-3675 E-mail: cs@emsl.com	**Bulk Building Material** Client P.O # EBHM250042	**SEND REPORT TO:** Invoice # Name: Pierce Lagle Company: Goodwyn Mills Cawood Address: 2400 5th Avenue S Suite 200 Birmingham, AL 35233 Phone#: (205)879-4462 Cell #: (205)533-11174 E-mail(s): pierce.lagle@gmcnetwork.com PDF: yes / no	Page 1 of 1
CLIENT: ACCS	PROJECT NAME/#: Enterprise State - Lolley Gym	SAMPLER(S): (print) Pierce Lagle	

RECEIVED
EMSL
CINNAMINSON, NJ
2025 OCT 30 A 10:43

Date Collected	Sample ID	Sample Description	Location	Analysis	Turn around
	HA 10-1	Tan coating Coating on CMU	Basement	PLM	72-hour
	HA 10-2	Tan coating Coating on CMU	Basement	PLM	72-hour
	HA 1-1	1x1 ceiling tile with figures and pen holes	E1	PLM	72-hour
	HA 11-1	4 inch grey base cove white/tan mastic	E 19	PLM	72-hour
	HA 11-2	4 inch grey base cove white/tan mastic	E3 0	PLM	72-hour
	HA 1-2	1x1 ceiling tile with figures and pen holes	E1	PLM	72-hour
	HA 12-1	1x1 ceiling tile with fishers and pen holes	E19	PLM	72-hour
	HA 12-2	1x1 ceiling tile with fishers and pen holes	E 108	PLM	72-hour
	HA 12-3	1x1 ceiling tile with fishers and pen holes	E 38	PLM	72-hour
	HA 13-1	12 X 12 white floor tile with brown specs and tan mastic	E 106	PLM	72-hour
	HA 13-2	12 X 12 white floor tile with brown specs and tan mastic	E108	PLM	72-hour
	HA 14-1	4 inch maroon Bass Cove	E 108	PLM	72-hour
	HA 14-2	5 inch maroon Bass Cove	E 106	PLM	72-hour
	HA 15-1	Drywall joint compound	E 106	PLM	72-hour
	HA 16 -1	Gray beige coating on CMU	E 31	PLM	72-hour
	HA 17-1	White 4 inch base cove	Natatorium	PLM	72-hour
	HA 18-1	Black 4 inch base Cove	E 29	PLM	72-hour
	HA 2-1	1x1 ceiling tile, large, fissures, pen holes	E6 men's restroom	PLM	72-hour
	HA 3-1	2 inch white pipe run insulation	E6 men's restroom	PLM	72-hour
	HA 3-2	2 inch white pipe run insulation	E6 men's restroom	PLM	72-hour
	HA 3-3	2 inch white pipe run insulation	E 36	PLM	72-hour
	HA 4-1	2 inch pipe elbow associated with HA3	E6 men's restroom	PLM	72-hour
	HA 4-2	2 inch pipe elbow associated with HA3	E6 men's restroom	PLM	72-hour
	HA 4-3	2 inch pipe elbow associated with HA3	E 36	PLM	72-hour
	HA 5-1	2 inch pipe, run insulation fiberglass with paper jacketing	E4	PLM	72-hour
	HA 6-1	Coating on CMU	E4	PLM	72-hour
	HA 7-1	A maroon 4 inch base cove with mastic	E4. Concession.	PLM	72-hour
	HA 8-1	White tan, beige Coating on CMU	Natatorium	PLM	72-hour
	HA 8-2	Coating on CMU	Natatorium	PLM	72-hour
	HA 8-3	Coating on CMU	Natatorium	PLM	72-hour
	HA 9-1	One by one ceiling tile large fissures	E 103 stairwell	PLM	72-hour
	PA 1-1	Gray and red paint on doorway	E4	SW 846-7000B	72-hour
	PA 2-1	Blue chipping floor in natatorium	Natatorium	SW 846-7000B	72-hour
	PA 2-2	Blue chipping floor	Natatorium	SW 846-7000B	72-hour
	PA 3-1	Blue paint off doorway to natatorium	Natatorium	SW 846-7000B	72-hour
	PA 4-1	Paint on railing	Exterior door walkway E 38	SW 846-7000B	72-hour

Composite Drywall Samples but report each layer individually as well.

Relinquished by Sampler: PL Signed:	Date: 10/28/25	Time: 1145	Received by: Shaun Newlet Signed: Shaun Newlet EFX	Date: 10/30/25	Time: 1000	
Relinquished by: Signed:	Date:	Time:	Received by: Signed:	Date:	Time:	Remarks:
Relinquished by: Signed:	Date:	Time:	Received in Lab by: Signed:	Date:	Time:	

(31 ASB 5Pb)

96hr TAT Lead ES&

Split ASB/Lead - SAH

21 SAH

AD406663

EMSL ANALYTICAL, INC Cinnaminson, NJ 08077 PHONE: 1-800-220-3675 E-mail: cs@emsl.com	**Bulk Building Material** Client P.O # EBHM250042	**SEND REPORT TO:** Name: Pierce Lagle Company: Goodwyn Mills Cawood Address: 2400 5th Avenue S Suite 200 Birmingham, AL 35233 Phone#: (205)879-4462 E-mail(s): pierce.lagle@gmcnetwork.com	Invoice # Page 1 of 1 Cell # (205)533-11174 PDF: yes no

CLIENT:	PROJECT NAME/#:	SAMPLER(S):
ACCS	Enterprise State - Lolley Gym	(print) Pierce Lagle

RECEIVED
EMSL
CINNAMINSON NJ
2025 OCT 30 A 10:43

Date Collected	Sample ID	Sample Description	Location	Analysis	Turn around
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	HA 14-2	5 inch maroon Bass Cove	E 106	PLM	72-hour
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	HA 3-1	2 inch white pipe run insulation	E6 men's restroom	PLM	72-hour
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	HA 8-1	White tan, beige Coating on CMU	Natatorium	PLM	72-hour
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	HA 8-3	Coating on CMU	Natatorium	PLM	72-hour
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	PA 2-1	Blue chipping floor in natatorium	Natatorium	SW 846-7000B	72-hour
	PA 2-2	Blue chipping floor	Natatorium	SW 846-7000B	72-hour
	PA 3-1	Blue paint off doorway to natatorium	Natatorium	SW 846-7000B	72-hour
	PA 4-1	Paint on railing	Exterior door walkway E 38	SW 846-7000B	72-hour

Composite Drywall Samples but report each layer individually as well.

Relinquished by Sampler: PL Signed:	Date: 10/28/25	Time: 1145	Received by: Sharyn Hewlett Signed: Shewlett EFX	Date: 10/30/25	Time: 1000	
Relinquished by: Signed:	Date:	Time:	Received by: Signed:	Date:	Time:	Remarks:
Relinquished by: Signed:	Date:	Time:	Received in Lab by: Signed:	Date:	Time:	

(31 ASB SPL)

90 hr TAT Lead EQ ∞

Split ASB/Lead - SAH

36 SAH

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:cs@emsl.com
www.emsl.com

EMSL Order ID: 012543059
LIMS Reference ID: AD43059
EMSL Customer ID: GDWN36A

Attention: Pierce Lagle
Goodwyn Mills Cawood LLC [GDWN36A]
2400 5th Ave S, Suite 200
Birmingham, AL 35233
(205) 533-1174
pierce.lagle@gmcnetwork.com

Project Name: Enterprise State - Lolley Gym

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/20/2025 09:30
Reported: 11/26/2025 14:17

Analytical Results

Analyte	Results	RL	Weight(g)	Prep Date & Tech	Prep Method	Analysis Date & Analyst	Analytical Method	Q	DF
Client Sample ID: PA 1-2/E21 Doorframe									**Date Sampled: 11/17/25**
Matrix: Chips									**LIMS Reference ID: AD43059-01**
Lead	9.4 % wt	0.27 % wt	0.0599	11/24/25 D.W.	SW-846 3050B	11/26/25 SD	SW846-7000B	D	10
Sample Comments:									
Client Sample ID: PA 1-3/E26 Doorframe									**Date Sampled: 11/17/25**
Matrix: Chips									**LIMS Reference ID: AD43059-02**
Lead	8.5 % wt	0.20 % wt	0.0796	11/24/25 D.W.	SW-846 3050B	11/26/25 SD	SW846-7000B	D	10
Sample Comments:									
Client Sample ID: PA 1-4/Doorframe From E31 to E32									**Date Sampled: 11/17/25**
Matrix: Chips									**LIMS Reference ID: AD43059-03**
Lead	3.2 % wt	0.086 % wt	0.0925	11/24/25 D.W.	SW-846 3050B	11/26/25 SD	SW846-7000B	D	5
Sample Comments:									
Client Sample ID: PA 1-5/E37 Doorframe									**Date Sampled: 11/17/25**
Matrix: Chips									**LIMS Reference ID: AD43059-04**
Lead	11 % wt	0.44 % wt	0.0917	11/24/25 D.W.	SW-846 3050B	11/26/25 SD	SW846-7000B	D	25
Sample Comments:									

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:cs@emsl.com
www.emsl.com

EMSL Order ID: 012543059
LIMS Reference ID: AD43059
EMSL Customer ID: GDWN36A

Attention: Pierce Lagle
Goodwyn Mills Cawood LLC [GDWN36A]
2400 5th Ave S, Suite 200
Birmingham, AL 35233
(205) 533-1174
pierce.lagle@gmcnetwork.com

Project Name: Enterprise State - Lolley Gym

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/20/2025 09:30
Reported: 11/26/2025 14:17

Certified Analyses included in this Report

Analyte	Certifications
SW846-7000B in Chips	
Lead	AIHA LAP

List of Certifications

Code	Description	Number	Expires
NJDEP	New Jersey Department of Environmental Protection	03036	06/30/2026
AIHA LAP	American Industrial Hygiene Association (AIHA LAP, LLC)	100194	04/01/2027
NYSDOH	New York State Department of Health ELAP	10872	04/01/2026
California ELAP	California Water Boards	1877	06/30/2026
A2LA	A2LA Environmental Certificate	2845.01	07/31/2026
21-A2LA	A2LA Food Chem/Mat Sci	2845.15	07/31/2026
PADEP	Pennsylvania Department of Environmental Protection	2845.25	11/30/2025
MADEP	Massachusetts Department of Environmental Protection	M-NJ337	06/30/2026
CTDPH	Connecticut Department of Public Health	PH-0270	06/30/2026

Please see the specific Field of Testing (FOT) on www.emsl.com <http://www.emsl.com> for a complete listing of parameters for which EMSL is certified.

Notes and Definitions

Item	Definition
D	Analyte was reported from a dilution run.
(Dig)	For metals analysis, sample was digested.
[2C]	Reported from the second channel in dual column analysis.
DA	Direct Analysis
DF	Dilution Factor
MDL	Method Detection Limit.
ND	Analyte was NOT DETECTED at or above the detection limit.
NR	Spike/Surrogate showed no recovery.
Q	Qualifier
RCS	Respirable Crystalline Silica
RL	Reporting Limit
	For paint chips, the RL is 0.008% by wt. (equiv. to 80 mg/kg, or ppm) based upon a minimum sample weight of 0.25 grams.
	For soils, the RL is 40 mg/kg (ppm) based upon a minimum sample weight of 0.5 grams.
	For dust wipes, the RL is 10 µg/wipe; reporting units of µg/sq. ft. are not validated by the lab based upon data provided by non-lab personnel.
Wet	Sample is not dry weight corrected.

Measurement of uncertainty and any applicable definitions of method modifications are available upon request. Per EPA NLLAP policy, sample results are not blank corrected.

EMSL Analytical, Inc.

200 Route 130, Cinnaminson, NJ, 08077
Telephone: 856-858-4800 Fax:cs@emsl.com
www.emsl.com

EMSL Order ID: 012543059
LIMS Reference ID: AD43059
EMSL Customer ID: GDWN36A

Attention: Pierce Lagle
Goodwyn Mills Cawood LLC [GDWN36A]
2400 5th Ave S, Suite 200
Birmingham, AL 35233
(205) 533-1174
pierce.lagle@gmcnetwork.com

Project Name: Enterprise State - Lolley Gym

Customer PO:
EMSL Sales Rep: Gillian Egiazarov
Received: 11/20/2025 09:30
Reported: 11/26/2025 14:17



Owen McKenna Laboratory Manager or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. QC sample results are within quality control criteria and met method specifications unless otherwise noted. All results for soil samples are reported on a dry weight basis, unless otherwise noted.

Analysis following EMSL SOP for the Determination of Environmental Lead by FLAA. The laboratory has a reporting limit of 0.0064% by wt., based upon a minimum sample weight of 0.25g submitted to the lab, and is not responsible for any result or reporting limit provided in mg/cm2 since it is dependent upon an area value provided by non-lab personnel. A "<" (less than) result signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty and definitions of modifications are available upon request. Results in this report are not blank corrected unless specified.

AD43059

EMSL	**Bulk Building Material**	**SEND REPORT TO:**	**Invoice #**
ANALYTICAL, INC		Name: Pierce Lagle	
Cinnaminson, NJ 08077		Company: Goodwyn Mills Cawood	
		Address: 2400 5th Avenue S Suite 200	Page 1 of 1
PHONE: 1-800-220-3675		Birmingham, AL 35233	
E-mail: cs@emsl.com	**Client P.O # EBHM250042**	Phone#: (205)879-4462	Cell # (205)533-11174
		E-mail(s): pierce.lagle@gmcnetwork.com	PDF: yes / no

CLIENT:	PROJECT	SAMPLER(S):
ACCS	NAME/#: Enterprise State - Lolley Gym	(print) Pierce Lagle

Date Collected	Sample ID	Sample Description	Location	Analysis	Turn around
11/7/25	PA 1-2	Paint on Doorways	E21 Doorframe	SW 846-7000B	96-hour
	PA 1-3	Paint on Doorways	E26 Doorframe	SW 846-7000B	96-hour
	PA 1-4	Paint on Doorways	Doorframe from E31 to E32	SW 846-7000B	96-hour
	PA 1-5	Paint on Doorways	E37 Doorframe	SW 846-7000B	96-hour

RECEIVED
EMSL
CINNAMINSON, NJ
2025 NOV 20 A 11:28

Composite Drywall Samples but report each layer individually as well.

	Date	Time		Date	Time	
Relinquished by Sampler: Signed:	11/19/25	0800	Received by: Angie O'Neill Signed: EFK	11/20/25	0930	
Relinquished by: Signed:			Received by: Signed:			Remarks:
Relinquished by: Signed:			Received in Lab by: Signed:			

(4) AD

AD43059

EMSL	**Bulk Building Material**	**SEND REPORT TO:**	**Invoice #**
ANALYTICAL, INC		Name: Pierce Lagle	
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PHONE: 1-800-220-3675		Birmingham, AL 35233	
E-mail: cs@emsl.com	**Client P.O # EBHM250042**	Phone#: (205)879-4462	Cell # (205)533-11174
		E-mail(s): pierce.lagle@gmcnetwork.com	PDF: yes / no

CLIENT: ACCS	PROJECT NAME/#: Enterprise State - Lolley Gym	SAMPLER(S): (print) Pierce Lagle

Date Collected	Sample ID	Sample Description	Location	Analysis	Turn around
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RECEIVED
EMSL
CINNAMINSON, NJ
2025 NOV 20 A 11:28

Composite Drywall Samples but report each layer individually as well.

	Date	Time		Date	Time	
Relinquished by Sampler: Signed:	11/19/25	0900	Received by: Angie O'Neill Signed: EFK	11/20/25	0930	
Relinquished by: Signed:	Date	Time	Received by: Signed:	Date	Time	Remarks:
Relinquished by: Signed:	Date	Time	Received in Lab by: Signed:	Date	Time	

(4) AD

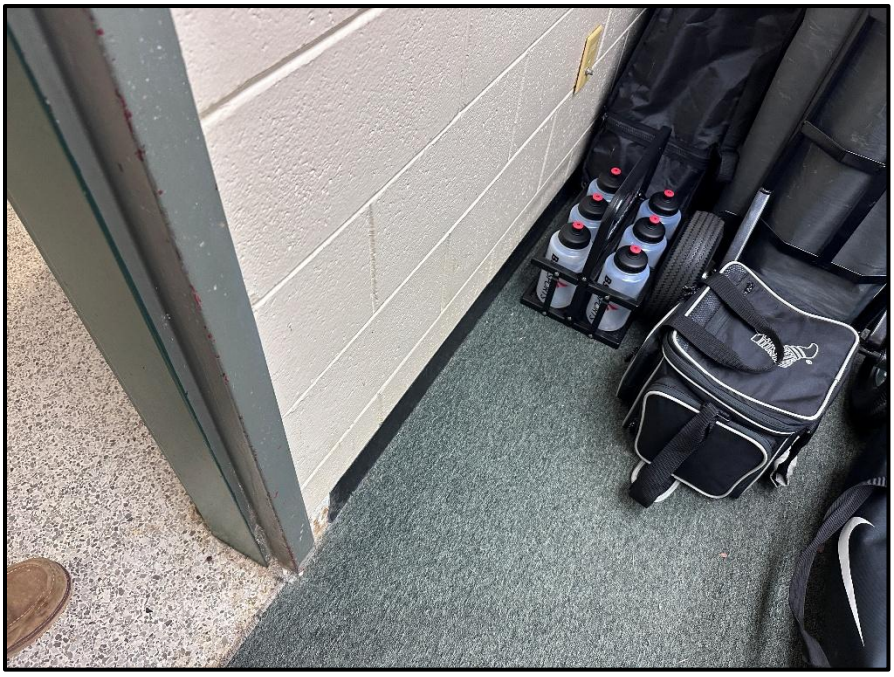
APPENDIX B
Photo Pages

P-1



View of black ACM wrapping on piping (HA21)

P-2



View of ACM 4” black basecove with tan/brown mastic (HA18)

P-3



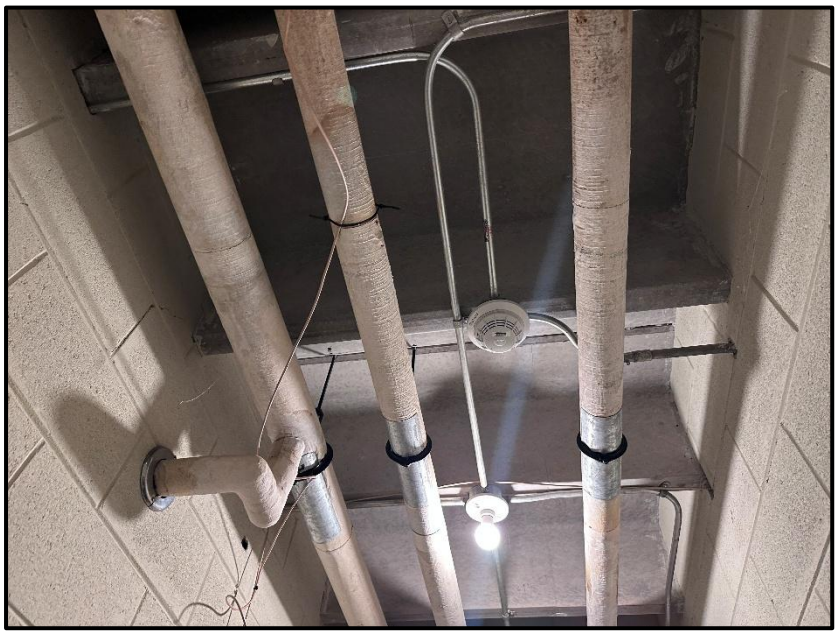
View of ACM white pipe insulation (HA3 & HA4)

P-4



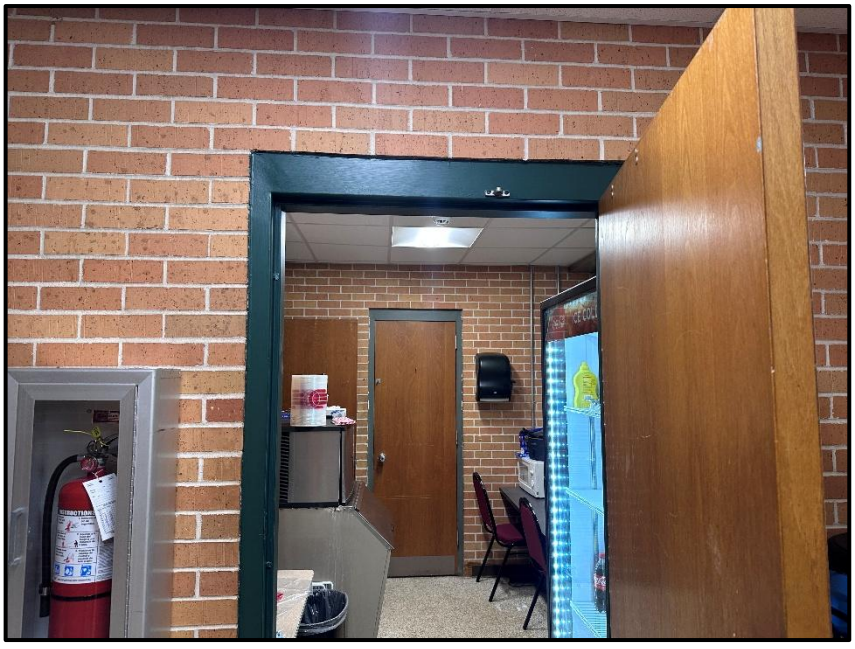
View of ACM white pipe insulation (HA3 & HA4)

P-5



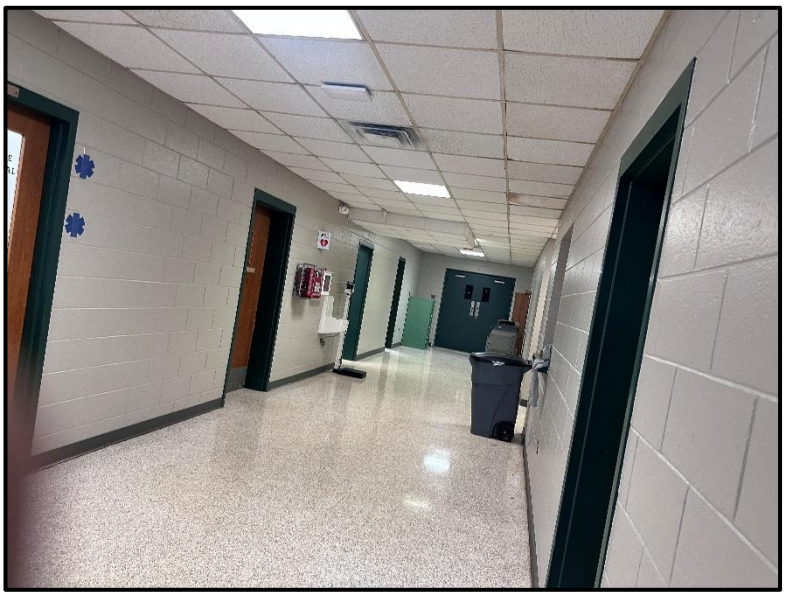
View of ACM white pipe joint on left of image (HA24)

P-6



View of lead containing paint on door frames within the subject building

P-7



View of lead containing paint on door frames within the subject building

P-8



View of exterior lead containing paint on railing north of the natatorium

APPENDIX C
Credentials of Inspector

THE UNIVERSITY OF ALABAMA®

UA SafeState

has examined the documentation of asbestos training and qualifications of the person named below and confers this

Certificate of Accreditation

Asbestos Inspector Renewal

Pierce Lagle

Alabama Accreditation Number

AIN0225721396

Certificate Expiration Date

February 5, 2026

This certificate has been issued pursuant to the authority granted to The University of Alabama SafeState Program by the Alabama Asbestos Contractor Accreditation Act, Alabama Act No. 89-517, May, 1989 and Alabama Act No. 97-626, May, 1997.

Environmental Services Manager

Associate Director for Environmental Programs