

Project Manual

New Building For  
EOC / 911 Dispatch  
**Pamlico County**  
103 N. Third Street  
Bayboro, North Carolina 28515



**PRE-BID DATE:** October 7, 2024  
**PRE-BID TIME:** 2:00 pm  
**PRE-BID LOCATION:** Patsy H. Sadler Room (Commissioner's Room)  
Pamlico County Courthouse  
202 Main Street, Bayboro, NC

**BID DATE:** October 17, 2024  
**BID TIME:** 2:00 pm  
**BID LOCATION:** Patsy H. Sadler Room (Commissioner's Room)  
Pamlico County Courthouse  
202 Main Street, Bayboro, NC



## **BID SET**

### **Specification Book 1 of 2**

September 2024

Architect's Project Number: 24017

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Oakley Collier Architects, PA  
109 Candlewood Road  
Rocky Mount, North Carolina 27804  
205 West Martin Street  
Raleigh, North Carolina 27601





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**PROJECT PERSONNEL**

**PROJECT:** New Facility for  
Pamlico County EOC / 911 Dispatch  
103 N. Third Street  
Bayboro, North Carolina 28515

**PROJECT NO:** 24017

**DATE:** September 2024

**OWNER:** Pamlico County  
302 Main Street  
P.O. Box 776  
Bayboro, North Carolina 28515

**ARCHITECT:** Oakley Collier Architects, P.A.  
109 Candlewood Road  
Rocky Mount, North Carolina 27804  
252-937-2500  
Firm License No. 50681

**CIVIL ENGINEER:** Stocks Engineering  
P.O. Box 1108  
Nashville, North Carolina 27856  
Firm License No. C-1874

**STRUCTURAL ENGINEER:** Scalene Design  
421 N. Harrington St., Suite 440  
Raleigh, North Carolina 27603  
Firm License No. P-1591

**PME ENGINEER:** Atlantec Engineering, PA  
3221 Blue Ridge Rd #113  
Raleigh, North Carolina 27612  
Firm License No. C-961

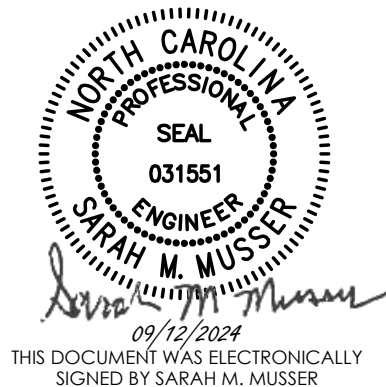


### CERTIFICATION OF TECHNICAL SPECIFICATIONS

The following Technical Specifications found in this project manual were prepared by the Design Professional whose name and stamp appear below.

<u>Specification Section</u>	<u>Specification Title</u>
014100	Special Inspections
033000	Cast in place Concrete
040511	Masonry Mortar and Grout
042000	Masonry
054000	Cold Form Metal Framing – Load Bearing
061000	Rough Carpentry
061753	Shop Fabricated Wood Trusses
316219	Timber Piles

<u>Full Name</u>	<u>Discipline</u>
Scalene Design Firm License #P-1591	Structural Engineer
Sarah Musser, PE PE License #031551 421 N Harrington St Raleigh, NC 27603 Phone: 919-825-0295 E-mail: smusser@scalene-design.com	







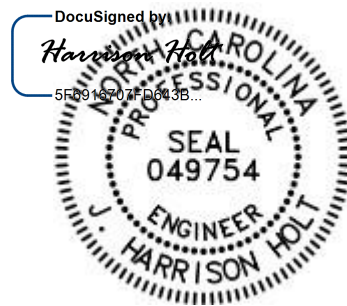
**CERTIFICATION OF TECHNICAL SPECIFICATIONS**

The following Technical Specifications found in this project manual were prepared by the Design Professional whose name and stamp appear below.

<u>Specification Section</u>	<u>Specification Title</u>
22 00 00	Plumbing Requirements

<u>Full Name</u>	<u>Discipline</u>
Atlantec Engineers, PA Firm License C-961	Mechanical Engineer
J. Harrison Holt, PE PE License 049754 3221 Blue Ridge Rd. Suite 113 Raleigh, NC 27612 Phone: 919-571-1111 E-mail: <a href="mailto:harrison@atlantecengineers.com">harrison@atlantecengineers.com</a>	

Seal



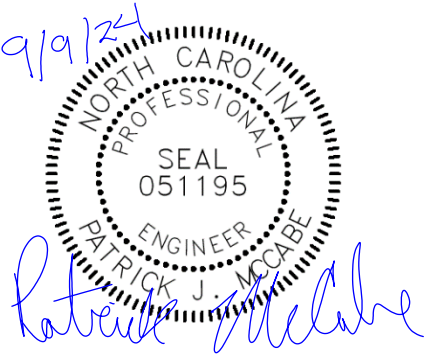
9/12/24



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<u>Specification Section</u>	<u>Specification Title</u>
230500	GENERAL MECHANICAL REQUIREMENTS
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230529	PIPE HANGERS AND SUPPORTS
230548	VIBRATION ISOLATION
230553	IDENTIFICATION OF HVAC COMPONENTS
230593	TESTING AND BALANCING
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233700	AIR DISTRIBUTION
235533	GAS FIRED UNIT HEATER
236213	AIR COOLED CONDENSING UNIT
238143	SPLIT SYSTEM HEAT PUMP


<u>Full Name</u>	<u>Discipline</u>	<u>Seal</u>
Atlantec Engineers, PA Firm License C-961	Mechanical Engineer	
Patrick J. McCabe, PE PE License 051195 3221 Blue Ridge Rd. Suite 113 Raleigh, NC 27612 Phone: 919-571-1111 E-mail: <a href="mailto:patrick@atlantecengineers.com">patrick@atlantecengineers.com</a>		



**CERTIFICATION OF TECHNICAL SPECIFICATIONS**

The following Technical Specifications found in this project manual were prepared by the Design Professional whose name and stamp appear below.

<u>Specification Section</u>	<u>Specification Title</u>
26 00 00	General Provisions Electrical
26 05 20	Wires and Cables
26 05 33	Boxes and Cabinets
26 05 45	Conduit and Conduit Fittings
26 24 16	Panel Boards and Circuit Breaker
26 27 26	Wiring Devices
26 27 27	Disconnects
26 51 00	Lighting Fixtures
28 31 00	Addressable Fire Alarm System

<u>Full Name</u>	<u>Discipline</u>	<u>Seal</u>
Atlantec Engineers, PA Firm License C-961	Electrical Engineer	
Matthew C. Briley, P.E. PE License 048828 3221 Blue Ridge Rd. Suite 113 Raleigh, NC 27612 Phone: 919-571-1111 E-mail: matthew@atlantecengineers.com		









## NOTICE TO BIDDERS

Sealed proposals will be received until 2:00pm on October 17, 2024, in the Patsy H. Sadler Room (Commissioner's Room) at Pamlico County Courthouse, 202 Main Street, Bayboro, NC 28515 (or mailed to P.O. Box 776, Bayboro, North Carolina 28515 marked to the attention of Tim Buck) and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment entering into the construction of the

New Facility for  
Pamlico County EOC / 911 Dispatch

The Project consists of the construction of a 5,165 square foot one story building including site development, plumbing, mechanical and electrical systems. The building includes a 911 Dispatch, an EOC / Training room, offices, storage bays, and support spaces. Construction includes wood trusses, slab on grade, load bearing CMU walls with brick veneer, single ply roof membrane system, and steel stud interior walls.

Bids will be received for Single Prime Contracts. All proposals shall be lump sum.

### Pre-Bid Meeting

An open Pre-bid Meeting will be held at 2:00pm on October 7, 2024, in Patsy H. Sadler Room (Commissioner's Room) at Pamlico County Courthouse, 202 Main Street, Bayboro, NC 28515. The meeting will address project specific questions, issues, bidding procedures and bid forms.

Complete plans, specifications and contract documents will be open for inspection in the offices of Oakley Collier Architects, P.A., 109 Candlewood Road, Rocky Mount, NC 27804 (252.937.2500), and in the plan rooms of the Carolinas Associated General Contractors, Raleigh, NC, in the local North Carolina offices of Dodge Data & Analytics,, in McGee Cadd Reprographics Greenville, NC, and in the Eastern Regional Office of Construction Market Data in Norcross, GA and in Minority Plan Rooms in the NC Institute of Minority Economic Development, Inc in Durham, NC and in East Coast Digital – Minority Plan Room Provider, Greenville, NC.

Complete plans and specifications for this project are available free of charge for a Digital Download or for \$350.00 (refundable) deposit by cash or certified check for hard copies. Either format can be obtained from Oakley Collier Architects, 109 Candlewood Road, Rocky Mount, NC 27804, 252.937.2500, or by emailing Ashley Seaman ([aseaman@oakleycollier.com](mailto:aseaman@oakleycollier.com)) beginning September 17, 2024, during normal office hours. Plans will also be available in the plan rooms of the Carolinas Associated General Contractors, Raleigh, NC, in McGee Cadd Reprographics Greenville, NC, in the local North Carolina offices of Dodge Data & Analytics, and in the Construct Connect in Norcross, GA and in Minority Plan Rooms in the NC Institute of Minority Economic Development, Inc in Durham, NC and in East Coast Digital – Minority Plan Room Provider, Greenville, NC.

NOTE: The bidder shall include with the bid proposal the form Identification of Minority Business Participation identifying the minority business participation it will use on the project and shall include either Affidavit A or Affidavit B as applicable. Forms and instructions are included within the Proposal

Form in the bid documents. Failure to complete these forms is grounds for rejection of the bid. (GS143-128.2c Effective 1/1/2002.) All contractors are hereby notified that they must have proper license as required under the state laws governing their respective trades.

All contractors are hereby notified that they must have proper license as required under the state laws governing their respective trades.

General contractors are notified that Chapter 87, Article 1, General Statutes of North Carolina, will be observed in receiving and awarding general contracts. General contractors submitting bids on this project must have license classification for "Unlimited".

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, of an amount equal to not less than five percent (5%) of the proposal or in lieu thereof a bidder may offer a bid bond of five percent (5%) of the bid executed by a surety company licensed under the laws of North Carolina to execute such bonds, conditioned that the surety will, upon demand forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract in accordance with the bid bond. Said deposit shall be retained by the Owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or to give satisfactory surety as required by law.

A Performance Bond and a Payment Bond will be required for one hundred percent (100%) of the contract price.

Payment will be made based on ninety-five percent (95%) of monthly estimates and final payment made upon completion and acceptance of work.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 60 days.

The owner reserves the right to reject any or all bids and to waive informalities.

Owner: Pamlico County  
Attn: Tim Buck  
302 Main Street  
P.O. Box 776  
Bayboro, North Carolina 28515

Architect: Oakley Collier Architects, PA  
Attn: Jennifer Starkey  
109 Candlewood Road  
Rocky Mount, NC 27804



# AIA<sup>®</sup> Document A701<sup>™</sup> – 2018

## Instructions to Bidders

for the following Project:  
(Name, location, and detailed description)

**THE OWNER:**  
(Name, legal status, address, and other information)

**THE ARCHITECT:**  
(Name, legal status, address, and other information)

OAKLEY COLLIER ARCHITECTS, PA  
109 CANDLEWOOD ROAD  
ROCKY MOUNT, NC 27804

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- 2 BIDDER'S REPRESENTATIONS
- 3 BIDDING DOCUMENTS
- 4 BIDDING PROCEDURES
- 5 CONSIDERATION OF BIDS
- 6 POST-BID INFORMATION
- 7 PERFORMANCE BOND AND PAYMENT BOND
- 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

### ADDITIONS AND DELETIONS:

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

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

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612<sup>™</sup>-2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

## ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

## ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

## ARTICLE 3 BIDDING DOCUMENTS

### § 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

*(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)*

EMAIL

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

### § 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.  
*(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)*

EMAIL

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

### § 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

#### § 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

#### § 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

*(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)*

EMAIL

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

### ARTICLE 4 BIDDING PROCEDURES

#### § 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

#### § 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

*(Insert the form and amount of bid security.)*

SUBMIT BID BOND (AIA 310-2010), CASH, OR CERTIFIED CHECK IN THE AMOUNT OF 50% OF THE BID.

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.



§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning days after the opening of Bids, withdraw its Bid and request the return of its bid security.

### § 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:

*(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)*

SUBMIT PAPER COPY IN COMPLIANCE WITH BIDDING REQUIREMENTS.

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

### § 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:

*(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)*

OWNER SHALL RETAIN BID SECURITY

## ARTICLE 5 CONSIDERATION OF BIDS

### § 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

## **§ 5.2 Rejection of Bids**

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

## **§ 5.3 Acceptance of Bid (Award)**

**§ 5.3.1** It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

**§ 5.3.2** Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

## **ARTICLE 6 POST-BID INFORMATION**

### **§ 6.1 Contractor's Qualification Statement**

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

### **§ 6.2 Owner's Financial Capability**

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

### **§ 6.3 Submittals**

**§ 6.3.1** After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

**§ 6.3.2** The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

**§ 6.3.3** Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

**§ 6.3.4** Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

## **ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND**

### **§ 7.1 Bond Requirements**

**§ 7.1.1** If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.



§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

*(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)*

## § 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

## ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.

*(Insert the complete AIA Document number, including year, and Document title.)*

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.

*(Insert the complete AIA Document number, including year, and Document title.)*

USE FORMS INCLUDED IN PROJECT MANUAL

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.

*(Insert the complete AIA Document number, including year, and Document title.)*

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

*(Insert the date of the E203-2013.)*

NOT REQUIRED

.5 Drawings

<del>Number</del>	<del>Title</del>	<del>Date</del>
.6	Specifications	

<del>Section</del>	<del>Title</del>	<del>Date</del>	<del>Pages</del>
.7	Addenda:		

<del>Number</del>	<del>Date</del>	<del>Pages</del>
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.8 ~~Other Exhibits.~~  
*(Check all boxes that apply and include appropriate information identifying the exhibit where required.)*

~~AIA Document E204™ 2017, Sustainable Projects Exhibit, dated as indicated below.~~  
*(Insert the date of the E204-2017.)*

~~The Sustainability Plan.~~

<del>Title</del>	<del>Date</del>	<del>Pages</del>
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~~Supplementary and other Conditions of the Contract.~~

<del>Document</del>	<del>Title</del>	<del>Date</del>	<del>Pages</del>
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.9 Other documents listed below:  
*(List here any additional documents that are intended to form part of the Proposed Contract Documents.)*

A312-2010 PERFORMANCE BOND  
A312-2010 PAYMENT BOND  
G704-2017 CERTIFICATE OF SUBSTANTIAL COMPLETION  
G706A-1994 CONTRACTORS RELEASE OF LIENS

**SUPPLEMENTARY INSTRUCTIONS TO BIDDERS**

Note the following changes and additions to the printed AIA Document A701, Instructions to Bidders, 2018 Edition.

**ARTICLE 3 - BIDDING DOCUMENTS**

Add the following subparagraphs to Section 3.2:

"3.2.4 Whenever there are discrepancies between Drawings, or between the Drawings and Specifications, or conflicts within the Specifications, and such discrepancy is not called to the Architect's attention in time to permit clarification by Addendum, the bidder shall base his bid upon providing the better quality or greater quantity of work or material called for, shall submit a written statement with his proposal noting such discrepancies, and shall so furnish and install such better quality or greater quantity unless otherwise ordered in writing."

**ARTICLE 4 - BIDDING PROCEDURES**

Add the following to Subparagraph 4.1.1:

"Proposals shall be submitted on the extra proposal form attached to this Project Manual. The Form of Proposal bound into the Project Manual is for reference only and shall not be removed. Proposals submitted shall include the following items: Single-Prime General Contractor Form of Proposal, Bid Bond, and MBE forms."

Add the following Subparagraphs 4.2.4 and 4.2.5:

4.2.4 Bids shall be accompanied by a cash-deposit or a certified check drawn on and certified by a bank or trust company insured by the Federal Deposit Insurance Corporation, in an amount not less than 5 percent of the bid, or in lieu thereof, a bidder may offer a bid bond of 5 percent of bid.

"4.2.5 Certified checks and/or Bid Bonds shall be pinned or clipped to the Proposal Form."

Add the following to Subparagraph 4.3.1:

"Proposals shall be hand carried to the time and place indicated in the Contract Documents by a representative of the Contractor, in sealed envelopes bearing the address of the Owner, the name of the project, the bidder's name, and State license number. Bids shall be submitted in separate envelopes for single-prime and multi-prime bids. Each bid shall carry separate bid bonds. Bids may also be delivered by certified mail, receipt required."

Add the following to Subparagraph 4.4.1:

"No bid may be withdrawn after the scheduled closing time for receipt of bids for a period of sixty (60) days."

Add the following to Subparagraph 4.4.2:

"Proposals may be modified by an authorized representative of the bidder **IN PERSON AT PLACE OF BID OPENING PRIOR TO TIME OF OPENING BIDS ONLY**. Modifications submitted by any other means **WILL NOT BE CONSIDERED**."

#### **ARTICLE 5 - CONSIDERATION OF BIDS**

Subparagraph 5.3.1 – Delete and substitute the following 5.3.1:

"It is the intention of the Owner to award the contract to the most suited responsive bidder submitting the proposal to the Owner and whose construction skill and financial resources are fully equal to the task of executing the work in a rapid and satisfactory manner, and of completing the work within the time limit. The owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests."

Add the following to subparagraph 5.3.2:

"The Owner's acceptance of any or all alternates will not extend the stated contract time."

"The basis of contract award for the work required for the complete project will be the lowest single-prime bid. Failure of the Proposer to fully and accurately complete the bid form, including names of subcontractors will cause single prime bids to be rejected as non-responsive."

#### **ARTICLE 6 - POST BID INFORMATION**

Delete Paragraph 6.2

Add the following to Subparagraph 6.3.1:

"The successful Bidder(s), within 7 days following the opening of bids, shall submit a letter to the Architect which shall verify that the Contractor(s) complied with the Owner's Minority Business Guidelines and specify any other efforts to the Contractor(s) made to recruit minority subcontractors and minority suppliers for work on this project. This letter should include copies of any advertisements or correspondences the Contractor(s) has made to recruit minority subcontractors and suppliers. Further, a list of awards that have been or will be offered to minority subcontractors and suppliers and a list of others that were recruited shall be included."

Add the following to Subparagraph 6.3.4:

"The Bidder shall furnish upon request adequate data on any named entity on the list in order to permit the Architect and Owner to conduct a proper evaluation. Failure to object to a manufacturer shall not constitute a waiver of any of the requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements."

**ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND**

Delete subparagraph 7.2.1 and replace with the following subparagraph 7.2.1

"The Bidder shall deliver the required bonds to the Owner prior to the date of execution of the Contract."

**END OF SUPPLEMENTARY INSTRUCTIONS TO BIDDERS**



## General Conditions of the Contract for Construction

for the following PROJECT:  
(Name and location or address)

**THE OWNER:**  
(Name, legal status and address)

**THE ARCHITECT:**  
(Name, legal status and address)

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

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, *Guide for Supplementary Conditions*.

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## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 Basic Definitions**

#### **§ 1.1.1 The Contract Documents**

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

#### **§ 1.1.2 The Contract**

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

#### **§ 1.1.3 The Work**

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

#### **§ 1.1.4 The Project**

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

#### **§ 1.1.5 The Drawings**

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

#### **§ 1.1.6 The Specifications**

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

#### **§ 1.1.7 Instruments of Service**

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

#### **§ 1.1.8 Initial Decision Maker**

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

### **§ 1.2 Correlation and Intent of the Contract Documents**

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

**§ 1.2.1.1** The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

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

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

### **§ 1.3 Capitalization**

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

### **§ 1.4 Interpretation**

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

### **§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service**

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

**§ 1.5.2** The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

### **§ 1.6 Notice**

**§ 1.6.1** Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

**§ 1.6.2** Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

### **§ 1.7 Digital Data Use and Transmission**

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

### **§ 1.8 Building Information Models Use and Reliance**

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document



G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

## **ARTICLE 2 OWNER**

### **§ 2.1 General**

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

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

### **§ 2.2 Evidence of the Owner's Financial Arrangements**

**§ 2.2.1** Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

**§ 2.2.2** Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

**§ 2.2.3** After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

**§ 2.2.4** Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

### **§ 2.3 Information and Services Required of the Owner**

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

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

**§ 2.3.3** If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

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

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

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

#### **§ 2.4 Owner's Right to Stop the Work**

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

#### **§ 2.5 Owner's Right to Carry Out the Work**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

### **ARTICLE 3 CONTRACTOR**

#### **§ 3.1 General**

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

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

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

#### **§ 3.2 Review of Contract Documents and Field Conditions by Contractor**

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

**§ 3.2.2** Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

**§ 3.2.4** If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

### **§ 3.3 Supervision and Construction Procedures**

**§ 3.3.1** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

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

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

### **§ 3.4 Labor and Materials**

**§ 3.4.1** Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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

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

### **§ 3.5 Warranty**

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

**§ 3.5.2** All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

### **§ 3.6 Taxes**

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

### **§ 3.7 Permits, Fees, Notices and Compliance with Laws**

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

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

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

### **§ 3.7.4 Concealed or Unknown Conditions**

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

**§ 3.7.5** If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

### **§ 3.8 Allowances**

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

**§ 3.8.2** Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

### **§ 3.9 Superintendent**

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

**§ 3.9.2** The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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

### **§ 3.10 Contractor's Construction and Submittal Schedules**

**§ 3.10.1** The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

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

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

### **§ 3.11 Documents and Samples at the Site**

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and

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delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

### **§ 3.12 Shop Drawings, Product Data and Samples**

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

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

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

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

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

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

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

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

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

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

**§ 3.12.10.1** If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely

upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

**§ 3.12.10.2** If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

### **§ 3.13 Use of Site**

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

### **§ 3.14 Cutting and Patching**

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

**§ 3.14.2** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

### **§ 3.15 Cleaning Up**

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

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

### **§ 3.16 Access to Work**

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

### **§ 3.17 Royalties, Patents and Copyrights**

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

### **§ 3.18 Indemnification**

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

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

## **ARTICLE 4 ARCHITECT**

### **§ 4.1 General**

**§ 4.1.1** The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

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

### **§ 4.2 Administration of the Contract**

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

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

**§ 4.2.3** On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

### **§ 4.2.4 Communications**

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.



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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

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

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

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

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

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

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

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

## ARTICLE 5 SUBCONTRACTORS

### § 5.1 Definitions

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

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

### § 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

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

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

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

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

### § 5.3 Subcontractual Relations

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

### § 5.4 Contingent Assignment of Subcontracts

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

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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

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

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

## **ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

### **§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts**

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

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

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

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

### **§ 6.2 Mutual Responsibility**

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

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

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

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

### § 6.3 Owner's Right to Clean Up

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

## ARTICLE 7 CHANGES IN THE WORK

### § 7.1 General

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

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

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

### § 7.2 Change Orders

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

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

### § 7.3 Construction Change Directives

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

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

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

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

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

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

#### § 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

### ARTICLE 8 TIME

#### § 8.1 Definitions

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

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

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

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

## § 8.2 Progress and Completion

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

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

## § 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

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

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

## ARTICLE 9 PAYMENTS AND COMPLETION

### § 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

### § 9.2 Schedule of Values

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

### § 9.3 Applications for Payment

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

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

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

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

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

#### **§ 9.4 Certificates for Payment**

**§ 9.4.1** The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

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

#### **§ 9.5 Decisions to Withhold Certification**

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

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

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- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

**§ 9.5.2** When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

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

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

### **§ 9.6 Progress Payments**

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

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

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

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

**§ 9.6.5** The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

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

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

**§ 9.6.8** Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.



### **§ 9.7 Failure of Payment**

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

### **§ 9.8 Substantial Completion**

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

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

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

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

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

### **§ 9.9 Partial Occupancy or Use**

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

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

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

### **§ 9.10 Final Completion and Final Payment**

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

**§ 9.10.2** Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

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

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

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **§ 10.1 Safety Precautions and Programs**

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

### **§ 10.2 Safety of Persons and Property**

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

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- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

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

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

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

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

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

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

#### § 10.2.8 Injury or Damage to Person or Property

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

#### § 10.3 Hazardous Materials and Substances

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

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will

promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

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

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

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

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

#### **§ 10.4 Emergencies**

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

### **ARTICLE 11 INSURANCE AND BONDS**

#### **§ 11.1 Contractor's Insurance and Bonds**

**§ 11.1.1** The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

**§ 11.1.2** The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

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

**§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or

expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

## **§ 11.2 Owner's Insurance**

**§ 11.2.1** The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

**§ 11.2.2 Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

**§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

## **§ 11.3 Waivers of Subrogation**

**§ 11.3.1** 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; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

**§ 11.3.2** If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

#### **§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance**

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

#### **§11.5 Adjustment and Settlement of Insured Loss**

**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

**§ 11.5.2** Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

### **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

#### **§ 12.1 Uncovering of Work**

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

**§ 12.1.2** If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

#### **§ 12.2 Correction of Work**

##### **§ 12.2.1 Before Substantial Completion**

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

##### **§ 12.2.2 After Substantial Completion**

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

that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

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

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

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

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

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

### § 12.3 Acceptance of Nonconforming Work

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

## ARTICLE 13 MISCELLANEOUS PROVISIONS

### § 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

### § 13.2 Successors and Assigns

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

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

### § 13.3 Rights and Remedies

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

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



## § 13.4 Tests and Inspections

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

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

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

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

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

## § 13.5 Interest

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

## ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

### § 14.1 Termination by the Contractor

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

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

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



§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

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

#### § 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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

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

#### § 14.3 Suspension by the Owner for Convenience

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

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

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

#### § 14.4 Termination by the Owner for Convenience

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

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

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

- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

**§ 14.4.3** In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

## **ARTICLE 15 CLAIMS AND DISPUTES**

### **§ 15.1 Claims**

#### **§ 15.1.1 Definition**

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

#### **§ 15.1.2 Time Limits on Claims**

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

#### **§ 15.1.3 Notice of Claims**

**§ 15.1.3.1** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

**§ 15.1.3.2** Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

#### **§ 15.1.4 Continuing Contract Performance**

**§ 15.1.4.1** Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

**§ 15.1.4.2** The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

#### **§ 15.1.5 Claims for Additional Cost**

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

#### **§ 15.1.6 Claims for Additional Time**

**§ 15.1.6.1** If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

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

**§ 15.1.7 Waiver of Claims for Consequential Damages**

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

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

**§ 15.2 Initial Decision**

**§ 15.2.1** Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

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

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

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

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

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

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

### **§ 15.3 Mediation**

**§ 15.3.1** Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

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

**§ 15.3.3** Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

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

### **§ 15.4 Arbitration**

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

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

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

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

**§ 15.4.4 Consolidation or Joinder**

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

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

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



## **SUPPLEMENTARY GENERAL CONDITIONS**

### **STANDARD AIA FORMS**

General Conditions of the Contract Standard Form A201 (Latest Edition) of the American Institute of Architects are hereby made a part of the specifications and are bound herein. The General Conditions including Modifications and Special Conditions herein, shall become a part of the contract, and shall apply to all Contractors and all subcontractors.

### **SUPPLEMENTS TO AIA DOCUMENTS A201**

The following supplements modify, change, delete from or add to the "General Conditions of the Contract for Construction, 'AIA Document A201.' Where any Article of the General Conditions is modified, or any Paragraph, Subparagraph or Clause thereof is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

### **ARTICLE 1 GENERAL PROVISIONS**

#### **1.1 BASIC DEFINITIONS**

Add the following:

##### **1.1.5.1 PRODUCT**

The term "product" as used in the Contract Documents includes materials, systems and equipment.

##### **1.1.6.1 PROJECT MANUAL**

The term "Project Manual" as used in this section is the volume that includes the bidding requirements, Conditions of the Contract and the Specifications.

##### **1.1.8 CONTRACTOR**

The term "Contractor" shall mean the Contractor involved with this project.

##### **1.1.9 GENERAL CONTRACTOR**

The term "General Contractor" shall mean the Contractor responsible for the General Contract Work.

##### **1.1.10 SUBCONTRACTOR**

The term "subcontractor" shall mean subcontractor employed by the Contractor.

## **ARTICLE 3 CONTRACTOR**

### **3.3 SUPERVISION AND CONSTRUCTION PROCEDURES**

Add the following paragraph:

3.3.2.1 - The contractor agrees that no contractual relationship exists between the subcontractor and the owner in regard to the contract, and that the subcontractor acts on this work as an agent or employee of the contractor.

### **3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

Add the following paragraphs:

3.12.11.1 - Products are generally specified by ASTM or other reference standard, and/or by manufacturer's name and model number or trade number. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the Contractor has the option of using any product and manufacturer combination listed.

3.12.11.2 - After the Contract has been executed, the Owner and Architect will consider a formal request for the substitution of products in place of those specified, under the following conditions:

1. The request is accompanied by complete data on the proposed substitution substantiating compliance with the Contract Documents including product identification and description, performance and test data, references and samples where applicable, and an itemized comparison of the proposed substitution with the products specified or named by Addenda, with data relating to Contract time schedule, design and artistic effect where applicable, and its relationship to separate contracts.
2. The request is accompanied by accurate cost data on the proposed substitution in comparison with the product specified, whether or not modification of the Contract Sum is to be a consideration.

3.12.11.3 - Requests for substitution based on Clause 3.12.11.2 above, when forwarded by the Contractor to the Architect, are understood to mean that the Contractor:

1. Represents that he has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified.
2. Will provide the same guarantee for the substitution that he would for that specified;
3. Certified that the cost data presented is complete and include all related costs under this Contract, but excludes costs under separate contracts and the Architect's redesign costs, and



that he waives all claims for additional costs related to the substitution which subsequently become apparent; and

4. Will coordinate the installation of the accepted substitute, making such changes as may be required for the work to be complete in all respects.

3.12.11.4 - Substitutions will not be considered if:

1. They are indicated or implied on shop drawing submissions without the formal request required in Clause 4.4.1.3 above; or

2. For their implementation they require a substantial revision of the Contract Documents in order to accommodate their use.

3.12.11.5 - When required, three samples of sufficient size to indicate general visual effect shall be submitted. Where samples must show a range of color, texture, finish, graining, or other similar property, submit three sets of pairs illustrating the full scope of this range. One set of "Approved" samples will be retained at the Architect's project office.

### **3.15 CLEANING UP**

Add the following paragraph:

3.15.1.1 - The Contractor shall remove rubbish and leave the building broom clean, clean all glass, replace all broken glass, remove stains, spots, marks, and dirt from the decorated work: clean hardware, remove paint spots and smears from all surfaces, clean fixtures and wash all concrete, tile and cement floors, polish all resilient floors. Cleanup will be performed at the end of each day and will be monitored by the Owner and Architect.

## **ARTICLE 4 ARCHITECT**

### **4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT**

Add the following paragraphs:

4.2.1.1 - All instructions to the contractor will be made only by or through the designer or his designated project representative. Observations made by official representatives of the owner shall be conveyed to the designer for review and coordination prior to issuance to the contractor.

4.2.1.2 - All work shall be inspected by designer and/or special inspector prior to being covered by the contractor. Contractor shall give a minimum two weeks' notice unless otherwise agreed to by all parties. If inspection fails, after the first re-inspection all costs associated with additional re-inspections shall be borne by the contractor.

4.2.1.3 - Where special inspection or testing is required by virtue of any state laws, instructions of the designer, specifications or codes, the contractor shall give adequate notice to the designer of the time

set for such inspection or test, if the inspection or test will be conducted by a party other than the designer. Such special tests or inspections will be made in the presence of the designer, or his authorized representative, and it shall be the contractor's responsibility to serve ample notice of such tests.

4.2.1.4 - Should any work be covered up or concealed prior to inspection and approval by the designer and/or special inspector such work shall be uncovered or exposed for inspection, if so requested by the designer in writing. Inspection of the work will be made upon notice from the contractor. All cost involved in uncovering, repairing, replacing, recovering and restoring to design condition, the work that has been covered or concealed will be paid by the contractor involved.

4.2.6.1 - Mechanics whose work is unsatisfactory to the owner, or unskilled or otherwise objectionable, shall be instantly dismissed from the work upon notice of the Architect.

## **ARTICLE 5 SUBCONTRACTORS**

### **5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

5.2.1 - Change first sentence to read: Unless otherwise required by the Contract Documents or the Bidding Documents, the Contractor, within 5 days from the contract date, shall furnish to the owner and architect in writing the names or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the work.

## **ARTICLE 7 CHANGES IN THE WORK**

### **7.2 CHANGE ORDERS**

Add the following paragraphs:

7.2.2 – In determining the values of changes, either additive or deductive, contractors are restricted to the use of the following methods:

1. Where the extra work involved is covered by unit prices quoted in the proposal, or subsequently agreed to by the Contractor, Designer, and Owner the value of the change shall be computed by application of unit prices based on quantities, estimated or actual as agreed of the items involved, except in such cases where a quantity exceeds the estimated quantity allowance in the contract by one hundred percent (100%) or more. In such cases, either party may elect to proceed under subparagraph 7.2.2.2 herein. If neither party elects to proceed under 7.2.2.2, then unit prices shall apply.
2. The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the contract price.

7.2.3 - Under Paragraph 7.2.2, the allowances for overhead and profit combined shall be as follows: all contractors (the single contracting entity (prime), his subcontractors(1st tier subs), or their sub-subcontractors (2nd tier subs, 3rd tier subs, etc.)) shall be allowed a maximum of 10% on work they each self-perform; the prime contractor shall be allowed a maximum of 5% on contracted work of his 1st tier sub; 1<sup>st</sup> tier, 2nd tier, 3rd tier, etc. contractors shall be allowed a maximum of 2.5% on the contracted work of their subs. ; Under Method "c(1)", no additional allowances shall be made for overhead and profit. In the case of deductible change orders, under 7.2.2, the contractor shall include no less than five percent (5%) profit, but no allowances for overhead.

7.2.4 - The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein shall be limited to the following:

1. The actual costs of materials and supplies incorporated or consumed as part of the work;
2. The actual costs of labor expended on the project site; labor expended in coordination, change order negotiation, record document maintenance, shop drawing revision or other tasks necessary to the administration of the project are considered overhead whether they take place in an office or on the project site.
3. The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions; worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor;
4. The actual costs of rental for tools, excluding hand tools; equipment; machinery; and temporary facilities required for the work;
5. The actual costs of premiums for bonds, insurance, permit fees, and sales or use taxes related to the work.
6. Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the owner.

7.2.5 - Should concealed conditions be encountered in the performance of the work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods. All change orders shall be supported by a unit cost breakdown showing method of arriving at net cost as defined in 7.2.4.

7.2.6 - In all change orders, the procedure will be for the designer to request proposals for the change order work in writing. The contractor will provide such proposal and supporting data in suitable format. The designer shall verify correctness. Delay in the processing of the change order due to lack of proper submittal by the contractor of all required supporting data shall not constitute grounds for a time extension or basis of a claim. Within fourteen (14) days after receipt of the contractor's accepted proposal including all supporting documentation required by the designer, the designer shall prepare

the change order and forward to the contractor for his signature or otherwise respond, in writing, to the contractor's proposal. Within seven (7) days after receipt of the change order executed by the contractor, the designer shall, certify the change order by his signature, and forward the change order and all supporting data to the owner for the owner's signature.

7.2.7 - A change order, when issued, shall be full compensation, or credit, for the work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the work.

## **ARTICLE 8 TIME**

### **8.2 PROGRESS AND COMPLETION**

Delete and substitute the following:

8.2.3 - "The Contractors shall commence work to be performed under this agreement on a date to be specified in a written order from the architect or corresponding to the date of the Pre-construction conference and shall fully complete all work hereunder as follows:

300 Days

### **8.3 DELAYS AND EXTENSIONS OF TIME**

Add the following paragraphs:

8.3.1.1 - Time extensions will not be granted for rain, wind, snow or other natural phenomena of normal intensity for the locality where work is performed. For purpose of determining extent of delay attributable to unusual weather phenomena, a determination shall be made by comparing the weather for the contract period involved with the average of the preceding five (5) year climatic range during the same time interval based on the National Oceanic and Atmospheric Administration National Weather Service statistics for the locality where work is performed and on daily weather logs kept on the job site by the contractor reflecting the effect of the weather on progress of the work and initialed by the designer's representative. No weather delays shall be considered after the building is dried in unless work claimed to be delayed is on the critical path of the baseline schedule or approved updated schedule. Time extensions for weather delays, acts of God, labor disputes, fire, delays in transportation, unavoidable casualties or other delays which are beyond the control of the Owner do not entitle the Contractor to compensable damages for delays. Any contractor claim for compensable damages for delays is limited to delays caused solely by the owner or its agents. Contractor caused delays shall be accounted for before owner or designer caused delays in the case of concurrent delays.

8.3.1.2 - Request for extension of time shall be made in writing to the designer, copies to the owner, within twenty (20) days following cause of delay. In case of continuing cause for delay, the Contractor shall notify the Designer, copies to the owner, of the delay within 20 days of the beginning of the delay and only one claim is necessary.

8.3.1.3 - The contractor shall notify his surety in writing of extension of time granted.

8.3.1.4 - No claim for time extension shall be allowed on account of failure of the designer to furnish drawings or instructions until twenty (20) days after demand for such drawings and/or instructions. Demand must be in written form clearly stating the potential for delay unless the drawings or instructions are provided. Any delay granted will begin after the twenty (20) day demand period is concluded.

### **Liquidated Damages**

Time extensions for weather delays do not entitle the Contractor to extended overhead recovery. As outlined in Article 3 of the Agreement, the Contractor agrees to pay \$500.00 per day liquidated damages to the owner for each calendar day the Contractor shall be in default.

## **ARTICLE 9 PAYMENTS AND COMPLETION**

### **9.3 APPLICATIONS FOR PAYMENTS**

Add the following paragraphs:

9.3.1 - The form of Application of Payment shall be on AIA Document G702 "Application and Certificate for Payment".

9.3.1.1 - Until final payment the Owner will pay ninety-five (95%) percent of the amount due the Contractor on account of progress payments. There will be no reduction in the (5) percent retainage withheld after substantial completion. Retainage will be released upon final completion and acceptance of the project and receipt of the Certificate of Compliance with the building inspection authority having jurisdiction over the project. The General Contractor shall be responsible for securing such certification.

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **10.1 SAFETY PRECAUTIONS AND PROGRAMS**

Add the following Subparagraphs 10.1.5 and 10.1.6 to Paragraph 10.1:

10.1.5 - If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop the Work in the affected area and report the condition to the Owner and Architect in writing. The Owner, Contractor and Architect shall then proceed in the same manner described in Subparagraph 10.1.2.

10.1.6 - The Owner shall be responsible for obtaining the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to verify that it has been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and

Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has a reasonable objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection.

**ARTICLE 11 INSURANCE AND BONDS**

**11.1 CONTRACTOR'S LIABILITY INSURANCE:**

Modify the following:

11.1.1.8 - Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:

Premises-Operations (including X-C-U)  
Independent Contractor's protective.

Products and completed operations.  
Contractual-including specified provisions for the Contractors obligations under paragraph 4.18.  
Owned, non-owned and hired motor vehicles.  
Broad form coverage for property damage.

Add the following:

11.1.2.1 - Provide the following insurance limits:

Workers Compensation

Applicable Federal, State	<u>\$Statutory</u>
Employer's Liability - Each Accident	<u>\$1,000,000.00</u>
Disease Policy Limit	<u>\$1,000,000.00</u>
Disease Limit per Each Employee	<u>\$1,000,000.00</u>

Contractor's LIABILITY INSURANCE (clauses 1.1.1.2,.3,.4,.5,.6,.7) including CONTRACTUAL LIABILITY (subparagraph 11.1.2)

Form of insurance shall be:

Comprehensive General Liability  
Comprehensive Automobile Liability

NOTE: The Owner and the Architect shall be included as additional insured parties on the Comprehensive General Liability Policy.

(1) BODILY INJURY	
Each Occurrence	<u>\$1,000,000.00</u>
General Aggregate	<u>\$2,000,000.00</u>
Product Liability Completed Operations Aggregate	<u>\$2,000,000.00</u>
(2) PROPERTY DAMAGE - including completed operations broad form and X,C,U	
Each Occurrence	<u>\$1,000,000.00</u>
Aggregate	<u>\$2,000,000.00</u>
(3) PERSONAL INJURY	
Each Persons Aggregate	<u>\$ 500,000.00</u>
General Aggregate	<u>\$1,000,000.00</u>
Catastrophic Liability	<u>\$1,000,000.00</u>
(4) AUTOMOBILE LIABILITY - owned, non-owned and hired	
Bodily Injury each person	<u>\$2,000,000.00</u>
Bodily Injury each accident	<u>\$2,000,000.00</u>
Property Damaged each occurrence	<u>\$ 500,000.00</u>
(5) INSTALLATION FLOATER - Per Project Requirements to Be Based Upon the Most Expensive Piece of Equipment to Be Provided.	
(6) BUSINESS UMBRELLA POLICY	
Over Primary Insurance	<u>\$2,000,000.00</u>
Retention	<u>\$ 10,000.00</u>

### 11.3 PROPERTY INSURANCE

Delete in its entirety and substitute:

11.3.1 - The Contractor shall purchase and maintain property insurance upon the entire work at the site to the full insurable value thereof. The insurance shall include the interest of the Owner, Architect/Engineer, the Contractor, and subcontractors in the work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including without duplication of coverage, theft, vandalism and malicious mischief. The Contractor shall effect and maintain similar property insurance on portions of the work stored off the site or in transit when such portions of the work are to be included in an Application for Payment under Subparagraph 9.3.2.

The Architect/Engineer will also be insured under this policy to insure their interests.

Fire, Extended Coverage, Vandalism and Malicious Mischief in the names of the Owner, Architect/Engineer and Contractor as their interests may appear with limits as follows:

Amount equal to the Contract Sum for the Work

Independent Contractors: Same limits as above.

Products and Completed Operation:

Same limits as above for one (1) year, commencing with issuance of final certificate of payment.

Contractual Liability:

Same limits as above.

11.3.1.1 - Furnish three (3) copies of Certificates herein required; specifically setting forth evidence of all coverage required by Subparagraphs 11.1.1.

11.3.1.2 - The form of the Certificate shall be ACORD 25-S supplemented as necessary with AIA Document G715. Furnish copies of any endorsements that are subsequently issued amending coverage of limits. The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits.

11.3.1.3 - If this insurance is written with stipulated amounts deductible under the terms of the policy, the Contractor shall pay the difference attributable to deductions in any payments made by the insurance carrier on claims paid by this insurance.

11.3.1.5 - The insurance required by Paragraph 11.3 is not intended to cover machinery, tools or equipment owned or rented by the Contractor, which are utilized in the performance of the Work but not incorporated into the permanent improvements. The Contractor shall, at the Contractor's own expense, provide insurance coverage for owned or rented machinery, tools or equipment which shall be subject to the provisions of Subparagraph 11.3.7.

### **11.3.2 BOILER AND MACHINERY INSURANCE**

Modify as follows:

11.3.2 - Change the first sentence to read, "The Contractor shall purchase and maintain such boiler and machinery insurance as may be required by the contract documents or by law.

Modify as follows:

11.3.6 - In the last sentence change "will not be cancelled" to "shall not be cancelled".

Add the following paragraph:

11.3.12 - The Contractor shall file the original and one certified copy of all policies with the owner and architect before exposure to loss may occur. If the owner is damaged by the failure of the Contractor to



maintain such insurance and to so notify the owner, then the Contractor shall bear all reasonable costs properly attributable thereto.

#### **11.4 PERFORMANCE BOND AND PAYMENT BOND:**

11.4.1.1 - Add the following sentence:

"Prior to signing contract, Contractor shall pay the premium for and furnish Performance and Payment Bond in the amount of the contract price on Form AIA 311 to cover faithful performance of the contract and payment of all obligations arising thereunder. Bonds shall be in such form as Owner may prescribe and with sureties as he may approve. Copy of Agent's Power-of-Attorney, giving him authority to sign bond and shall be furnished to the Architect. The Contractor shall provide six (6) copies."

#### **ARTICLE 15 CLAIMS AND DISPUTES**

##### **15.1.4 CLAIMS FOR ADDITIONAL COST**

Add the following paragraphs:

15.1.4.1 - Should the contractor consider that as a result of instructions given by the designer, he is entitled to extra cost above that stated in the contract, he shall give written notice thereof to the designer within seven (7) days without delay. The written notice shall clearly state that a claim for extra cost is being made and shall provide a detailed justification for the extra cost. The contractor shall not proceed with the work affected until further advised. No claims for extra compensation shall be considered unless the claim is so made. The designer shall render a written decision within seven (7) days of receipt of claim.

15.1.4.2 - The contractor shall not act on instructions received by him from persons other than the designer, and any claims for extra compensation or extension of time on account of such instruction will not be honored. The designer shall not be responsible for misunderstandings claimed by the contractor of verbal instructions which have not been confirmed in writing, and in no case shall instructions be interpreted as permitting a departure from the contract documents unless such instruction is confirmed in writing and supported by a properly authorized change order.

#### **ADD THE FOLLOWING ARTICLES 16-24:**

##### **ARTICLE 16 UTILITIES, STRUCTURES, SIGNS**

The General Contractor shall call ULOCO at 1-800-632-4949 before conducting any sitework in order to avoid damaging existing underground utilities services.

The General Contractor shall provide necessary and adequate facilities and pay all costs for water, electricity, gas, oil, sewer, and other services that may be necessary and required for completion of the project according to the Contract Documents. Any permanent meters installed shall be Owner.

Meters shall be relisted in the Owner's name on the day following completion and acceptance of the General Contractor's work, and the Owner shall pay for services used after that date.

The Owner shall be reimbursed for all metered utility service charges paid by or attributed to the Owner after the meter is relisted in the Owner's name and prior and prior to completion and acceptance of the work of all contractors. Reimbursement shall be made by the contractor whose work has not been completed and accepted. If the work of two or more contractors has not been completed and accepted, reimbursement to the Owner shall be paid by the contractors involved on the basis of assessments by the Architect.

The General Contractor shall provide temporary plumbing, Heating and Electrical systems as required for his work and the work of other Prime Contractors until the permanent systems can be utilized for temporary purposes.

- A. Prior to acceptance of work by the Owner, each contractor shall remove and replace any parts of the permanent building systems damaged through use during construction.
- B. Temporary filters shall be installed in each of the heating and air conditioning units during construction.
- C. Extra effort shall be maintained to keep the building clean and under no circumstances shall air systems be operated if finishing operations are creating dust in excess of what would be considered normal if the building were occupied. Provide filter media on return air grilles. The intent is to present the duct system in a clean condition at final inspection.
- D. It shall be understood that any warranty on equipment presented to the Owner shall extend from the day of final acceptance by the Owner. The cost of warranting the equipment during operation in the finishing stages of construction shall be borne by the Contractor whose system is utilized.
- E. When the permanent lighting system is used during the finishing stages of construction, lamps shall be replaced and shall be new at the time of final inspection.

The General Contractor shall provide temporary toilet facilities for male and female employees as required. These facilities will be available to other contractors on the job and shall be kept in a neat sanitary condition at all times. Chemical toilets are acceptable.

The General Contractor shall erect a temporary field office, complete with lights, telephone, heat and air conditioning.

## **ARTICLE 17 GUARANTEE**

This Contractor shall guarantee in writing the materials and workmanship for a period of one year from the date of final acceptance by the Owner. This Contractor shall replace and/or repair, without cost to the Owner, any defective part or parts within the guarantee period.

#### **ARTICLE 18 STORAGE OF MATERIALS**

The Contractor shall make provisions for storage of materials on the site. Consult the owner for available space on the site.

#### **ARTICLE 19 DEMOLITION**

The General Contractor shall be responsible for all demolition and capping of all plumbing, HVAC and electrical lines.

#### **ARTICLE 20 GUARANTEES AND OPERATION INSTRUCTION**

All guarantees, warranties, operation instructions, maintenance instructions, etc. shall be delivered to the architect in triplicate, bound in a suitable three ring notebook. Originals with photocopies are acceptable.

#### **ARTICLE 21 PARTIAL UTILIZATION BENEFICIAL OCCUPANCY**

The Owner may desire to occupy all or a portion of the project when the work is substantially complete.

Prior to the final payment, the Owner may request the Contractor(s) in writing, through the Architect if applicable, to permit him to use a specified part of the project that he believes he may use without significant interference with construction of the other parts of the project. If the contractor(s) agree, the Architect will schedule a beneficial occupancy inspection after which the Architect may issue a Certificate of Substantial Completion. The certificate shall include the following documentation:

1. Date of substantial completion.
2. A tentative list of items to be completed or corrected before final payment.
3. Establishing responsibility between Contractor and Owner for maintenance, heat utilities and insurance.
4. Establishing the date for guarantees and warranties under terms of the Contract.
5. Consent of Surety.
6. Endorsement from Insurance Company permitting occupancy.

The Owner shall have the right to exclude the Contractor from any part of the project which the Architect has so certified to be substantially complete, but the Owner will allow the contractor reasonable access to complete or correct work to bring it into compliance with the contract.

Occupancy by the Owner under this Article will in no way relieve the Contractor from his contractual requirement to complete the project within the specified time. The Contractor will not be relieved of

liquidated damages because of beneficial occupancy. The Architect may prorate liquidated damages based on the percentage of project occupied.

#### **ARTICLE 22 CODES AND STANDARDS**

Wherever reference is given to codes, or standard specifications or other data published by regulating agencies including but not limited to national Electrical Codes, North Carolina State Building Codes, Federal Specifications, ASTM Specifications, various Institute Specifications, etc., it shall be understood that such reference is to the latest edition including addenda published prior to the date of the contract documents.

#### **ARTICLE 23 ASBESTOS CONTAINING MATERIALS**

Each Prime Contractor to provide an affidavit certifying that building materials, equipment, or any other component of this project does not contain asbestos.

#### **ARTICLE 24 RECORD DRAWINGS**

The General Contractor shall maintain (1) set of marked up construction drawings and specifications in addition to the working set normally used on the job. These record drawings will be presented to the Architect in good legible and clean condition at the completion of the project for record purposes.

#### **END OF SUPPLEMENTARY GENERAL CONDITIONS**



# SOUTHERN ENGINEERING

Consulting | Testing | Special Inspections

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Raleigh, NC 27610
- ☎ (919) 321-9407
- 🌐 [www.southernengineeringpc.com](http://www.southernengineeringpc.com)



SE&T PROJECT NO.: 24-960 | August 28, 2024

## Report of Subsurface Exploration & Geotechnical Engineering Evaluation

Pamlico Co. Emergency Operations Center | Bayboro, North Carolina

### PREPARED FOR:

OAKLEY COLLIER ARCHITECTS  
109 Candlewood Road  
Rocky Mount, NC 27804

# REVISED

August 28, 2024

Ms. Jennifer Starkey, NCARB, LEED AP  
Oakley Collier Architects  
109 Candlewood Road  
Rocky Mount, NC 27804

**Report of Subsurface Exploration  
and Geotechnical Engineering Evaluation**  
**Pamlico Co. Emergency Operations Center**  
**Third Street**  
**Bayboro, North Carolina**  
**SE&T Project No.: 24-960**

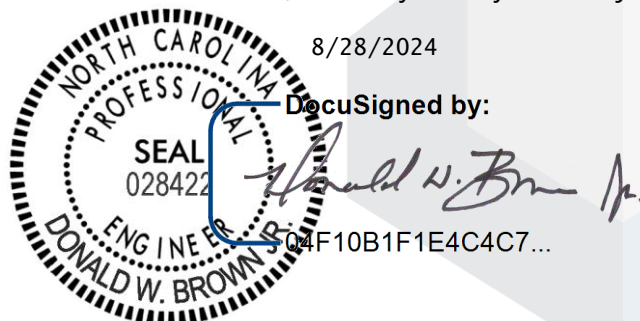
Southern Engineering and Testing, P.C. (SE&T) has completed the geotechnical engineering evaluation for the project referenced above. This report describes the field exploration and presents the results of our engineering evaluation along with geotechnical related design and construction recommendations for this project.

We appreciate the opportunity to work with you during the design phase of this project.

Sincerely,

***SOUTHERN ENGINEERING AND TESTING, P.C.***

NC License No. C-4167; SC Certificate of Authority 5297



Donald W. Brown Jr, PE  
Vice President | Principal

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### **Appendix A**

Site Vicinity Map  
Boring Location Diagram

### **Appendix B**

Boring Snapshot  
Boring Logs  
Legend of Soil Descriptions

### **Appendix C**

Site Photographs

### **Appendix D**

GBA Circular

## **1 OBJECTIVE AND AUTHORIZATION**

The primary objective of our services was to evaluate the subsurface conditions within the area of planned construction and to make recommendations regarding site development, including foundation design. The original scope for the geotechnical engineering services discussed in this report was outlined in SE&T Proposal No.: 24-31497 (dated July 15, 2024) and authorized by Oakley Collier Architects (OCA) by way of signed proposal on July 15, 2024. Remobilization for two additional soil test borings and an update to the original report were approved by OCA on August 14, 2024 by way of signed Change Order No. 1.

## **2 PROJECT UNDERSTANDING**

We understand that the project will involve the design and construction of a new emergency operations center (EOC). The proposed structure will be a one-story, 4,900± sf facility with load bearing CMU walls and brick facade. At this early design stage grading plans are not available, so we've assumed that the finished floor elevation (FFE) will be 12-13 feet, MSL (i.e., pad raised 2 feet).

According to the preliminary site layout provided to us, a small asphalt parking lot is planned for the east side of the new building. A future 7,000 sf Maintenance Building is planned for the north end of the site (not included in the scope of this report).

## **3 SITE INFORMATION**

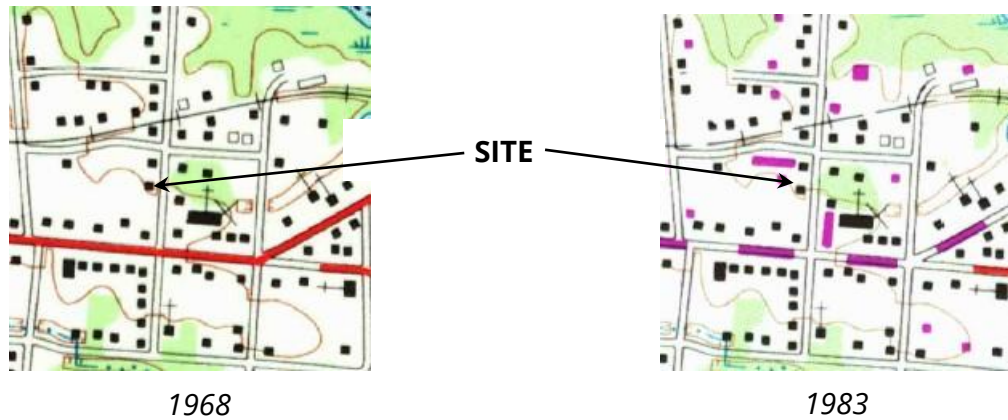
### **3.1 Site Location and Description**

The property is in the southwest quadrant of the intersection of North Street and NW 3<sup>rd</sup> Street in Bayboro, North Carolina. Please see Figure A1 in [Appendix A](#) for a site vicinity map.

The site is currently open and undeveloped, with the majority being a gravel parking lot. The surrounding area is grass covered. The ground surface across the site is generally flat and level except for a narrow, 2-3 feet tall soil berm at the north end of the site. Two timber utility poles, a below grade tank lid (bolted shut), a dilapidated yard inlet, and two permanent groundwater monitoring wells were observed in the northern portion of the property. Photographs of site conditions taken while at the site are included in [Appendix C](#).

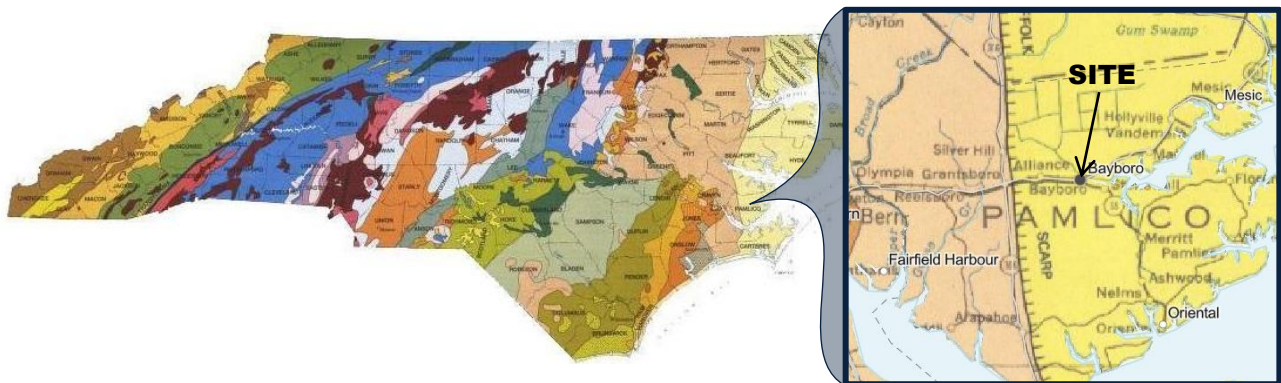


Based on a review of past aerial photographs available on Google Earth, and old USGS topographic quadrangle maps (see below), the site was once occupied by multiple structures.



### 3.2 Local Geology

The project site is located in Pamlico County, which lies at the eastern edge of the Coastal Plains geologic province of North Carolina. Review of the *Quaternary Geologic Map of the Hatteras 4° x 6° Quadrangle (USGS, 1986)* shows that the area is underlain by surficial quaternary deposits of marine sands, clays, and gravels left behind during the Pleistocene.



As shown on the geologic map, the site is situated approximately 3 to 4 miles east of the Suffolk Scarp where it trends north-south along Highway 306. The Suffolk Scarp is an ancient landform created by erosion from waves of the Atlantic Ocean. The scarp represents that former shoreline 300k-500k years ago and is roughly 20 feet higher in elevation than the Pamlico Terrace to the east of the scarp. The Pamlico Terrace, which is where the subject site is situated, represents the upper portion of the Continental Shelf (i.e., sea floor) during that period. The Suffolk Scarp extends from this area of Pamlico County northward to the middle peninsula of Virginia

## 4 FIELD AND LABORATORY SERVICES

### 4.1 **Subsurface Exploration**

#### 4.1.1 Standard Penetration Test (SPT) Borings

The original geotechnical exploration consisted of three SPT borings, designated as B-1 through B-3. Subsequently, two additional borings (B-6 and B-7) were completed for a revised building location. The approximate boring locations are illustrated by Figure A2 in [Appendix A](#) of this report. The borings were advanced to approximate depths ranging from 10 feet to 70 feet below the current ground surface. Drilling was performed by Bridger Drilling with a trailer-mounted CME 45 drill rig using mud rotary tooling in general accordance with ASTM D5783.

Sampling operations were conducted in general accordance with ASTM D1586. At predetermined intervals, soil samples were obtained with a split-barrel sampler (standard 2-inch O.D.). The sampler was rested on the bottom of the borehole and driven to a penetration of 18 inches (or fraction thereof) with blows of a 140-pound automatic drop hammer falling 30 inches. Of the 18 inches, the number of hammer blows required to achieve 6 inches of penetration is recorded for three consecutive segments. The sum of the blow counts for the second and third 6-inch segment is termed the SPT N-value. The N-values presented on the Snapshot and Boring Logs are the actual, field-recorded blow counts and do not include correction factors for hammer energy or overburden soil pressures.

#### 4.1.2 Hand Auger Borings

The soil conditions in the berm were evaluated with hand augers during our initial site visit. Both hand auger borings (B-4 and B-5) were advanced to a depth of approximately 3 feet below the current grade.

### 4.2 **Laboratory Services**

The soil samples obtained during the drilling operations were placed in labeled containers and delivered to our Raleigh laboratory where they were visually-manually classified in general accordance with ASTM D2488 and logged by a member of Southern Engineering's geotechnical engineering staff. Typed boring logs are included in [Appendix B](#) of this report.

## **5 SUBSURFACE CONDITIONS**

The following is a subsurface description of a generalized nature, provided to highlight the major soil strata encountered. The stratification of the subsurface materials illustrated on the Boring Logs and Boring Snapshot represent the conditions at the actual test locations; therefore, variations should be expected between borings. Stratigraphy boundaries only represent the approximate depth/elevation of a noticed material change but the transition between material types is typically gradual. The soil types are based on the Unified Soil Classification System (USCS).

The ground surface elevation and State plane coordinates at each current boring location were measured by Southern Engineering using a Carlson BRx7 GPS unit. These are reported on the Boring Logs and Boring Summary Table in [Appendix B](#) of this report. The accuracy of these measurements is 0.1± foot unless otherwise noted.

### **5.1 Surficial Soils**

A 2 to 4-inch thick organic-laden soil (topsoil) layer was encountered at the ground surface at all seven test locations.

### **5.2 Fill**

Fill is a material that was placed during past grading. Fill soil was encountered in all five SPT borings. The fill extended to approximately 8 feet deep in boring B-1 and ranged from 1 to 6.5 feet deep in the remainder of the SPT borings. The fill primarily consisted of very loose to medium dense Silty SAND (SM), but some very soft fat CLAY (CH) was encountered in boring B-1. The fill in boring B-1 contained trace organic matter, shells, and even black plastic sheeting at/near the base of the fill. The fill in boring B-1 and B-2 appears to be uncompacted. The fill in borings B-3, B-6, and B-7 appears to be moderately-well to well compacted.

The soil in the berm is also considered fill. The soil encountered in the berm consisted of Silty SAND (SM) with no appreciable organic matter noted.

### **5.3 Coastal Plain Soils**

Native soil in this geologic region of North Carolina are Coastal Plain deposits that were left behind hundreds of thousands to millions of years ago as the Atlantic Ocean receded. Coastal Plain soils were encountered in each of the borings, directly beneath the fill soils discussed above, and consisted of very loose to loose SANDs (SM and SC) and very soft to stiff CLAYs (CH and CL). Medium dense poorly-graded SAND (SP-SM) and stiff SILT were also encountered in boring B-7. SPT resistances (N-values) recorded in the Coastal Plain soil varied, ranging from 0 to 27 blows per foot (bpf).

## 5.4 Groundwater

Apparent groundwater depths were noted at depths ranging from 2.2 feet to 3 feet below the current ground surface during the drilling/sampling process. Accurate groundwater measurements could not be made immediately after drilling due to the mud drilling technique used, which requires bentonite slurry to be introduced into the borehole. We were, however, able to get a stabilized groundwater measurement from the onsite monitoring well between borings B-1 and B-2 - 2.1 feet (el. 7.3 feet).

The groundwater depths noted above represent the conditions at the time of the exploration. Fluctuations in groundwater levels are common and should be expected. Common factors that influence groundwater levels include, but are not limited to, soil stratification, climate/weather, nearby bodies of water (lakes, ponds, etc.), tidal fluctuation, underground springs, rivers, and surface water discharge. At the onset, as well as continually throughout the construction process, the contractor should monitor groundwater levels if determined to be detrimental to the project.

## 6 ENGINEERING ASSESSMENT AND RECOMMENDATIONS

### 6.1 Site Grading

#### 6.1.1 Subgrade Preparation

All vegetation, topsoil, root mat, old foundations, pavements, and any other unsatisfactory or deleterious materials should be removed from the limits of new construction. Such material should be considered unsuitable for reuse as structural fill.

After stripping the topsoil, and before placing fill to establish finished subgrade, we recommend that the exposed soils in all structural areas be thoroughly densified with repeated passes of a large roller to improve the sand's density and stability. Densification using the vibratory action of rollers/compactor should be kept to a minimum since groundwater is only 2± feet below the current grade. Excessive vibration from compactors will cause a capillary rise of the groundwater and destabilize (liquefy) the subgrade.

We recommend that the finished subgrade elevation (FSE) for the building pad be raised to at least 12 feet (MSL) to provide separation from the groundwater table and to avoid the need for a permanent dewatering system.

#### 6.1.2 Groundwater Management

Excavation below el. 7.5± feet MSL will encounter the water table. As such, we anticipate localized dewatering will be needed for deeper excavations such as utility trenches. An appropriate groundwater control plan for construction shall be determined by the contractor.

Please note that if the FSE cannot be set to 12 feet or higher, then a French drain dewatering system will likely be needed.

#### 6.1.3 Structural Fill

##### 6.1.3.1 Selection

Whether imported or borrowed from an onsite source, structural fill should satisfy the following:

- No excessive deleterious material.
- Organic content no greater than 5% (by weight).
- No rocks or other solid inclusions greater than 3 inches in diameter.
- Maximum Dry Density (MDD) of 95 pounds per cubic foot (pcf) or greater, as determined by the Standard Proctor Compaction Test (ASTM D698).
- Liquid Limit (LL) of 40 or less and a Plasticity Index (PI) of 20 or less, as determined by Atterberg Limit testing (ASTM D4318), unless otherwise noted/allowed.

The onsite sands (SM and SC) will meet these criteria and should be considered suitable for reuse as structural fill if they're free of excessive organic material or other debris. Judging by the two hand auger borings performed on top of the berm, we anticipate that the soil in the berm will be reusable.

### 6.1.3.2 Moisture Conditioning

The water content of structural fill containing more than 5% fines should be maintained within -2% to +3% of the material's optimum water content as determined by the Standard Proctor Compaction Test (ASTM D698). Granular soils containing less than 5% fines are generally less sensitive to compaction moisture and can be placed in a wetter condition if proper compaction is achieved.

The sands at this site dry relatively quickly, so construction in the summer months may require wetting of surface soil to facilitate proper compaction. We also anticipate that soil excavated below 2 feet of the existing grade will require drying.

Please note that soil can be deemed unusable due to water content but shall not be classified as unsuitable based solely on water content. When soil water content falls outside of the requirements set herein, the contractor shall be responsible for taking appropriate measures (drying or wetting) to render the soil usable.

### 6.1.3.3 Compaction

Due to the shallow groundwater in this area, compaction efforts should be accomplished with minimal vibratory effort. Using vibratory mode will wick water up from below and destabilize the surficial soil. When using large, ride-on compactors without vibratory action, fill should be placed in loose lifts measuring 8 -inch thick or less. Lift thicknesses should be thinned to 4 inches when using smaller, Rammax-type compactors.

Structural fill should be compacted to the requirements below, which are based on the soil's maximum dry density as determined by ASTM D698:

- Within 12 inches of finished subgrade elevation ..... 98%
- Below 12 inches of finished subgrade elevation ..... 95%

It is recommended that the placement and compaction of structural fill be monitored by the owner's testing agency. Field compaction testing should be performed in accordance with ASTM D1556 (Sand Cone Method), ASTM D2937 (Drive Cylinder Method), or ASTM D6938/D8167 (Nuclear Methods).

The following compaction test frequencies are recommended as minimums:

- One test per 2,000 square feet for each lift placed in the building pad.
- One test per 5,000 square feet for each lift placed in the parking lot and driveways.
- One test per lift for every 75 linear feet of utility trench.

## 6.2 Building Foundation

The proposed building will have load bearing walls around the perimeter and one down its center in the log direction. The strip loading imposed by the walls varies up to approximately 2.5 kips per linear foot (klf) along the perimeter and about 1.1 klf through the center. Due to the loose/soft native soil below the proposed building pad, conventional shallow foundations are not suitable to support this structure. Instead, we recommend a driven timber pile foundation.

### 6.2.1 Design

Timber piles are deep foundation elements that are installed in groups to transfer foundation loads to deeper soil strata. Piles derive their capacity from a combination skin friction developed along their sides, as well as the end bearing at the pile tip. We recommend the use of piles with a minimum tip diameter of 9 inches, which is a common size and expected to be readily available in the project area. The recommended design parameters are provided in Table 1.

Table 1: Timber Pile Design Parameters

Parameter	9-inch Dia. Tip
Allowable Axial Capacities <sup>1</sup> , kips per pile	
Compression	25
Tension/Uplift	15
Lateral Capacity <sup>2</sup> , kips per pile	4
Estimated Settlement	
Total, in.	Less than 1
Differential, in.	Less than ½
Required Minimum Tip Depth <sup>3</sup> , ft	40
<i>Footnotes:</i>	
1. When driven to the minimum tip depth noted in this table	
2. Free-head condition with 1-inch head deflection when driven to/beyond the required minimum tip depth shown in table. Refer to Sec. 1810.3.3.2 of the Code to determine if FOS is warranted.	
3. Depth below bottom of pile cap.	

Soil adjacent to the pile cap will provide passive resistance to lateral movement for which we recommend a passive earth pressure coefficient (Kp) of 3.00 and safety factor of at least 1.5. We also recommend using a moist unit weight of 120 pcf to compute the soil mass weight.



Table 2: Multipliers for Lateral Loading

C to C Spacing	Row 1	Row 2	Row 3 or higher
3B	0.8	0.4	0.3
5B	1.0	0.85	0.7

*Footnote: Multiplier values can be linearly interpolated between spacings*

### 6.2.2 Construction

When selecting the piles, it is recommended that they meet the requirements of ASTM D-25. Furthermore, the piles should meet the requirements of AWPA C3. Timber piles should be treated with CCA (copper chromated arsenate) or Ammoninacal Copper Zinc Arsenate (ACZA). Where pile cut-off is necessary, the cutoff surface should be treated with copper naphthenate in accordance with AWPA M-4 to protect the end of the pile from organic degradation.

Piles should be advanced with conventional impact pile driving equipment to a driving resistance of 60 kips, while also satisfying the minimum tip depth noted in the table. After a hammer is selected, but prior to mobilization, the Owner's testing agency should be engaged to establish the pile driving criteria using Wave Equation Analysis of Pile Driving (WEAP) software. During this analysis, predicted compression and tensile stresses in the pile will also be checked to avoid overstressing while driving.

Piles should be placed within 3 inches of the plan location and driven with an axial alignment of ¼-in per foot of vertical. Pile driving should be as continuous an operation as possible and should proceed without stopping over the last 10 feet of penetration. At all times, the hammer should be operated at the chamber pressure, speed, drop height, etc. recommended by the manufacturer and modeled in the driving criteria model. Piles should be installed under continuous monitoring by a Geotechnical Engineer or representative thereof to make field judgments of pile penetration and to check for appropriate size/diameter, length, materials, splicing and defects. Piles should be monitored during driving for handling, location, alignment, hammer performance, and penetration (blow counts).



We anticipate that localized pore pressure increases will occur during pile driving, lowering effective stress on the pile and making it difficult to achieve the prescribed driving resistance. As such, pile restrikes will be necessary to confirm satisfactory driving resistance. To do so, the pile driving contractor will need to stop driving once the recommended pile embedment depth is reached, wait 24+ hours for pile “set up”, and then restrike the pile. We recommend performing restrikes on at least two piles. Restrikes should not be performed with a cold hammer. The pile contractor should warm up the hammer by driving other piles or actuating the hammer on timber mats placed on the ground (20 full stroke blows minimum).

### **6.3 Slab-On-Grade**

#### **6.3.1 Design**

We recommend that the slab-on-grade be thickened and include reinforcing steel to help reduce the potential for cracking cause by differential settlement between the grade-supported slab and the adjacent pile-supported grade beams. We further recommend a minimum 6-inch base layer of No. 57 washed stone below the slab to provide uniform support and to provide a capillary break. We also recommend the installation of a vapor barrier as a measure of protection against water vapor intrusion. Omitting the vapor barrier could lead to water vapor transmission through the slab and cause damage to flooring and/or elevated moisture levels within the structure. We recommend considering the use of a vapor barrier meeting ASTM E1745, which should be installed per the ACI guidelines (ACI 302.2R) and ASTM E1643.

The design of the concrete slab-on-grade should be based on Westergaard’s modulus of subgrade reaction ( $k$ ). Based on the soil conditions encountered near the surface at the site, and the stone layer recommended above, we recommend using an effective value ( $k_{ef}$ ) of 120 pci for slab design.

It is important to point out that cracking of concrete is normal and should be expected. Proper jointing of slabs is paramount in the control of cracking. The American Concrete Institute (ACI) recommends a maximum panel size (in feet) equal to approximately three times the thickness of the slab (in inches) in both directions. Controlling the water-cement ratio of the concrete, particularly after batching, and including fiber reinforcement in the mix can also help reduce shrinkage cracking.

### **6.4 Seismic Design Considerations**

Per the 2018 N.C. Building Code, the design of a structure must consider dynamic forces resulting from seismic events, regardless of their likelihood of occurrence. As part of a generalized procedure to estimate seismic forces, the code assigns a Seismic Site Classification (letter designation of Class A through F) based on the subgrade soil/rock conditions within the upper 100 feet of the ground surface at the subject site. Based on our

review of the SPT N-values recorded in borings B-1 and B-7, the site classifies as a Seismic Site Class “E”.

The following bulleted items briefly discuss our qualitative assessments of the other seismic-related issues. Detailed quantitative analyses for these items were not included in our Scope of Work and are not considered necessary at this time given the development plans and the subsurface conditions encountered.

- Liquefaction – Risk level is low - Based on disaggregation data for the site (mean EQ magnitude=6.52, Return Period = 2,475 yr, PGA = 0.061g) our models suggest post-event liquefaction-induced settlement ranging from 1-inch to 10 inches; however, since this structure will be supported by piles it will not undergo liquefaction-induced settlement.
- Slope Stability – Risk level is low - Based on the grading plan, neither tall nor overly steep cut/fill slopes are planned for construction.
- Surface Rupture – Risk is low – No known active faults underlie the site.

## 6.5 Pavement

### 6.5.1 Design

The recommended asphalt pavement sections are provided in Table 2. Our recommendations are based on the soil conditions encountered in the borings, the site preparation recommendations contained in this report, and the assumed traffic mix presented below. If the actual anticipated traffic loadings vary from what we have assumed, we request the opportunity to revise these pavement sections.

- 200 cars per day
- Two (2) delivery trucks per day
- Two (2) garbage trucks per week
- Four (4) 80,000 lb fire truck per year

Table 3: Asphalt Pavement Sections<sup>1</sup>

Course	Light-Duty Thickness <sup>2</sup> , in.	Heavy-Duty Thickness <sup>3</sup> , in.
Surface (S9.5B)	2	2.5 <sup>4</sup>
Aggregate Base (ABC)	6	8

1. Flexible pavement sections are based NCDOT/AASHTO design methodology using an estimated CBR value of 6.0 and a standard 20-year design life.  
 2. Stalls only.  
 3. All listed traffic considered.  
 4. Two lifts required.

### 6.5.2 Construction

The pavement recommendations herein are predicated by the assumption that the subgrade soils are suitable for pavement support and have been properly moisture conditioned and compacted to a uniform and stable condition. To verify stability, we recommend proofrolling the finished subgrade with a tandem-axle dump truck weighing between 25 and 35 tons. The same should occur for the stone base prior to paving. Proofrolling should occur in the presence of the owner's testing agency so that recommendations can be provided for areas that rut, pump, or deflect excessively. Proofrolling should not be performed on frozen or excessively wet subgrades. If subgrades are exposed to precipitation or freezing temperatures prior to paving, the area should be re-proofrolled to verify its condition.

All materials and workmanship used during construction should conform to the North Carolina Department of Transportation Standard Specifications for Roads and Structures, current edition. Aggregate base course stone should be compacted to at least 98 percent of its maximum dry density as determined by AASHTO T-180 (modified Proctor). Asphalt shall be placed with appropriate lift thicknesses and achieve the proper compaction for the mix(es) used, as specified in the latest edition of the NCDOT QMS for Asphalt Pavements.

The pavement sections provided herein do not account for construction traffic (dump trucks, concrete trucks, Lulls, etc.), which is typically very heavy. If construction traffic is allowed to operate on paved surfaces, damage should be expected. Operating construction equipment on an early placement of base/intermediate course, and then placing a final surface lift at the end of construction, is not an appropriate approach unless the pavement is designed accordingly. In light of this, we recommend that paving operations be scheduled for the end of construction when heavy construction traffic will be less.

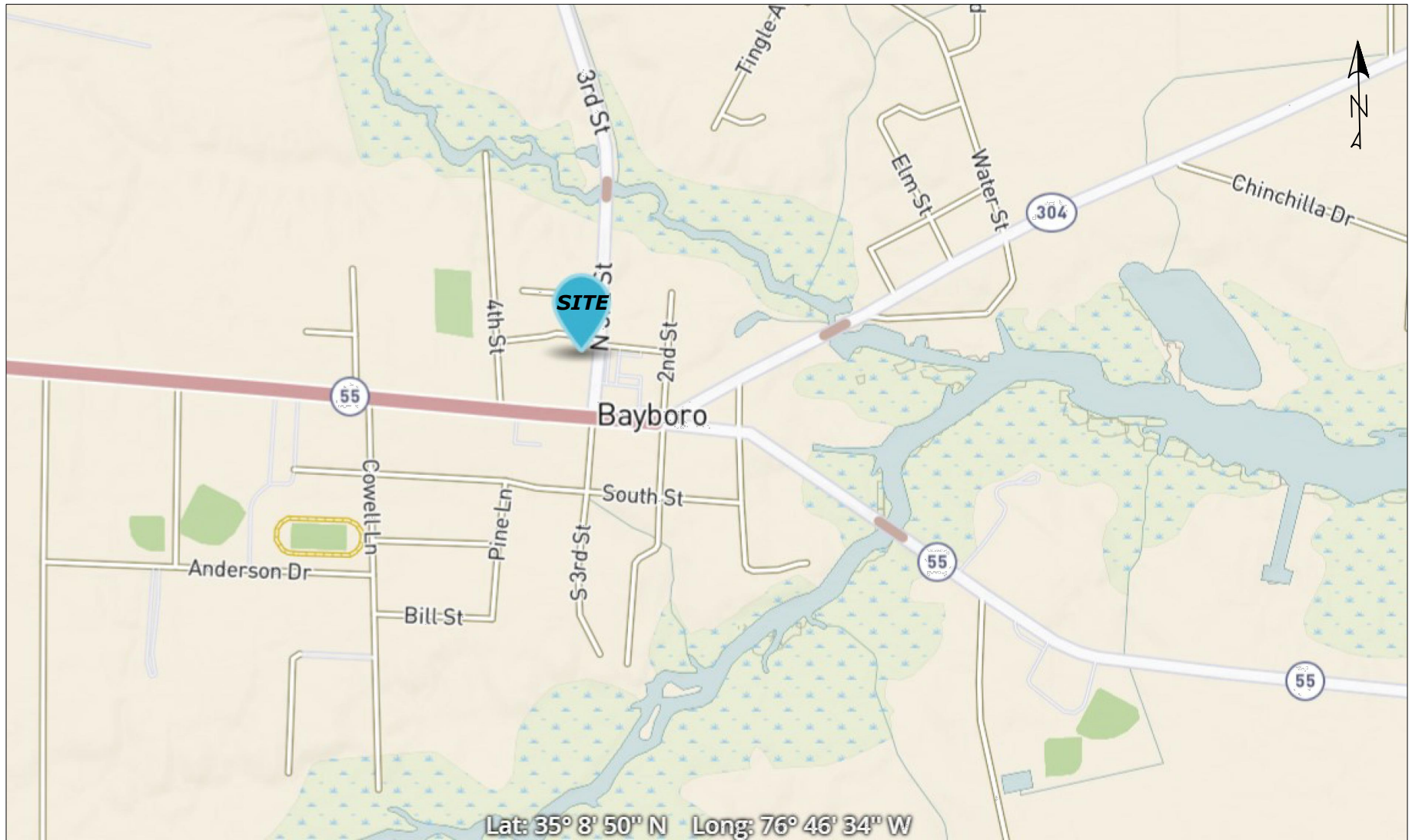
### 6.5.3 Maintenance

Preventative maintenance should be planned and provided through an ongoing pavement management program to enhance future pavement performance. Preventative maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Preventative maintenance, which consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing), is usually the top priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements.



**APPENDIX A**

SITE VICINITY MAP  
BORING LOCATION DIAGRAM



**SITE VICINITY MAP**  
**PAMLICO CO. EOC**  
 100 NW 3rd Street  
 Bayboro, NC

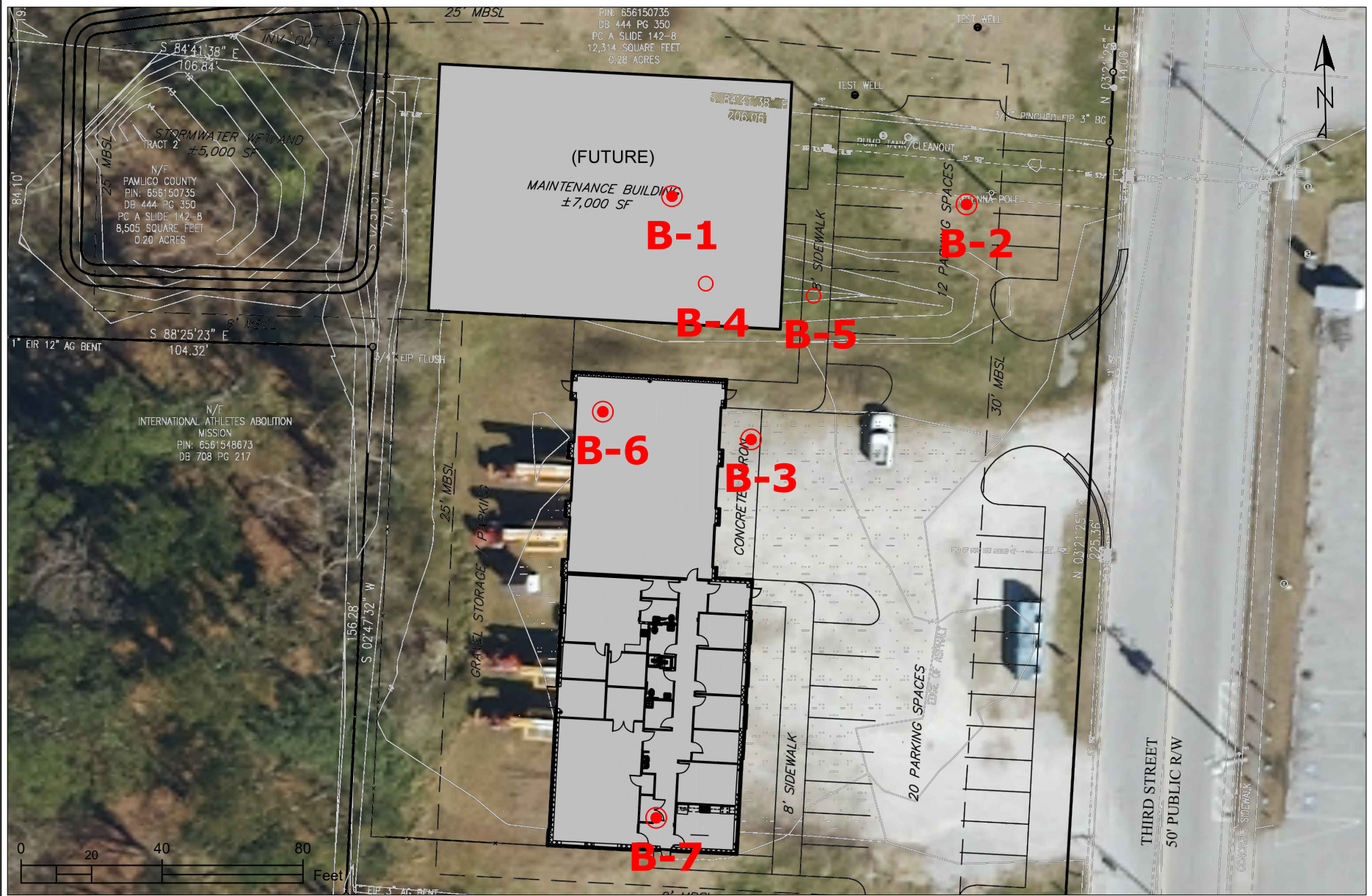
Project No.:	24-960
Scale:	NTS
Prepared by:	DB
Date:	08-22-24

Figure No.:

# A1

Note: Drawing adapted from information provided to SE&T. All test locations are approximate (unless otherwise noted) and intended for illustration purposes only.





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 www.southernengineeringpc.com

**BORING LOCATION DIAGRAM**  
**PAMLICO CO. EOC**  
 100 NW 3rd Street  
 Bayboro, NC

Project No.:	24-960
Scale:	1 in = 40 ft
Prepared by:	DB
Date:	08-22-24

Figure No.:

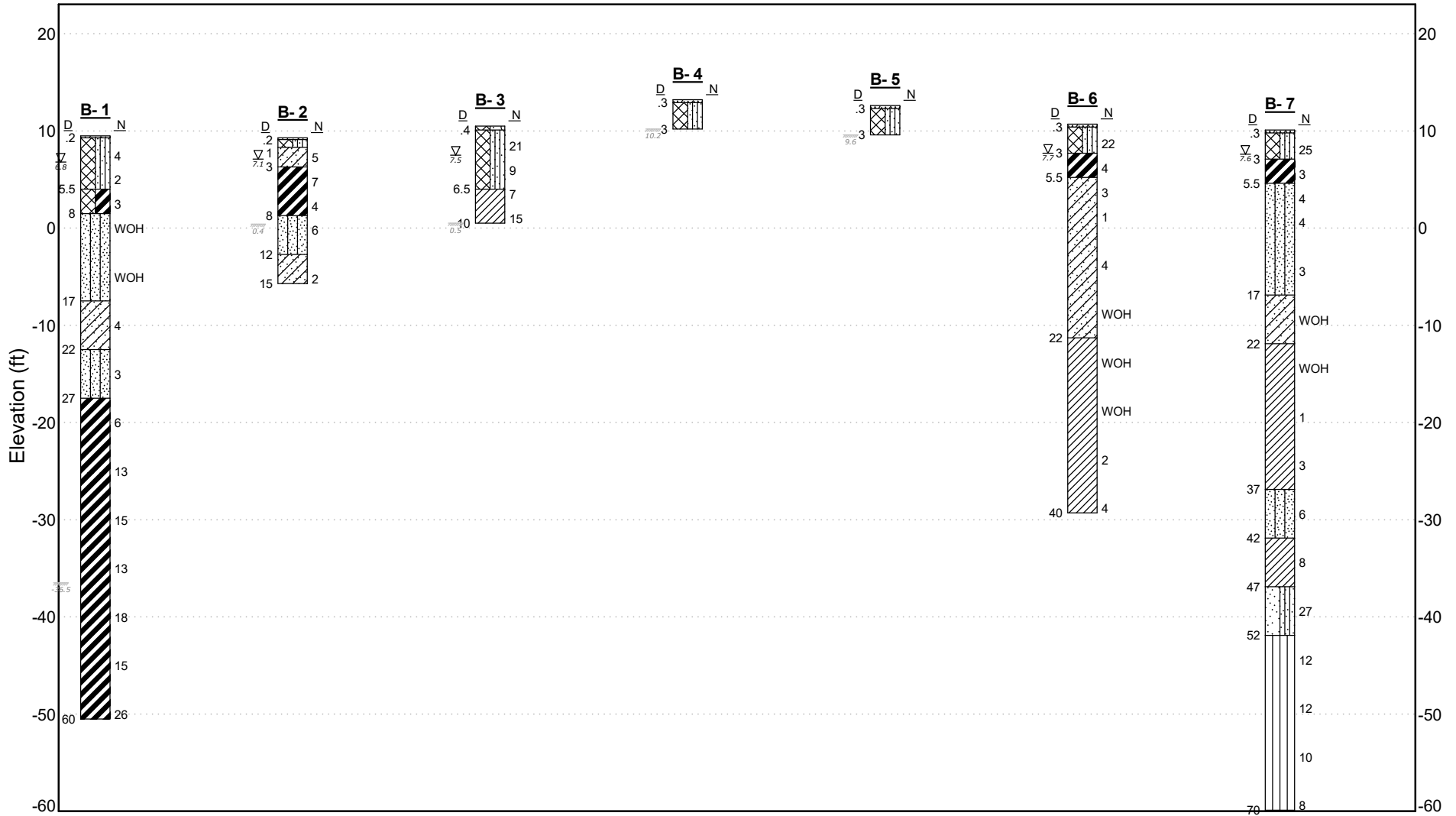
**A2**

Note: Drawing adapted from information provided to SE&T. All test locations are approximate (unless otherwise noted) and intended for illustration purposes only.



**APPENDIX B**

BORING SNAPSHOT  
BORING LOGS  
LEGEND TO SOIL DESCRIPTIONS



Notes: 1) The borings in this snapshot are arranged in alphabetical/numerical order and do not represent a profile or cross section of the subsurface conditions. 2) Stratigraphy lines represent approximate soil boundaries. Transitions should be assumed to be gradual.

"N" SPT N-value (bpf), "D" Depth (ft)

### LITHOLOGY GRAPHICS

Topsoil	Fill - Silty Sand (SM)	Fill - Fat Clay (CH)	Silty Sand (SM)	Clayey Sand (SC)
Fat Clay (CH)	Fill - Poorly-graded Gravel with Sand (GPS)	Lean Clay (CL)	Poorly-Graded Sand with Silt (SP-SM)	Silt (ML)

**PAMLICO CO. EOC**  
BAYBORO, NC



PROJECT PAMLICO CO. EOC

 CLIENT OAKLEY COLLIER ARCHITECTS

 LOCATION BAYBORO, NC

 PROJECT NO. 24-960

 DATE DRILLED 8/2/24 LOGGED BY D. BROWN, PE

 GROUND SURFACE EL. 9.5 FT BORING DEPTH 60 FT

 DRILLED BY BRIDGER DRILLING

 ▽ GW DURING DRILLING 2.7 FT

 DRILLING METHOD MUD ROTARY

 ▽ GW AFTER DRILLING N/A CAVE-IN DEPTH 46 FT

 DRILL RIG CME 45 HAMMER TYPE AUTO

 ▽ N/A - BOREHOLE BACKFILLED IMMEDIATELY AFTER DRILLING

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE DEPTH (ft)	SAMPLE TYPE	SAMPLE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)								
										10	20	30	40	50	60	70	80	90
										PL ● WC LL								
										□ FINES CONTENT (%)								
										10	20	30	40	50	60	70	80	90
0.2		TOPSOIL	9.3															
		FILL																
	SM	VERY LOOSE TO LOOSE, BROWN AND BLACK, WET TO SATURATED SILTY SAND WITH ROOTLETS AND TRACE ORGANICS		6.8	1	SS	1	1	2	4								
					2.5			2										
					3.5			1										
					5	SS	2	1	1	2								
5.5		VERY SOFT, GRAY, SATURATED, SANDY FAT CLAY WITH SHELLS AND PLASTIC SHEETING	4.0		6			0										
	CH				7.5	SS	3	1	2	3								
8.0		COASTAL PLAIN SOIL (NATIVE)	1.5		8.5													
		VERY LOOSE, GRAY, SATURATED, SILTY SAND WITH SHELLS			10	SS	4	WOH	WOH	WOH								
	SM				13.5			WOH	WOH	WOH								
					15	SS	5	WOH	WOH	WOH								
17.0		LOOSE, GRAY, SATURATED, CLAYEY SAND WITH TRACE SHELLS	-7.5		18.5			2	1	3								
	SC				20	SS	6	2	3	4								
22.0		VERY LOOSE, GRAY, SATURATED, SILTY SAND WITH TRACE SHELLS	-12.5		23.5			4	2	1								
	SM				25	SS	7	4	2	1								
27.0		MEDIUM STIFF TO VERY STIFF, GRAY, SATURATED, SANDY FAT CLAY	-17.5		28.5			2	3	3								
	CH				30	SS	8	2	3	3								
					33.5			4	5	8								
								4	5	8								

Notes: 1) Stratigraphy lines represent approximate soil boundaries. Transitions should be assumed to be gradual. 2) SPT Blow Counts are per 6 inches of penetration unless otherwise noted.

(Continued Next Page)

PROJECT PAMLICO CO. EOC

 CLIENT OAKLEY COLLIER ARCHITECTS

 LOCATION BAYBORO, NC

 PROJECT NO. 24-960

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE DEPTH (ft) TYPE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)								
								10	20	30						
								PL ● WC LL 10 20 30 40 50 60 70 80 90 10 20 30 40 50 60 70 80 90								
								□ FINES CONTENT (%)								
								10	20	30	40	50	60	70	80	90
35		MEDIUM STIFF TO VERY STIFF, GRAY, SATURATED, SANDY FAT CLAY														
38.5					SS 10	3 8 7	15									
40																
43.5					SS 11	4 4 9	13									
45																
48.5					SS 12	5 6 12	18									
50																
53.5					SS 13	2 6 9	15									
55																
58.5					SS 14	5 11 15	26									
60.0	CH															

BORING TERMINATED

 NOTE(S):  
 GSE MEASURED BY SOUTHERN ENGINEERING.

Notes: 1) Stratigraphy lines represent approximate soil boundaries. Transitions should be assumed to be gradual. 2) SPT Blow Counts are per 6 inches of penetration unless otherwise noted.

PROJECT PAMLICO CO. EOC

 CLIENT OAKLEY COLLIER ARCHITECTS

 LOCATION BAYBORO, NC

 PROJECT NO. 24-960

 DATE DRILLED 8/2/24 LOGGED BY D. BROWN, PE

 GROUND SURFACE EL. 9.3 FT BORING DEPTH 15 FT

 DRILLED BY BRIDGER DRILLING

 ∇ GW DURING DRILLING 2.2 FT

 DRILLING METHOD MUD ROTARY

 ▼ GW AFTER DRILLING N/A CAVE-IN DEPTH 8.9 FT

 DRILL RIG CME 45 HAMMER TYPE AUTO

 ▼ N/A - BOREHOLE BACKFILLED IMMEDIATELY AFTER DRILLING

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE		SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)	
					DEPTH (ft)	ID NUMBER			10	20
0.2	SM	TOPSOIL	-9.1							
1.0	SM	FILL	-8.3							
	SC	LOOSE, GRAY, MOIST, SILTY SAND			1	SS 1	2			
	SC	COASTAL PLAIN SOIL (NATIVE)		7.1	2.5		3	5		
3.0	SC	LOOSE, TAN, GRAY AND ORANGE, MOIST TO WET, CLAYEY SAND	-6.3				2			
	CH	SOFT TO MEDIUM STIFF, GRAY, TAN AND ORANGE, WET TO SATURATED SANDY FAT CLAY			3.5	SS 2	3			
	CH				5		3	7		
	CH				6	SS 3	2			
	CH				7.5		2	4		
8.0	CH		-1.3				2			
	SM	LOOSE, GRAY, SATURATED, CLAYEY SILTY SAND			8.5	SS 4	3			
	SM			0.4	10		4	6		
	SM						2			
12.0	SC	VERY LOOSE, GRAY, SATURATED, CLAYEY SAND WITH SHELLS	-2.7							
	SC				13.5	SS 5	3			
	SC						1			
15.0	SC		-5.7		15		1	2		

BORING TERMINATED

 NOTE(S):  
 GSE MEASURED BY SOUTHERN ENGINEERING.

PROJECT PAMLICO CO. EOC

 CLIENT OAKLEY COLLIER ARCHITECTS

 LOCATION BAYBORO, NC

 PROJECT NO. 24-960

 DATE DRILLED 8/2/24 LOGGED BY D. BROWN, PE

 GROUND SURFACE EL. 10.5 FT BORING DEPTH 10 FT

 DRILLED BY BRIDGER DRILLING

 ▽ GW DURING DRILLING 3 FT

 DRILLING METHOD MUD ROTARY

 ▽ GW AFTER DRILLING N/A CAVE-IN DEPTH 10 FT

 DRILL RIG CME 45 HAMMER TYPE AUTO

 ▽ N/A - BOREHOLE BACKFILLED IMMEDIATELY AFTER DRILLING

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE DEPTH (ft) TYPE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)	
								10 20 30 40 50 60 70 80 90	10 20 30 40 50 60 70 80 90
								PL ● WC LL 10 20 30 40 50 60 70 80 90	
								□ FINES CONTENT (%)	
								10 20 30 40 50 60 70 80 90	
0.4		<b>FILL</b> GRAVEL (5± INCHES)	10.1						
	SM	<b>FILL</b> LOOSE TO MEDIUM DENSE, TAN AND BROWN, MOIST TO WET, SILTY FINE SAND		7.5	1 2.5 SS 1	13 10 11	21		
					3.5 5 SS 2	5 5 4	9		
6.5		<b>COASTAL PLAIN SOIL (NATIVE)</b> MEDIUM STIFF TO STIFF, TAN, GRAY AND ORANGE, WET, SANDY LEAN CLAY	4.0		6 7.5 SS 3	2 3 4	7		
	CL				8.5 10 SS 4	4 7 8	15		
10.0		BORING TERMINATED	0.5						

NOTE(S):  
GSE MEASURED BY SOUTHERN ENGINEERING.



PROJECT PAMLICO CO. EOC

CLIENT OAKLEY COLLIER ARCHITECTS

LOCATION BAYBORO, NC

PROJECT NO. 24-960

DATE DRILLED 7/23/24 LOGGED BY D. BROWN, PE

GROUND SURFACE EL. 13.2 FT BORING DEPTH 3 FT

DRILLED BY \_\_\_\_\_

▽ GW DURING DRILLING NONE

DRILLING METHOD HAND AUGER

▼ GW AFTER DRILLING NONE CAVE-IN DEPTH 3 FT

DRILL RIG \_\_\_\_\_ HAMMER TYPE \_\_\_\_\_

▼ N/A - BOREHOLE BACKFILLED IMMEDIATELY AFTER DRILLING

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE TYPE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)	
								10 20 30 40 50 60 70 80 90	10 20 30 40 50 60 70 80 90
								PL ● WC LL	
								□ FINES CONTENT (%)	
								10 20 30 40 50 60 70 80 90	
0.3		TOPSOIL	12.9						
		FILL							
	SM	BROWN-TAN, MOIST, SILTY FINE SAND WITH SHELLS							
3.0			10.2						

BORING TERMINATED 10.2

NOTE(S):  
 GSE MEASURED BY SOUTHERN ENGINEERING.  
 PERFORMED ON TOP OF BERM

Notes: 1) Stratigraphy lines represent approximate soil boundaries. Transitions should be assumed to be gradual. 2) SPT Blow Counts are per 6 inches of penetration unless otherwise noted.



PROJECT PAMLICO CO. EOC

CLIENT OAKLEY COLLIER ARCHITECTS

LOCATION BAYBORO, NC

PROJECT NO. 24-960

DATE DRILLED 7/23/24 LOGGED BY D. BROWN, PE

GROUND SURFACE EL. 12.6 FT BORING DEPTH 3 FT

DRILLED BY \_\_\_\_\_

▽ GW DURING DRILLING NONE

DRILLING METHOD HAND AUGER

▼ GW AFTER DRILLING NONE CAVE-IN DEPTH 3 FT

DRILL RIG \_\_\_\_\_ HAMMER TYPE \_\_\_\_\_

▼ N/A - BOREHOLE BACKFILLED IMMEDIATELY AFTER DRILLING

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE TYPE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)	
								10 20 30 40 50 60 70 80 90	10 20 30 40 50 60 70 80 90
								PL ● WC LL	
								□ FINES CONTENT (%)	
								10 20 30 40 50 60 70 80 90	
0.3		TOPSOIL	12.3						
	SM	FILL BROWN-TAN, MOIST, SILTY FINE SAND WITH SHELLS							
3.0			9.6						

BORING TERMINATED 9.6

NOTE(S):  
 GSE MEASURED BY SOUTHERN ENGINEERING.  
 PERFORMED ON TOP OF BERM



PROJECT PAMLICO CO. EOC

CLIENT OAKLEY COLLIER ARCHITECTS

LOCATION BAYBORO, NC

PROJECT NO. 24-960

DATE DRILLED 8/19/24 LOGGED BY D. BROWN, PE

GROUND SURFACE EL. 10.7 FT BORING DEPTH 40 FT

DRILLED BY BRIDGER DRILLING

▽ GW DURING DRILLING 3 FT

DRILLING METHOD MUD ROTARY

▽ GW AFTER DRILLING N/A

DRILL RIG CME 45 HAMMER TYPE AUTO

▽ N/A - BOREHOLE BACKFILLED IMMEDIATELY AFTER DRILLING

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE DEPTH (ft)	SAMPLE TYPE	SAMPLE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)								
										10	20	30	40	50	60	70	80	90
0.3		TOPSOIL	10.4															
	SM	FILL MEDIUM DENSE, GRAY, BLACK AND TAN, MOIST, SILTY FINE SAND			1	SS	SS 1	12 12 10	22									
3.0		COASTAL PLAIN SOIL (NATIVE)	7.7	▽ 7.7	2.5													
	CH	SOFT, GRAY AND ORANGE, WET TO SATURATED, SANDY FAT CLAY			3.5		SS 2	1 2 2	4									
5.5		VERY LOOSE TO LOOSE, GRAY, SATURATED, CLAYEY SAND	5.2		5													
		SHELLS BELOW ~8 FEET			6		SS 3	1 1 2	3									
					7.5													
					8.5		SS 4	WOH WOH 1	1									
					10													
	SC				13.5		SS 5	3 2 2	4									
					15													
					18.5		SS 6	WOH WOH WOH	WOH									
					20													
22.0		VERY SOFT TO SOFT, GRAY, SATURATED, LEAN CLAY	-11.3															
					23.5		SS 7	WOH WOH WOH	WOH									
					25													
					28.5		SS 8	WOH WOH WOH	WOH									
					30													
					33.5		SS 9	WOH WOH 2	2									

Notes: 1) Stratigraphy lines represent approximate soil boundaries. Transitions should be assumed to be gradual. 2) SPT Blow Counts are per 6 inches of penetration unless otherwise noted.

PROJECT PAMLICO CO. EOC

CLIENT OAKLEY COLLIER ARCHITECTS

LOCATION BAYBORO, NC

PROJECT NO. 24-960

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE DEPTH (ft) TYPE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)									
								10	20	30	40	50	60	70	80	90	
								PL			● WC	LL					
								10	20	30	40	50	60	70	80	90	
								□ FINES CONTENT (%)									
								10	20	30	40	50	60	70	80	90	
40.0	CL	VERY SOFT TO SOFT, GRAY, SATURATED, LEAN CLAY	-29.3		38.5 SS 10	WOH 2 2	4										
BORING TERMINATED																	

NOTE(S):  
GSE MEASURED BY SOUTHERN ENGINEERING.





PROJECT PAMLICO CO. EOC

CLIENT OAKLEY COLLIER ARCHITECTS

LOCATION BAYBORO, NC

PROJECT NO. 24-960

DATE DRILLED 8/19/24 LOGGED BY D. BROWN, PE

GROUND SURFACE EL. 10.1 FT BORING DEPTH 70 FT

DRILLED BY BRIDGER DRILLING

▽ GW DURING DRILLING 2.5 FT

DRILLING METHOD MUD ROTARY

▽ GW AFTER DRILLING N/A

DRILL RIG CME 45 HAMMER TYPE AUTO

▽ N/A - BOREHOLE BACKFILLED IMMEDIATELY AFTER DRILLING

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE DEPTH (ft)	SAMPLE TYPE	SAMPLE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)									
										10	20	30	40	50	60	70	80	90	
0.3		TOPSOIL WITH GRAVEL	9.8																
	SM	FILL MEDIUM DENSE, GRAY-TAN AND BLACK, MOIST TO WET, SILTY FINE SAND			1	SS 1		17 17 8	25										
3.0		COASTAL PLAIN SOIL (NATIVE) VERY SOFT, GRAY, SATURATED, SANDY FAT CLAY	7.1	7.6	2.5														
	CH				3.5	SS 2		1 2 1	3										
5.5		VERY LOOSE TO LOOSE, GRAY AND ORANGE-TAN, SATURATED, CLAYEY SILTY SAND	4.6		5														
	SM				6	SS 3	WOH 2 2		4										
					7.5														
					8.5	SS 4		1 2 2	4										
					10														
17.0		VERY LOOSE, GRAY, SATURATED, CLAYEY SAND	-6.9		13.5	SS 5		3 2 1	3										
	SC				15														
					18.5	SS 6	WOH WOH WOH		WOH										
22.0		VERY SOFT, GRAY, SATURATED, LEAN CLAY WITH TRACE SHELLS	-11.9		20														
	CL				23.5	SS 7	WOH WOH WOH		WOH										
					25														
					28.5	SS 8		2 1 0	1										
					30														
					33.5	SS 9	WOH 1 2		3										

Notes: 1) Stratigraphy lines represent approximate soil boundaries. Transitions should be assumed to be gradual. 2) SPT Blow Counts are per 6 inches of penetration unless otherwise noted.

**PROJECT** PAMLICO CO. EOC

**CLIENT** OAKLEY COLLIER ARCHITECTS

**LOCATION** BAYBORO, NC

**PROJECT NO.** 24-960

DEPTH (ft)	MATERIAL TYPE	MATERIAL DESCRIPTION	ELEVATION (ft)	WL / CAVE EL (ft)	SAMPLE DEPTH (ft)	SAMPLE TYPE	SAMPLE ID NUMBER	SPT BLOW COUNTS	N-VALUE (bpf)	▲ SPT N-VALUE (BPF)									
										10	20	30	40	50	60	70	80	90	
										PL ● WC LL									
										□ FINES CONTENT (%)									
										10	20	30	40	50	60	70	80	90	
37.0	CL	VERY SOFT, GRAY, SATURATED, LEAN CLAY WITH TRACE SHELLS			35														
		-----																	
		LOOSE, GRAY, SATURATED, SILTY SAND	-26.9																
	SM				38.5		SS 10	2 3	6										
		-----			40														
42.0		MEDIUM STIFF, GRAY, SATURATED, SANDY LEAN CLAY	-31.9																
	CL				43.5		SS 11	3 4	8										
		-----			45														
47.0		MEDIUM DENSE, GRAY, SATURATED, POORLY-GRADED SAND WITH SILT AND TRACE ORGANICS	-36.9																
	SP SM				48.5		SS 12	10 13	27										
		-----			50			14											
52.0		STIFF, GRAY, WET, SANDY SILT	-41.9																
		-----			53.5		SS 13	3 5	12										
					55			7											
		-----			58.5		SS 14	3 5	12										
					60			7											
		-----			63.5		SS 15	3 5	10										
		NO SAMPLE RECOVERY FOR SS-15			65			5											
		-----			68.5		SS 16	3 3	8										
					70			5											
70.0	ML	BORING TERMINATED	-59.9																

NOTE(S):  
GSE MEASURED BY SOUTHERN ENGINEERING.

# UNIFIED SOIL CLASSIFICATION (ASTM D-2487)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS  >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	$Cu > 4$ AND $1 < Cc < 3$	GW	WELL-GRADED GRAVEL	
		GRAVELS WITH FINES >12% FINES	$Cu > 4$ AND $1 > Cc > 3$	GP	POORLY-GRADED GRAVEL	
		SANDS  >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL	
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL	
	SANDS  >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	$Cu > 6$ AND $1 < Cc < 3$	SW	WELL-GRADED SAND	
		SANDS AND FINES >12% FINES	$Cu > 6$ AND $1 > Cc > 3$	SP	POORLY-GRADED SAND	
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND	
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND	
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS  LIQUID LIMIT < 50	INORGANIC	$PI > 7$ AND PLOTS > "A" LINE	CL	LOW PLASTICITY (LEAN) CLAY	
		INORGANIC	$PI > 4$ AND PLOTS < "A" LINE	ML	LOW PLASTICITY SILT	
		ORGANIC	LL (oven dried)/LL (not dried) < 0.75	OL	ORGANIC CLAY OR SILT	
	SILTS AND CLAYS  LIQUID LIMIT > 50	INORGANIC	$PI$ PLOTS > "A" LINE	CH	HIGH PLASTICITY (FAT) CLAY	
		INORGANIC	$PI$ PLOTS < "A" LINE	MH	HIGH ELASTICITY SILT	
		ORGANIC	LL (oven dried)/LL (not dried) < 0.75	OH	ORGANIC CLAY OR SILT	
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT	

### MATERIAL TYPES ENCOUNTERED ONSITE

Fat Clay (CH)	Lean Clay (CL)
Fill - Fat Clay (CH)	Fill - Poorly-graded Gravel with Sand (GPS)
Fill - Silty Sand (SM)	Silt (ML)
Clayey Sand (SC)	Silty Sand (SM)
Poorly-Graded Sand with Silt (SP-SM)	Topsoil

### PENETRATION RESISTANCE (RECORDED AS BLOWS PER 6 IN.)

SAND & GRAVEL		SILT & CLAY	
DENSITY	BLOWS/FT*	CONSISTENCY	BLOWS/FT*
VERY LOOSE	0 - 3	VERY SOFT	0 - 1
LOOSE	4 - 9	SOFT	2 - 4
MEDIUM DENSE	10 - 30	MEDIUM STIFF (FIRM)	5 - 8
DENSE	31 - 50	STIFF	9 - 15
VERY DENSE	51+	VERY STIFF	16 - 30
		HARD	31+

\* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

### SAMPLE TYPES FOR THIS EXPLORATION

SPLIT SPOON

### ABBREVIATIONS & SYMBOLS

<p>HSA - HOLLOW-STEM AUGER          HA - HAND AUGER          SPT - STANDARD PENETRATION TEST          BPF - BLOWS PER FOOT          PL - PLASTIC LIMIT          LL - LIQUID LIMIT          MC - MOISTURE CONTENT          SS - SPLIT SPOON          AP - AUGER PROBE          WC - WATER CONTENT          WR - WEATHERED ROCK          USCS - UNIFIED SOIL CLASSIFICATION SYSTEM          WOH - WEIGHT OF HAMMER          WOR - WEIGHT OF RODS</p>	<p>AR - AUGER REFUSAL          REF - REFUSAL          HAR - HAND AUGER REFUSAL          FIAD - FILLED IMMEDIATELY AFTER DRILLING/DIGGING          DRY - REQUIRES WETTING TO REACH OPTIMUM          MOIST - AT OR NEAR OPTIMUM          WET - REQUIRES DRYING TO REACH OPTIMUM          SAT - SATURATED (FREE WATER)   WATER LEVEL DURING DRILLING   WATER LEVEL IMMED. AFTER DRILLING   WATER LEVEL AFTER DELAY (WAIT PERIOD)   BOREHOLE CAVE-IN AFTER DRILLING/DELAY</p>
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**APPENDIX C**

SITE PHOTOGRAPHS





Photograph 1: View looking north across the proposed building area.



Photograph 2: View looking northeast toward 3<sup>rd</sup> Street from building area.





Photograph 3: View looking southwest toward the building area from 3<sup>rd</sup> Street.



Photograph 4: Looking east along soil berm in the northern portion of the site.





Photograph 5: Below grade vault with lid bolted shut in the northern portion of the site.



Photograph 4: Groundwater monitoring well (second well in the distance) in the northern portion of the site.





**APPENDIX D**

GBA CIRCULAR:  
*"IMPORTANT INFORMATION ABOUT THIS  
GEOTECHNICAL ENGINEERING REPORT"*



# Important Information about This

# Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

**The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.**

## Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

## Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

## Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

## You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

### Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

### This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

### This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

### Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

*conspicuously that you’ve included the material for information purposes only.* To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

### Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

### Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

### Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* **Confront the risk of moisture infiltration** by including building-envelope or mold specialists on the design team. **Geotechnical engineers are not building-envelope or mold specialists.**



Telephone: 301/565-2733

e-mail: [info@geoprofessional.org](mailto:info@geoprofessional.org) [www.geoprofessional.org](http://www.geoprofessional.org)

**FORM OF SINGLE PRIME GENERAL CONTRACTOR PROPOSAL**

New Facility for  
Pamlico County EOC / 911 Dispatch  
Architect's Project # 24017

Bidder: \_\_\_\_\_  
Date: \_\_\_\_\_

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Proposal as principal of principals is or are named herein and that no other person than herein mentioned has any interest in this Proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud. The Bidder further declares that he has examined the site of the Work and the Contract Documents relative thereto and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed.

The bidder proposes and agrees if this Proposal is accepted to contract with Pamlico County in the form of contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation, and labor necessary to complete the construction of the Pamlico County EOC / 911 Dispatch in full accordance with the plans, specifications, and contract documents, to the full and entire satisfaction of Pamlico County with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and Contract Documents for the sum of:

**SINGLE PRIME CONTRACT:** \_\_\_\_\_

**Base Bid:**  
  
\_\_\_\_\_ Dollars(\$)

<b>Subcontractors:</b>	<b>License No.</b>	<b>Dollars(\$)</b>
Site:	_____	_____
Plumbing:	_____	_____
Mechanical:	_____	_____
Electrical:	_____	_____

**ALTERNATES**

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be "added to" or "deducted from" the base bid. (Strike out "Add" or "Deduct" as appropriate.)

**GENERAL CONTRACT:**

**Alternate No. G-1: Additional Storage Bays**  
**(Add)(Deduct)**

**Dollars (\$)**

**UNIT PRICES**

Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the base bid quantity of the work all in accordance with the contract documents.

**GENERAL CONTRACT:**

Unit Price No. 1: Data Outlet and Conduit.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

Cost for additional 10 occurrences included in Base Bid Price(\$) \_\_\_\_\_

Unit Price No. 2: Duplex Receptacle and Circuit.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

Cost for additional 10 occurrences included in Base Bid Price(\$) \_\_\_\_\_

Unit Price No. 3: Earthwork Subsoil.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

Unit Price No. 4: Earthwork Topsoil.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

Unit Price No. 5: Earthwork Aggregate.....(Unit) ton Unit Price (\$) \_\_\_\_\_

Unit Price No. 6: Site Clearing.....(Unit) sq ft Unit Price (\$) \_\_\_\_\_

Unit Price No. 7: Rough Grading Topsoil Fill Material.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

Unit Price No. 8: Rough Grading Subsoil Fill Material.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

Unit Price No. 9: Rough Grading Structural Fill Material.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

Unit Price No. 10: Rough Grading Granular Fill Material.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

Unit Price No. 11: Excavating Soil Materials.....(Unit) cu yd Unit Price (\$) \_\_\_\_\_

- Unit Price No. 12: Trenching .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 13: Trenching Subsoil Fill .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 14: Trenching Structural Fill.....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 15: Trenching Granular Fill.....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 16: Trenching Concrete Fill .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 17: Fill Material .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 18: Structural Fill Material .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 19: Concrete Fill .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 20: Erosion Control Diversion Channel.....(Unit) In ft Unit Price (\$)\_\_\_\_\_
- Unit Price No. 21: Erosion Control Rock Energy Dissipator .....(Unit) each Unit Price (\$)\_\_\_\_\_
- Unit Price No. 22: Erosion Control Rip Rap Outlet Protection...(Unit) ton Unit Price (\$)\_\_\_\_\_
- Unit Price No. 23: Erosion Control Sediment Basin .....(Unit) each Unit Price (\$)\_\_\_\_\_
- Unit Price No. 24: Erosion Control Skimmer Sediment Basin ....(Unit) each Unit Price (\$)\_\_\_\_\_
- Unit Price No. 25: Erosion Control Temporary Sediment Trap..(Unit) each Unit Price (\$)\_\_\_\_\_
- Unit Price No. 26: Cleaning Sedimentation Structures .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 27: Riprap.....(Unit) ton Unit Price (\$)\_\_\_\_\_
- Unit Price No. 28: Aggregate Subbase .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 29: Aggregate Base Course .....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
- Unit Price No. 30: Asphalt Paving Aggregate Subbase.....(Unit) cu yd Unit Price (\$)\_\_\_\_\_

- Unit Price No. 31: Asphalt Paving Base Course.....(Unit) ton Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 32: Asphalt Paving Binder Course.....(Unit) ton Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 33: Asphalt Paving Wearing Course.....(Unit) ton Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 34: Asphalt Paving Tack Coat.....(Unit) sq yd Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 35: Concrete Paving Aggregate.....(Unit) ton Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 36: Concrete Paving.....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 37: Soil Preparation Grassed Areas .....(Unit) sq ft Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 38: Landscape Grading Topsoil.....(Unit) cu yd Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 39: Seeding Grassed Areas .....(Unit) sq ft Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 40: Precast Concrete Valve Vault.....(Unit) each Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 41: Precast Concrete Meter Boxes .....(Unit) each Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 42: Water Service Connections Pipe & Fittings ..(Unit) In ft Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 43: Water Service Connections Corporation .....(Unit) each Unit Price (\$)\_\_\_\_\_  
Stop Assembly
  
- Unit Price No. 44: Water Service Connections Curb Stop.....(Unit) each Unit Price (\$)\_\_\_\_\_  
Assembly
  
- Unit Price No. 45: Water Service Connections Water Meters...(Unit) each Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 46: Water Service Connections Back Flow .....(Unit) each Unit Price (\$)\_\_\_\_\_  
Preventer
  
- Unit Price No. 47: Water Utility Distribution Valves.....(Unit) each Unit Price (\$)\_\_\_\_\_
  
- Unit Price No. 48: Fire Hydrant.....(Unit) each Unit Price (\$)\_\_\_\_\_

Unit Price No. 49: Disinfection of Water Utility Distribution.....(Unit) In ft Unit Price (\$)\_\_\_\_\_

The Bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in a written order of the Architect and shall fully complete all work within **300** consecutive calendar days from date of commencement established in a Notice to Proceed.

BIDDER further agrees to pay as liquidated damages, the sum of \$500 for each consecutive calendar day thereafter as provided in Article 15 of the General Conditions.

**MINORITY BUSINESS PARTICIPATION REQUIREMENTS**

*Provide with the bid* - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of Minority Business Participation Form) the minority businesses that it will use on the project with the total dollar value of the bids that will be performed by the minority businesses. **Also** list the good faith efforts (Affidavit **A**) made to solicit minority participation in the bid effort.

**NOTE:** A contractor that performs all of the work with its own workforce may submit an Affidavit (**B**) to that effect in lieu of Affidavit (**A**) required above. The MB Participation Form must still be submitted even if there is zero participation.

*After the bid opening* - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (**C**) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit **D** is not necessary;

**\* OR \***

If less than the 10% goal, Affidavit (**D**) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract.

**Note:** Bidders must always submit **with their bid** the Identification of Minority Business Participation Form listing all MB contractors, vendors and suppliers that will be used. If there is no MB participation, then enter none or zero on the form. Affidavit A **or** Affidavit B, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid.



**PROPOSAL SIGNATURE PAGE**

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bond within ten (10) consecutive calendar days after written notice being given on the award contract, the check, cash or bid bond accompanying this bid shall be paid into the funds of the Owner’s account set aside for the project, as liquidated damages for such failure; otherwise the check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Attach certified check, cash or bid bond to this proposal.

Respectfully submitted this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_.

Name of firm or corporation making bid

\_\_\_\_\_

WITNESS: By: \_\_\_\_\_

\_\_\_\_\_ Title: \_\_\_\_\_

Proprietorship or Partnership (Owner, Partner, Pres., V. Pres.)

Address: \_\_\_\_\_

\_\_\_\_\_

License No: \_\_\_\_\_

Federal ID No: \_\_\_\_\_

(Corporate Seal)

ATTEST:

By: \_\_\_\_\_

Title: \_\_\_\_\_

(Corp. Sec. or Asst. Sec. Only)

Addenda received and used in computing bid:

Addendum No. 1 \_\_\_\_\_ Addendum No. 3 \_\_\_\_\_

Addendum No. 2 \_\_\_\_\_ Addendum No. 4 \_\_\_\_\_

**For All Official Notices:**

---

Name and Title

---

Name of Firm/Corporation

---

Street Address, City, State and Zip

---

Telephone and Fax Numbers

## Identification of HUB Certified/ Minority Business Participation

I, \_\_\_\_\_  
(Name of Bidder)

do hereby certify that on this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work Type	*Minority Category	**HUB Certified (Y/N)

\*Minority categories: Black, African American (B), Hispanic (H), Asian American (A) American Indian (I), Female (F) Socially and Economically Disadvantaged (D)

**\*\* HUB Certification with the state HUB Office required to be counted toward state participation goals.**

**The total value of minority business contracting will be (\$) \_\_\_\_\_.**



# State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of \_\_\_\_\_

(Name of Bidder)

Affidavit of \_\_\_\_\_

I have made a good faith effort to comply under the following areas checked:

**Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive.** (1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- 2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- 3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- 5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- 8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- 9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- 10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

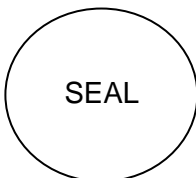
The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of \_\_\_\_\_, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_



# State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of \_\_\_\_\_

Affidavit of \_\_\_\_\_

(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the \_\_\_\_\_ contract.

(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

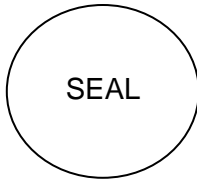
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of \_\_\_\_\_, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_





# State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of \_\_\_\_\_

**(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)**

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.  
 This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of \_\_\_\_\_ I do hereby certify that on the \_\_\_\_\_  
 (Name of Bidder)

\_\_\_\_\_ (Project Name)  
 Project ID# \_\_\_\_\_ Amount of Bid \$ \_\_\_\_\_

I will expend a minimum of \_\_\_\_\_% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

\*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**\*\* HUB Certification with the state HUB Office required to be counted toward state participation goals.**

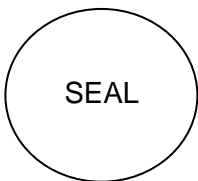
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of \_\_\_\_\_, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_



# State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of \_\_\_\_\_

**(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)**

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of \_\_\_\_\_ I do hereby certify that on the \_\_\_\_\_  
(Name of Bidder)

Project ID# \_\_\_\_\_ (Project Name) Amount of Bid \$ \_\_\_\_\_

I will expend a minimum of \_\_\_\_\_% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

\*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**\*\* HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- B. Copies of quotes or responses received from each firm responding to the solicitation.
- C. A telephone log of follow-up calls to each firm sent a solicitation.
- D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- F. Copy of pre-bid roster
- G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- H. Letter detailing reasons for rejection of minority business due to lack of qualification.
- I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

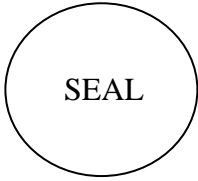
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: \_\_\_\_\_ Name of Authorized Officer: \_\_\_\_\_

Signature: \_\_\_\_\_

Title: \_\_\_\_\_



State of \_\_\_\_\_, County of \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

Notary Public \_\_\_\_\_

My commission expires \_\_\_\_\_

## **Bid Bond**

**CONTRACTOR:**

*(Name, legal status and address)*

**SURETY:**

*(Name, legal status and principal place of business)*

**OWNER:**

*(Name, legal status and address)*

**BOND AMOUNT: \$**

**PROJECT:**

*(Name, location or address, and Project number, if any)*

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

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

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

**ADDITIONS AND DELETIONS:**

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

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

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

Signed and sealed this day of ,

\_\_\_\_\_  
(Contractor as Principal)

\_\_\_\_\_  
(Seal)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Surety)

\_\_\_\_\_  
(Seal)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Title)

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Init.

User Notes:

(944732791)

 **AIA**<sup>®</sup> Document A101<sup>™</sup> – 2017

**Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum**

**AGREEMENT** made as of the    day of    in the year  
*(In words, indicate day, month and year.)*

**BETWEEN** the Owner:  
*(Name, legal status, address and other information)*

and the Contractor:  
*(Name, legal status, address and other information)*

for the following Project:  
*(Name, location and detailed description)*

The Architect:  
*(Name, legal status, address and other information)*

The Owner and Contractor agree as follows.

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

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

The parties should complete A101<sup>™</sup>-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201<sup>™</sup>-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

**TABLE OF ARTICLES**

- 1 THE CONTRACT DOCUMENTS**
- 2 THE WORK OF THIS CONTRACT**
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**
- 4 CONTRACT SUM**
- 5 PAYMENTS**
- 6 DISPUTE RESOLUTION**
- 7 TERMINATION OR SUSPENSION**
- 8 MISCELLANEOUS PROVISIONS**
- 9 ENUMERATION OF CONTRACT DOCUMENTS**

**EXHIBIT A INSURANCE AND BONDS**

**ARTICLE 1 THE CONTRACT DOCUMENTS**

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

**ARTICLE 2 THE WORK OF THIS CONTRACT**

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

**ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION**

**§ 3.1** The date of commencement of the Work shall be:

*(Check one of the following boxes.)*

- The date of this Agreement.
- A date set forth in a notice to proceed issued by the Owner.
- Established as follows:  
*(Insert a date or a means to determine the date of commencement of the Work.)*

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

**§ 3.2** The Contract Time shall be measured from the date of commencement of the Work.

**§ 3.3 Substantial Completion**

**§ 3.3.1** Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

*(Check one of the following boxes and complete the necessary information.)*

Init.



[ ] Not later than ( ) calendar days from the date of commencement of the Work.

[ ] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
-----------------	-----------------------------

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

#### ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$ ), subject to additions and deductions as provided in the Contract Documents.

#### § 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
------	-------

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement. (Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
------	-------	---------------------------

§ 4.3 Allowances, if any, included in the Contract Sum: (Identify each allowance.)

Item	Price
------	-------

#### § 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

#### § 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

#### § 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

## ARTICLE 5 PAYMENTS

### § 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than ( ) days after the Architect receives the Application for Payment.

*(Federal, state or local laws may require payment within a certain period of time.)*

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

### § 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

*(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)*

**§ 5.1.7.1.1** The following items are not subject to retainage:  
*(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)*

**§ 5.1.7.2** Reduction or limitation of retainage, if any, shall be as follows:  
*(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)*

**§ 5.1.7.3** Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:  
*(Insert any other conditions for release of retainage upon Substantial Completion.)*

**§ 5.1.8** If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

**§ 5.1.9** Except with the Owner’s prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

**§ 5.2 Final Payment**

**§ 5.2.1** Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

**§ 5.2.2** The Owner’s final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect’s final Certificate for Payment, or as follows:

**§ 5.3 Interest**

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.  
*(Insert rate of interest agreed upon, if any.)*

%

**ARTICLE 6 DISPUTE RESOLUTION**

**§ 6.1 Initial Decision Maker**

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.  
*(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

## § 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

*(Check the appropriate box.)*

- [ ] Arbitration pursuant to Section 15.4 of AIA Document A201–2017
- [ ] Litigation in a court of competent jurisdiction
- [ ] Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

## ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

*(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)*

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

## ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

*(Name, address, email address, and other information)*

§ 8.3 The Contractor's representative:

*(Name, address, email address, and other information)*

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

**§ 8.5 Insurance and Bonds**

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™-2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201-2017, may be given in accordance with AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

*(If other than in accordance with AIA Document E203-2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)*

§ 8.7 Other provisions:

**ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS**

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™-2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™-2017, General Conditions of the Contract for Construction

.5 Drawings

Number	Title	Date
--------	-------	------

.6 Specifications

Section	Title	Date	Pages
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.7 Addenda, if any:

Number	Date	Pages
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Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:

*(Check all boxes that apply and include appropriate information identifying the exhibit where required.)*

Init.

AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:  
(Insert the date of the E204-2017 incorporated into this Agreement.)

The Sustainability Plan:

Title	Date	Pages
-------	------	-------

Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
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**.9** Other documents, if any, listed below:

*(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)*

This Agreement entered into as of the day and year first written above.

\_\_\_\_\_  
**OWNER** (Signature)

\_\_\_\_\_  
**CONTRACTOR** (Signature)

\_\_\_\_\_  
(Printed name and title)

\_\_\_\_\_  
(Printed name and title)

Init.

 **AIA**® Document A312™ – 2010

**Performance Bond**

**CONTRACTOR:**  
*(Name, legal status and address)*

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

**OWNER:**  
*(Name, legal status and address)*

**CONSTRUCTION CONTRACT**

Date:  
Amount: \$  
Description:  
*(Name and location)*

**BOND**  
Date:  
*(Not earlier than Construction Contract Date)*

Amount: \$  
Modifications to this Bond:  None  See Section 16

<b>CONTRACTOR AS PRINCIPAL</b>	<b>SURETY</b>
Company: <i>(Corporate Seal)</i>	Company: <i>(Corporate Seal)</i>
Signature: _____	Signature: _____
Name and	Name and
Title:	Title:

*(Any additional signatures appear on the last page of this Performance Bond.)*

*(FOR INFORMATION ONLY — Name, address and telephone)*

<b>AGENT or BROKER:</b>	<b>OWNER'S REPRESENTATIVE:</b>
	<i>(Architect, Engineer or other party:)</i>

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

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

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

**§ 1** The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

**§ 2** If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

**§ 3** If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

**§ 4** Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

**§ 5** When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

**§ 5.1** Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

**§ 5.2** Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

**§ 5.3** Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

**§ 5.4** Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

**§ 6** If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

**§ 7** If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the

Init.



Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

#### § 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

Init.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

**CONTRACTOR AS PRINCIPAL**

**SURETY**

Company: \_\_\_\_\_ (Corporate Seal)

Company: \_\_\_\_\_ (Corporate Seal)

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Address: \_\_\_\_\_

Address: \_\_\_\_\_

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**Payment Bond**

**CONTRACTOR:**  
*(Name, legal status and address)*

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

**OWNER:**  
*(Name, legal status and address)*

**CONSTRUCTION CONTRACT**  
Date:  
Amount: \$  
Description:  
*(Name and location)*

**BOND**  
Date:  
*(Not earlier than Construction Contract Date)*

Amount: \$  
Modifications to this Bond:  None  See Section 18

**CONTRACTOR AS PRINCIPAL**                      **SURETY**  
Company: *(Corporate Seal)*                      Company: *(Corporate Seal)*

Signature: \_\_\_\_\_                      Signature: \_\_\_\_\_  
Name and                                              Name and  
Title:                                                      Title:

*(Any additional signatures appear on the last page of this Payment Bond.)*

*(FOR INFORMATION ONLY — Name, address and telephone)*

**AGENT or BROKER:**                                      **OWNER'S REPRESENTATIVE:**  
*(Architect, Engineer or other party:)*

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

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

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

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

#### § 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

*(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)*

**CONTRACTOR AS PRINCIPAL**

**SURETY**

Company: \_\_\_\_\_ (Corporate Seal)

Company: \_\_\_\_\_ (Corporate Seal)

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Address: \_\_\_\_\_

Address: \_\_\_\_\_

## Certificate of Substantial Completion

**PROJECT:** *(name and address)*  
0000

**CONTRACT INFORMATION:**  
Contract For: General Construction  
Date:

**CERTIFICATE INFORMATION:**  
Certificate Number:  
Date:

**OWNER:** *(name and address)*

**ARCHITECT:** *(name and address)*

**CONTRACTOR:** *(name and address)*

The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate.

*(Identify the Work, or portion thereof, that is substantially complete.)*

\_\_\_\_\_  
**ARCHITECT** *(Firm Name)*

\_\_\_\_\_  
**SIGNATURE**

\_\_\_\_\_  
**PRINTED NAME AND TITLE**

\_\_\_\_\_  
**DATE OF SUBSTANTIAL COMPLETION**

### WARRANTIES

The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

*(Identify warranties that do not commence on the date of Substantial Completion, if any, and indicate their date of commencement.)*

### WORK TO BE COMPLETED OR CORRECTED

A list of items to be completed or corrected is attached hereto, or transmitted as agreed upon by the parties, and identified as follows:

*(Identify the list of Work to be completed or corrected.)*

The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment, whichever occurs first. The Contractor will complete or correct the Work on the list of items attached hereto within ( ) days from the above date of Substantial Completion.

Cost estimate of Work to be completed or corrected: \$0.00

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:

*(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)*

The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate of Substantial Completion:

\_\_\_\_\_  
**CONTRACTOR** *(Firm Name)*

\_\_\_\_\_  
**SIGNATURE**

\_\_\_\_\_  
**PRINTED NAME AND TITLE**

\_\_\_\_\_  
**DATE**

\_\_\_\_\_  
**OWNER** *(Firm Name)*

\_\_\_\_\_  
**SIGNATURE**

\_\_\_\_\_  
**PRINTED NAME AND TITLE**

\_\_\_\_\_  
**DATE**





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**SECTION 01 10 00  
SUMMARY****PART 1 GENERAL****1.01 PROJECT**

- A. Project Name: Pamlico County EOC / 911 Dispatch.
- B. Owner's Name: Pamlico County.
- C. Architect's Name: Oakley Collier Architects, PA.
- D. The Project consists of the construction of a 5,165 square foot one story building including site development, plumbing, mechanical and electrical systems. The building includes a 911 Dispatch, an EOC / Training room, offices, storage bays, and support spaces. Construction includes wood trusses, slab on grade, load bearing CMU walls with brick veneer, single ply roof membrane system, and steel stud interior walls.

**1.02 CONTRACT DESCRIPTION****1.03 WORK BY OWNER**

- A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion.
- B. Items noted OSOI (Owner Supplied Owner Installed) will be supplied and installed by the Owner.
- C. Items noted OSCI (Owner Supplied Contractor Installed) will be supplied by the Owner and installed by the Contractor:
- D. Items noted CSCI (Contractor Supplied Contractor Installed) will be supplied and installed by the Contractor.

**1.04 OWNER OCCUPANCY**

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

**1.05 CONTRACTOR USE OF SITE AND PREMISES**

- A. Construction Operations: Limited to areas noted on Drawings.
  - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Arrange use of site to allow:
  - 1. Work by Others.
- C. Provide access to and from site as required by law and by Owner:
  - 1. Do not obstruct roadways, sidewalks, or other public ways without permit.

**PART 2 PRODUCTS - NOT USED****PART 3 EXECUTION - NOT USED****END OF SECTION**

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**SECTION 01 20 00  
PRICE AND PAYMENT PROCEDURES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Procedures for preparation and submittal of application for final payment.

**1.02 SCHEDULE OF VALUES**

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- G. Revise schedule to list approved Change Orders, with each Application For Payment.

**1.03 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Authorized Change Orders.
  - 7. Total Completed and Stored to Date of Application.
  - 8. Percentage of Completion.
  - 9. Balance to Finish.
  - 10. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- I. Submit electronic copies of each Application for Payment.
- J. Include the following with the application:
  - 1. Transmittal letter as specified for submittals in Section 01 30 00.
  - 2. Construction progress schedule, revised and current as specified in Section 01 30 00.
  - 3. Partial release of liens from major subcontractors and vendors.

4. Affidavits attesting to off-site stored products.
- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

#### **1.04 MODIFICATION PROCEDURES**

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- C. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 10 days.
- E. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 60 00.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
  1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  2. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
- G. Substantiation of Costs: Provide full information required for evaluation.
  1. Provide the following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
  3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

**1.05 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  - 1. All closeout procedures specified in Section 01 70 00.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 21 00  
ALLOWANCES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Cash allowances.
- B. Payment and modification procedures relating to allowances.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

**1.03 CASH ALLOWANCES**

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts , less applicable taxes .
- B. Architect Responsibilities:
  - 1. Consult with Contractor for consideration and selection of products .
  - 2. Select products in consultation with Owner and transmit decision to Contractor.
- C. Contractor Responsibilities:
  - 1. Assist Architect in selection of products .
  - 2. Obtain proposals from suppliers and installers and offer recommendations.
  - 3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
  - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
  - 5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

**1.04 ALLOWANCES SCHEDULE**

- A. Allowance No. 1 - Brick:
  - 1. Include in the base bid amount an allowance of \$550 per 1000 brick for purchase and delivery of Face Brick.
- B. Allowance No. 2 - Landscaping:
  - 1. Include the stipulated sum of \$10,000 for design, purchase, delivery and installation of landscaping.
    - a. Design of landscaping is included in the landscape allowance.
    - b. Fine grading is not included in landscape allowance.
    - c. Seeding where indicated on the drawings is not included in the landscape allowance.
    - d. Sod where indicated on the drawings is not included in the landscape allowance.
    - e. Plantings where indicated on the drawings are not included in the landscape allowance.
- C. Unit Price No. 1 Allowance - Data Outlet and Conduit.
  - 1. The contractor shall stipulate the allowance amount to be included in the Base Bid for 5 occurrences based on the description of work and unit of measurement cost provided for in Section 01 22 00 - Unit Prices, Unit Price No. 1.
- D. Unit Price No. 2 Allowance - Duplex Receptacle and Circuit.
  - 1. The contractor shall stipulate the allowance amount to be included in the Base Bid for 5 occurrences based on the description of work and unit of measurement cost provided for in Section 01 22 00 - Unit Prices, Unit Price No. 2.

**PART 2 PRODUCTS - NOT USED****PART 3 EXECUTION - NOT USED****END OF SECTION**

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**SECTION 01 22 00  
UNIT PRICES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.
- C. Defect assessment and non-payment for rejected work.

**1.02 COSTS INCLUDED**

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

**1.03 UNIT QUANTITIES SPECIFIED**

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

**1.04 MEASUREMENT OF QUANTITIES**

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Testing agency will take all measurements and compute quantities accordingly.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.
- D. Measurement Devices:
  - 1. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year.
  - 2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
  - 3. Metering Devices: Inspected, tested and certified by the applicable state department within the past year.
- E. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- F. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- G. Measurement by Area: Measured by square dimension using mean length and width or radius.
- H. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- I. Stipulated Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.
- J. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.

**1.05 PAYMENT**

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.
- B. Payment will not be made for any of the following:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined as unacceptable before or after placement.
  - 3. Products not completely unloaded from the transporting vehicle.
  - 4. Products placed beyond the lines and levels of the required Work.
  - 5. Products remaining on hand after completion of the Work.
  - 6. Loading, hauling, and disposing of rejected Products.

**1.06 DEFECT ASSESSMENT**

- A. Replace Work, or portions of the Work, not complying with specified requirements.
- B. If, in the opinion of the Architect, it is not practical to remove and replace the Work, Architect will direct one of the following remedies:
  - 1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Architect, or:
  - 2. The defective Work will be partially repaired to the instructions of the Architect, and the unit price will be adjusted to a new unit price at the discretion of Architect.
- C. The authority of the Architect to assess the defect and identify payment adjustment is final.

**1.07 SCHEDULE OF UNIT PRICES**

- A. Unit Price No. 1 - Data Outlet and Conduit
  - 1. Description: Furnish and install data outlet and conduit to above ceiling in same configuration as delineated in the plans
  - 2. Unit of Measurement: Per single outlet.
  - 3. Amount to be included in Base Bid: 5 Occurances
- B. Unit Price No. 2 - Duplex Receptacle and Conduit
  - 1. Description: Furnish and install duplex receptacle and circuit to panel in same configuration as delineated in the plans
  - 2. Unit of Measurement: Per single outlet.
  - 3. Amount to be included in Base Bid: 5 Occurances
- C. Item: Unit Price No. 3 -Earthwork Subsoil
  - 1. Basis of Payment: Includes excavating existing subsoil, supplying subsoil and materials, stockpiling, and as further defined in Section 31 05 13 - Soils for Earthwork.
  - 2. Unit of Measurement: Cubic Yard.
- D. Item: Unit Price No. 4 - Earthwork Topsoil
  - 1. Basis of Payment: Includes excavating existing topsoil, supplying topsoil materials, stockpiling and re-spreading of topsoil, and as further defined in Section 31 05 13 - Soils for Earthwork.
  - 2. Unit of Measurement: Cubic Yard.
- E. Item: Unit Price No. 5 - Earthwork Aggregate
  - 1. Basis of Payment: Includes supplying aggregate materials, stockpiling, and as further defined in Section 31 05 16 - Aggregates for Earthwork.
  - 2. Unit of Measurement: Ton.
- F. Item: Unit Price No. 6 - Site Clearing
  - 1. Basis of Payment: Includes clearing site, loading and removing waste materials from site, applying herbicide to designated plant life and as further defined in Section 31 10 00 - Site Clearing.
  - 2. Unit of Measurement: Square Foot.
- G. Item: Unit Price No. 7 - Rough Grading Topsoil Fill Material
  - 1. Basis of Payment: Includes, at minimum, excavating existing soil, supplying soil materials, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 31 22 13 - Rough Grading.
  - 2. Unit of Measurement: Cubic Yard.
- H. Item: Unit Price No. 8 - Rough Grading Subsoil Fill Material
  - 1. Basis of Payment: Includes, at minimum, excavating existing subsoil, supplying subsoil materials, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 31 22 13 - Rough Grading.
  - 2. Unit of Measurement: Cubic Yard.
- I. Item: Unit Price No. 9 - Rough Grading Structural Fill Material
  - 1. Basis of Payment: Includes excavating existing subsoil, supplying structural fill materials, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 31 22 13 - Rough Grading.

2. Unit of Measurement: Cubic Yard.
- J. Item: Unit Price No. 10 - Rough Grading Granular Fill Material
  1. Basis of Payment: Includes, at minimum, supplying granular fill materials, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 31 22 13 - Rough Grading.
  2. Unit of Measurement: Cubic Yard.
- K. Item: Unit Price No. 11 - Excavating Soil Materials
  1. Basis of Payment: Includes general excavating to required elevations, loading, placing materials in stockpile, and/or removing materials from site, and as further defined in Section 31 23 16 - Excavation. Over Excavating: Payment will not be made for over excavated work nor for replacement materials.
  2. Unit of Measurement: Cubic Yard.
- L. Item: Unit Price No. 12 - Trenching
  1. Basis of Payment: Includes excavating to required elevations, protecting excavation, stockpiling excavated materials, removing excavated materials from site, and as further defined in Section 31 23 17 - Trenching. Over Excavating: Payment is not made for over excavated work nor for replacement materials.
  2. Unit of Measurement: Cubic Yard.
- M. Item: Unit Price No. 13 - Trenching Subsoil Fill
  1. Basis of Payment: Includes furnishing fill material, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 31 23 17 - Trenching.
  2. Unit of Measurement: Cubic Yard.
- N. Item: Unit Price No. 14 - Trenching Structural Fill
  1. Basis of Payment: Includes furnishing fill material, stockpiling, shaping substrate surface, placing where required, compacting, and as further defined in Section 31 23 17 - Trenching.
  2. Unit of Measurement: Cubic Yard.
- O. Item: Unit Price No. 15 - Trenching Granular Fill
  1. Basis of Payment: Includes furnishing fill material, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 31 23 17 - Trenching.
  2. Unit of Measurement: Cubic Yard.
- P. Item: Unit Price No. 16 - Trenching Concrete Fill
  1. Basis of Payment: Includes furnishing materials, forming, mixing and placing where required, curing, and as further defined in Section 31 23 17 - Trenching.
  2. Unit of Measurement: Cubic Yard.
- Q. Item: Unit Price No. 17 - Fill Material
  1. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 31 23 23 - Fill.
  2. Unit of Measurement: Cubic Yard.
- R. Item: Unit Price No. 18 - Structural Fill Material
  1. Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 31 23 23 - Fill.
  2. Unit of Measurement: Cubic Yard.
- S. Item: Unit Price No. 19 - Concrete Fill
  1. Includes supplying fill material, forming, mixing and placing where required, curing and as further defined in Section 31 23 23 - Fill.
  2. Unit of Measurement: Cubic Yard.
- T. Item: Unit Price No. 20 - Erosion Control Diversion Channel
  1. Basis of Payment: Includes excavating, windrowing, compacting, seeding, mulching, and as further defined in Section 31 25 13 - Erosion Controls.
  2. Unit of Measurement: Linear Foot.
- U. Item: Unit Price No. 21 - Erosion Control Rock Energy Dissipator

1. Basis of Payment: Includes cleaning, excavating, backfilling, placing embankment, placing geotextile fabric, placing rock, required grouting, and as further defined in Section 31 25 13 - Erosion Controls.
  2. Unit of Measurement: Each.
- V. Item: Unit Price No. 22 - Erosion Control Rip Rap Outlet Protection
1. Basis of Payment: Includes placing rock, coarse aggregate filter blanket, and as further defined in Section 31 25 13 - Erosion Controls.
  2. Unit of Measurement: Ton.
- W. Item: Unit Price No. 23 - Erosion Control Sediment Basin
1. Basis of Payment: Includes excavating, removing unsuitable material, backfilling, placing embankment, clearing, placing rock, grouting, and as further defined in Section 31 25 13 - Erosion Controls.
  2. Unit of Measurement: Each.
- X. Item: Unit Price No. 24 - Erosion Control Skimmer Sediment Basin
1. Basis of Payment: Includes clearing, excavating, piping, placing riser footing, constructing embankment and trench and rock basin, seeding, mulching, and as further defined in Section 31 25 13 - Erosion Controls.
  2. Unit of Measurement: Each.
- Y. Item: Unit Price No. 25 - Erosion Control Temporary Sediment Trap
1. Basis of Payment: Includes clearing, excavating, forming embankment, placing aggregate or rock and geotextile fabric, seeding, mulching, and as further defined in Section 31 25 13 - Erosion Controls.
  2. Unit of Measurement: Each.
- Z. Item: Unit Price No. 26 - Cleaning Sedimentation Structures
1. Basis of Payment: Includes removal, hauling, and disposal of sediment and other debris in system, and as further defined in Section 31 25 13 - Erosion Controls.
  2. Unit of Measurement: Cubic Yard.
- AA. Item: Unit Price No. 27 - Riprap
1. Basis of Payment: Includes supply and placing riprap mix in sacks, moist cured, and as further defined in Section 31 37 00 - Riprap.
  2. Unit of Measurement: Ton.
- BB. Item: Unit Price No. 28 - Aggregate Subbase
1. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 32 11 23 - Aggregate Base Courses.
  2. Unit of Measurement: Cubic Yard.
- CC. Item: Unit Price No. 29 - Aggregate Base Course
1. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 32 11 23 - Aggregate Base Courses.
  2. Unit of Measurement: Cubic Yard.
- DD. Item: Unit Price No. 30 - Asphalt Paving Aggregate Sub Base
1. Basis of Payment: Includes supplying and stockpiling aggregate, scarifying substrate surface, placing, compacting subbase, and as further defined in Section 32 12 16 - Asphalt Paving.
  2. Unit of Measurement: Ton.
- EE. Item: Unit Price No. 31 - Asphalt Paving Base Course
1. Basis of Payment: Includes priming surfaces, tack coating surfaces, furnishing, placing, compacting, testing base course, and as further defined in Section 32 12 16 - Asphalt Paving.
  2. Unit of Measurement: Ton.
- FF. Item: Unit Price No. 32 - Asphalt Paving Binder Course
1. Basis of Payment: Includes priming surfaces, tack-coating surfaces, furnishing, placing, compacting, testing binder course, and as further defined in Section 32 12 16 - Asphalt Paving.

2. Unit of Measurement: Ton.
- GG. Item: Unit Price No. 33 - Asphalt Paving Wearing Course
1. Basis of Payment: Includes priming surfaces, tack-coating surfaces, furnishing, placing, compacting, testing wearing course, and as further defined in Section 32 12 16 - Asphalt Paving.
  2. Unit of Measurement: Ton.
- HH. Item: Unit Price No. 34 - Asphalt Paving Tack Coat
1. Basis of Payment: Includes preparing surfaces, applying, and as further defined in Section 32 12 16 - Asphalt Paving.
  2. Unit of Measurement: Square Yard.
- II. Item: Unit Price No. 35 - Concrete Paving Aggregate
1. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, compacting, and as further defined in Section 32 13 13 - Concrete Paving.
  2. Unit of Measurement: Ton.
- JJ. Item: Unit Price No. 36 - Concrete Paving
1. Basis of Payment: Includes forms, reinforcing, concrete, accessories, placing, finishing, curing, testing, and as further defined in Section 32 13 13 - Concrete Paving.
  2. Unit of Measurement: Cubic Yard.
- KK. Item: Unit Price No. 37 - Soil Preparation Grassed Areas
1. Basis of Payment: Includes preparation of topsoil or placement of topsoil and as further defined in Section 32 91 13 - Soil Preparation.
  2. Unit of Measurement: Square Foot.
- LL. Item: Unit Price No. 38 - Landscape Grading Topsoil
1. Basis of Payment: Includes excavating existing topsoil, supplying topsoil materials, stockpiling, preparing and scarifying substrate surface, placing where required, rolling, and as further defined in Section 32 91 19 - Landscape Grading.
  2. Unit of Measurement: Cubic Yard.
- MM. Item: Unit Price No. 39 - Seeding Grassed Areas
1. Basis of Payment: Includes seeding, watering, maintenance for a period of one year, and as further defined in Section 32 92 19 - Seeding.
  2. Unit of Measurement: Square Foot.
- NN. Item: Unit Price No. 40 - Precast Concrete Valve Vault
1. Basis of Payment: Includes excavation, valve vault, accessories, tests, backfill, and as further defined in Section 33 05 17 - Precast Concrete Valve Vaults and Meter Boxes.
  2. Unit of Measurement: Each.
- OO. Item: Unit Price No. 41 - Precast Concrete Meter Boxes
1. Basis of Payment: Includes excavation, meter box, accessories, tests, backfill, and as further defined in Section 33 05 17 - Precast Concrete Valve Vaults and Meter Boxes.
  2. Unit of Measurement: Each.
- PP. Item: Unit Price No. 42 - Water Service Connections Pipe & Fittings
1. Basis of Payment: Includes hand trimming excavation, pipe and fittings, bedding, concrete thrust restraints, connection to building service piping and to municipal utility water source, and as further defined in Section 33 12 13 - Water Service Connections.
  2. Unit of Measurement: Linear Foot.
- QQ. Item: Unit Price No. 43 - Water Service Connections Corporation Stop Assembly
1. Basis of Payment: Includes corporation stop, fittings, accessories, and as further defined in Section 33 12 13 - Water Service Connections.
  2. Unit of Measurement: Each.
- RR. Item: Unit Price No. 44 - Water Service Connections Curb Stop Assembly

1. Basis of Payment: Includes curb stop, curb box and cover, fittings, accessories, and as further defined in Section 33 12 13 - Water Service Connections.
  2. Unit of Measurement: Each.
- SS. Item: Unit Price No. 45 - Water Service Connections Water Meters
1. Basis of Payment: Includes meter, meter setting equipment, fittings, accessories, and as further defined in Section 33 12 13 - Water Service Connections.
  2. Unit of Measurement: Each.
- TT. Item: Unit Price No. 46 - Water Service Connections Back Flow Preventer
1. Basis of Payment: Includes backflow preventer, fittings, accessories, and as further defined in Section 33 12 13 - Water Service Connections.
  2. Unit of Measurement: Each.
- UU. Item: Unit Price No. 47 - Water Utility Distribution Valves
1. Basis of Payment: Includes excavation, valve, valve box, accessories, tests, backfill, and as further defined in Section 33 12 16 - Water Utility Distribution Valves.
  2. Unit of Measurement: Each.
- VV. Item: Unit Price No. 48 - Fire Hydrant
1. Basis of Payment: Includes excavation, fire hydrant, accessories, tests, backfill, and as further defined in Section 33 12 19 - Water Utility Distribution Fire Hydrants.
  2. Unit of Measurement: Each.
- WW. Item: Unit Price No. 49 - Disinfection of Water Utility Distribution
1. Basis of Payment: Includes preparing, disinfecting, testing, reporting, and as further defined in Section 33 13 00 - Disinfecting of Water Utility Distribution.
  2. Unit of Measurement: Linear Foot.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 23 00  
ALTERNATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Description of Alternates.

**1.02 ACCEPTANCE OF ALTERNATES**

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

**1.03 SCHEDULE OF ALTERNATES**

- A. Alternate No. G-1 - Additional Storage Bays
  - 1. The contractor shall stipulate the sum to be added to the Base Bid for the inclusion of two additional storage bays as delineated in the plans, complete with related site work, mechanical, electrical, and plumbing.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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**SECTION 01 25 00  
SUBSTITUTION PROCEDURES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Procedural requirements for proposed substitutions.

**PART 2 PRODUCTS - NOT USED****PART 3 EXECUTION****3.01 GENERAL REQUIREMENTS**

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
  2. Agrees to provide the same warranty for the substitution as for the specified product.
  3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
  4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
  5. Waives claims for additional costs or time extension that may subsequently become apparent.
  6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. No specific form is required. Contractor's Substitution Request documentation must include the following:
    - a. Project Information:
      - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
      - 2) Owner's, Architect's, and Contractor's names.
    - b. Substitution Request Information:
      - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
      - 2) Indication of whether the substitution is for cause or convenience.
      - 3) Issue date.
      - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
      - 5) Description of Substitution.
      - 6) Reason why the specified item cannot be provided.
      - 7) Differences between proposed substitution and specified item.
      - 8) Description of how proposed substitution affects other parts of work.
    - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
      - 1) Physical characteristics.
      - 2) In-service performance.
      - 3) Expected durability.
      - 4) Visual effect.
      - 5) Warranties.
      - 6) Other salient features and requirements.
      - 7) Include, as appropriate or requested, the following types of documentation:
        - (a) Product Data:
        - (b) Samples.

- (c) Certificates, test, reports or similar qualification data.
- (d) Drawings, when required to show impact on adjacent construction elements.
- d. Impact of Substitution:
  - 1) Savings to Owner for accepting substitution.
  - 2) Change to Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
  - 1. Submit an electronic document, combining the request form with supporting data into single document.

### **3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT**

- A. Submittal Time Restrictions:
  - 1. Instructions to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.

### **3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Architect will consider requests for substitutions only within 15 days after date of Agreement.
  - 1. Instruction to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.
- 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 immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
  - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
  - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
  - 3. Bear the costs engendered by proposed substitution of:
    - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
- 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.

### **3.04 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.

### **3.05 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.

### **3.06 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - 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**

**SECTION 01 30 00  
ADMINISTRATIVE REQUIREMENTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Progress photographs.
- G. Coordination drawings.
- H. Submittals for review, information, and project closeout.
- I. Number of copies of submittals.
- J. Requests for Interpretation (RFI) procedures.
- K. Submittal procedures.

**1.02 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
  - 1. Requests for Interpretation (RFI).
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Coordination drawings.
  - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 11. Closeout submittals.

**PART 2 PRODUCTS - NOT USED****PART 3 EXECUTION****3.01 PRECONSTRUCTION MEETING**

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. Contractor.
- C. Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  - 5. Submission of initial Submittal schedule.
  - 6. Designation of personnel representing the parties to Contract, Owner and Architect.

7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  8. Scheduling.
  9. Scheduling activities of a Geotechnical Engineer.
- D. Architect will record minutes and distribute copies within two days after meeting to participants, with electronic copies to participants, and those affected by decisions made.

### 3.02 SITE MOBILIZATION MEETING

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

### 3.03 PROGRESS MEETINGS

- A. Contractor will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
1. Contractor.
  2. Owner.
  3. Architect.
  4. Contractor's superintendent.
- C. Agenda:
1. Review minutes of previous meetings.
  2. Review of work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.
  6. Maintenance of progress schedule.
  7. Corrective measures to regain projected schedules.
  8. Planned progress during succeeding work period.
  9. Maintenance of quality and work standards.
  10. Effect of proposed changes on progress schedule and coordination.
  11. Other business relating to work.
- D. Contractor will record minutes and distribute copies within two days after meeting to participants, with electronic copies to participants, and those affected by decisions made.

**3.04 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 32 16**

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

**3.05 PROGRESS PHOTOGRAPHS**

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
  - 1. Completion of site clearing.
  - 2. Excavations in progress.
  - 3. Foundations in progress and upon completion.
  - 4. Structural framing in progress and upon completion.
  - 5. Enclosure of building, upon completion.
  - 6. Final completion, minimum of ten (10) photos.
- E. Views:
  - 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
  - 2. Consult with Architect for instructions on views required.
  - 3. Provide factual presentation.
  - 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
  - 1. Delivery Medium: Via email.
  - 2. File Naming: Include project identification, date and time of view, and view identification.
  - 3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

**3.06 COORDINATION DRAWINGS**

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

**3.07 REQUESTS FOR INTERPRETATION (RFI)**

- A. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
  - 1. Prepare a separate RFI for each specific item.
    - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
    - b. Do not forward requests which solely require internal coordination between subcontractors.

2. Prepare in a format and with content acceptable to Architect.
  3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
  2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
    - a. Approval of submittals (use procedures specified elsewhere in this section).
    - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
    - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
    - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
  3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
  4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
  2. Owner's, Architect's, and Contractor's names.
  3. Discrete and consecutive RFI number, and descriptive subject/title.
  4. Issue date, and requested reply date.
  5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
  6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
  7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
  2. Note dates of when each request is made, and when a response is received.
  3. Highlight items requiring priority or expedited response.
  4. Highlight items for which a timely response has not been received to date.
- G. Review Time: Architect will respond and return RFIs to Contractor within fourteen calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

### 3.08 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
1. Submit at the same time as the preliminary schedule specified in Section - 01 32 16 - Construction Progress Schedule.



2. Format schedule to allow tracking of status of submittals throughout duration of construction.
3. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
4. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
  - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

### **3.09 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 for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

### **3.10 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.

### **3.11 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
  1. Project record documents.
  2. Operation and maintenance data.
  3. Warranties.
  4. Bonds.
  5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

### **3.12 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified 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.

**3.13 SUBMITTAL PROCEDURES**

- A. General Requirements:
  - 1. Use a separate transmittal for each item.
  - 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
  - 3. Transmit using approved form.
    - a. Use Contractor's form, subject to prior approval by Architect.
  - 4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
  - 5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
  - 6. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    - a. Send submittals in electronic format via email to Architect.
  - 7. 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.
  - 8. Provide space for Contractor and Architect review stamps.
  - 9. When revised for resubmission, identify all changes made since previous submission.
- B. Product Data Procedures:
  - 1. Submit only information required by individual specification sections.
  - 2. Collect required information into a single 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.

**3.14 SUBMITTAL REVIEW**

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
  - 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
  - 1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved", or language with same legal meaning.

- b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
  - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
- c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
- 2. Not Authorizing fabrication, delivery, and installation:
  - a. "Revise and Resubmit".
    - 1) Resubmit revised item, with review notations acknowledged and incorporated.
  - b. "Rejected".
    - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
  - 1. Items for which no action was taken:
    - a. "Received" - to notify the Contractor that the submittal has been received for record only.
  - 2. Items for which action was taken:
    - a. "Reviewed" - no further action is required from Contractor.

**END OF SECTION**

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**SECTION 01 32 16  
CONSTRUCTION PROGRESS SCHEDULE****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

**1.02 REFERENCE STANDARDS**

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; 2016.

**1.03 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. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- G. Submit under transmittal letter form specified in Section 01 30 00 - Administrative Requirements.

**1.04 QUALITY ASSURANCE**

- A. Contractor 's Administrative Personnel: Three years minimum experience in using and monitoring CPM schedules on comparable projects.

**1.05 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. Diagram Sheet Size: Maximum 22 x 17 inches (560 x 432 mm).
- C. Scale and Spacing: To allow for notations and revisions.

**PART 2 PRODUCTS - NOT USED****PART 3 EXECUTION****3.01 PRELIMINARY SCHEDULE**

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

**3.02 CONTENT**

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify 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. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. 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.

- G. Indicate delivery dates for owner-furnished products and products identified under Allowances.
- H. Provide legend for symbols and abbreviations used.

**3.03 BAR CHARTS**

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

**3.04 REVIEW AND EVALUATION OF SCHEDULE**

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

**3.05 UPDATING SCHEDULE**

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

**3.06 DISTRIBUTION OF SCHEDULE**

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

**END OF SECTION**

**SECTION 01 33 00  
SUBMITTAL PROCEDURES****PART 1 GENERAL****1.01 RELATED DOCUMENTS**

- A. The Contract Documents, Drawings and individual Specification Sections, Contractor's Submission Schedule; apply to this Section.

**1.02 SUMMARY**

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

**1.03 DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require the Design Professional's responsive action. Action submittals are those submittals indicated in individual specification sections as action submittals.
- B. Informational Submittals: Written and graphic information and physical samples that do not require the Design Professional's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual specification sections as informational submittals.
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- D. Required Submittal List Utility application: Interacts with and to be used with the Owner's Contract Manager system. The Design Professional uses the utility to itemize the list of submission items needed to be submitted by the Contractor in order to insure the design intent will be satisfied and inclusive of all Project turnover documents and/or Contract Closeout Requirements.
- E. Contractor's Submission Schedule: The itemized list of project submission requirements printed as a report from Contract Manager. The Contractor enters the date each item needs to be submitted in order to meet the schedule.

**1.04 ACTION SUBMITTALS**

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by the construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.
- B. Format for Submittals: Submit required submittals in electronic (PDF) file format.

**1.05 SUBMITTAL ADMINISTRATIVE REQUIREMENTS**

- A. Design Professional's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by the Design Professional for the Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with the performance of the Work.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Commissioning Authority will review submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the Design Professional review and approval.
  - 3. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 4. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

5. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
  - a. Submit Operation and Maintenance Manuals concurrent with action submittal.
  - b. The Owner or Design Professional reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for re-submittals, as follows. Time for review shall commence on the Design Professional's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.
  1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. The Design Professional will advise the Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Re-submittal Review: Allow 15 days for review of each re-submittal.
  4. Sequential Review: Where sequential review of submittals by the Design Professional's consultants, the Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- D. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
  1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by the Design Professional.
  3. Include the following information for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name of Design Professional.
    - d. Name of Construction Manager (if applicable).
    - e. Name of Contractor.
    - f. Name of subcontractor.
    - g. Name of supplier.
    - h. Name of manufacturer.
    - i. Submittal number including revision identifier.
      - 1) Submittal number shall be the submittal item number and Submittal Package number designated in the Contractor's Submission Schedule.
    - j. Drawing number and detail references, as appropriate.
    - k. Location(s) where product is to be installed, as appropriate.
    - l. Other necessary identification.
- E. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:
  1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.
  3. Provide means for insertion to permanently record the Contractor's review and approval markings and action taken by the Design Professional.
  4. Include the following information on an inserted cover sheet:
    - a. Project name.
    - b. Date.
    - c. Name and address of Design Professional.
    - d. Name of Construction Manager (if applicable).
    - e. Name of Contractor.
    - f. Name of firm or entity that prepared submittal.
    - g. Name of subcontractor.



- h. Name of supplier.
  - i. Name of manufacturer.
  - j. Number and title of appropriate Specification Section.
  - k. Drawing number and detail references, as appropriate.
  - l. Location(s) where product is to be installed, as appropriate.
  - m. Related physical samples submitted directly.
  - n. Other necessary identification.
5. Include the following information as keywords in the electronic file meta data:
- a. Project name.
  - b. Number and title of appropriate Specification Section.
  - c. Manufacturer name.
  - d. Product name.
- F. Options: Identify options requiring selection by the Design Professional.
- G. Deviations: Identify deviations from the Contract Documents on submittals.
- H. Additional Copies: Unless the Design Professional observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- I. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. The Design Professional will return submittals, without review, received from sources other than the Contractor.
- 1. Transmittal Form: Use the Contractor's office form.
  - 2. Transmittal Form: Provide locations on form for the following information:
    - a. Project name.
    - b. Date.
    - c. Destination (To:).
    - d. Source (From:).
    - e. Names of subcontractor, manufacturer, and supplier.
    - f. Category and type of submittal.
    - g. Submittal purpose and description.
    - h. Specification Section number and title.
    - i. Indication of full or partial submittal.
    - j. Drawing number and detail references, as appropriate.
    - k. Transmittal numbered consecutively.
    - l. Submittal and transmittal distribution record.
    - m. Remarks.
    - n. Signature of transmitter.
  - 3. On an attached separate sheet, prepared on the Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by the Design Professional on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- J. Re-submittals: Make re-submittals in same form and format.
- 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked with approval notation from the Design Professional's action stamp.
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Use only final submittals that are marked with approval notation from the Design Professional's action stamp.

**PART 2 PRODUCTS****2.01 SUBMITTAL PROCEDURES**

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Submit electronic submittals via email as electronic (PDF) files, to the Design Professional. The Owner may request paper copies of certain submittals for on-site coordination.
    - a. The Design Professional will return annotated file. Annotate and retain one copy of file as an electronic Project turnover document file.
    - b. The Commissioning Authority through the Design Professional will return annotated file.
    - c. PDF file shall be named as follows:
      - 1) Section number, space, dash, space, Submittal number, space, Section name.
        - (a) 00 00 00 - 001 Section Name.
          - (1) The submittal number is section specific.
  2. Operation and Maintenance Manual Submittals: Submit concurrent with the Action Submittal, as related in individual Specification Sections.
  3. Closeout Submittals: Comply with requirements specified in Section 01 78 00 - Closeout Submittals.
  4. Permits, Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Permits, Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Submittal Package number and Submittal Item number.
    - b. Manufacturer's catalog cuts.
    - c. Manufacturer's product specifications.
    - d. Standard color charts.
    - e. Statement of compliance with specified referenced standards.
    - f. Testing by recognized testing agency.
    - g. Application of testing agency labels and seals.
    - h. Notation of coordination requirements.
    - i. Availability and delivery time information.
  4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data concurrent with Samples.
  6. Submit Product Data in electronic (PDF) file format.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Submittal Package number and Submittal Item number.
    - b. Identification of products.
    - c. Schedules.
    - d. Compliance with specified standards.
    - e. Notation of coordination requirements.
    - f. Notation of dimensions established by field measurement.

- g. Relationship and attachment to adjoining construction clearly indicated.
      - h. Seal and signature of professional engineer if specified.
    2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
    3. Submit Shop Drawings in electronic (PDF) file format.
  - D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
    1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
    2. Identification: Attach label on unexposed side of Samples that includes the following:
      - a. Submittal Package number and Submittal Item number.
      - b. Generic description of Sample.
      - c. Product name and name of manufacturer.
      - d. Sample source.
      - e. Number and title of applicable Specification Section.
    3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
      - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
      - b. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor.
    4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
      - a. Number of Samples: For turnover purpose, submit three full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. The Design Professional will return submittal with options selected.
    5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
      - a. Number of Samples: Submit three sets of Samples. The Design Professional will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a turnover sample.
        - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
  - E. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
    1. Name, address, and telephone number of entity performing subcontract or supplying products.
    2. Number and title of related Specification Section(s) covered by subcontract.
    3. Drawing number and detail references, as appropriate, covered by subcontract.
    4. Submit subcontract list in PDF electronic file, to the Owner.
  - F. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

- G. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.
- H. Installer Certificates: Upon the Owner's request, submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- I. Manufacturer Certificates: Upon the Owner's request, submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- J. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- K. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- L. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

### **PART 3 EXECUTION**

#### **3.01 CONTRACTOR'S REVIEW**

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to the Design Professional.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of the Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### **3.02 DESIGN PROFESSIONAL'S ACTION**

- A. General: The Design Professional will not review submittals that do not bear the Contractor's approval stamp and will return them without action.
- B. Action Submittals: The Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it.
- C. Informational Submittals: The Design Professional will review each submittal and will return it if it does not comply with requirements.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from the Design Professional.
- E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.
- G. On projects that have commissioning, the Commissioning Authority will receive copies of the submittals through the Design Professional and will provide comments on the submittals via the Design Professional.

**END OF SECTION**

**SECTION 01 40 00  
QUALITY REQUIREMENTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Submittals.
- B. References and standards.
- C. Testing and inspection agencies and services.
- D. Control of installation.
- E. Mock-ups.
- F. Tolerances.
- G. Manufacturers' field services.
- H. Defect Assessment.

**1.02 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; 2024.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2023.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2023.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2021.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.
- G. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. 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 conformance with information given and the design concept expressed in the contract documents, or for Contractor's information.
- C. 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.
- D. 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.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Contractor.
- F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Contractor.
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 Contractor.

#### **1.04 REFERENCES AND STANDARDS**

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

#### **1.05 TESTING AND INSPECTION AGENCIES AND SERVICES**

- A. Contractor shall employ and pay for services of an independent testing agency to perform all specified testing except for Special Inspections.
- 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 E699, 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.

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

### **PART 3 EXECUTION**

#### **3.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.

- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

### 3.02 MOCK-UPS

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

### 3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

### 3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
  - 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-conformance of Work or products.
  - 6. Perform additional tests and inspections required by Architect/Engineer.
  - 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 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 as original testing.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

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

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, 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.

### **3.06 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

**END OF SECTION**



## SPECIAL INSPECTIONS

### PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary General Conditions and other Division I Specification Sections, apply to this Section.
- B. Refer to individual technical specification sections for specific qualifications, inspections, tests, frequency and standards required.

#### 1.2 GENERAL REQUIREMENTS

- A. Special Inspections shall be in accordance with Chapter 17 of the North Carolina State Building Code.
- B. The program of Special Inspection is a system intended to ensure that the work is performed in accordance with the Contract Documents. These services do not relieve the Contractor and/or the Construction Manager of responsibility for compliance with the requirements of the Contract Documents.
- C. This specification section is intended to inform the Contractor and/or the Construction Manager of the Owner's Special Inspection program and the extent of the responsibilities. This specification section is also intended to notify the Special Inspector, Testing Company/Testing Laboratory, and other Agents of the Special Inspector of their requirements and responsibilities.
- D. Perform inspections in accordance with industry standard referenced for specific material or procedure unless other criteria are specified. In the absence of a referenced standard, perform inspections in accordance with generally accepted industry standards.
- E. Failure to detect defective work or materials shall in no way prevent later rejection if defective work or materials are discovered.

#### 1.3 SCHEDULE OF SPECIAL INSPECTIONS

- A. Required Special Inspections are described in the attached Statement of Special Inspections.

#### 1.4 DEFINITIONS

- A. Testing: Evaluation of systems, primarily requiring physical manipulation and analysis of materials, in accordance with approved standards.
- B. Inspection: Evaluation of systems, primarily requiring observation and judgment.

- C. Special Inspection: Special Inspection herein includes items required by the current State Building Code, and other items which in the professional judgment of the Structural Engineer of Record, are critical to the integrity of the building structure.
- D. Structural Engineer of Record (SER): The Licensed Engineer in responsible charge of the structural design for the project.
- E. Testing Agency (TA):
  - 1. Testing Agency: Approved independent materials testing agency acceptable to the Owner, Architect, and SER.
- F. Special Inspector (SI): A licensed professional engineer responsible for administering and performing all Special Inspections required by the Statement of Special Inspections.
- G. Agents of Special Inspection (AI): Individual inspectors performing specific Special Inspections on behalf of the Special Inspector.
- H. Building Official: The Officer or duly authorized representative charged with the administration and enforcement of the State Building Code.

#### 1.5 QUALIFICATIONS

- A. The Special Inspector shall be a licensed Professional Engineer (licensed in state in which project is located) experienced with the type of work requiring Special Inspections, who is approved by the Owner, Structural Engineer of Record (SER) and Building Official.
- B. Required inspector's qualifications for the Special Inspector and Agents of the Special Inspector are described in the attached Statement of Special Inspection.

#### 1.6 SUBMITTALS

- A. The Special Inspector shall submit to the Owner for review a copy of their qualifications which shall include the names and qualifications of each of the agents of Special Inspection who will be performing inspections.

#### 1.7 PAYMENT

- A. The Owner shall engage and pay for the services of the Special Inspector and Agents of the Special Inspector.
- B. The Contractor and/or Construction Manager shall be responsible for the cost of any re-inspection of work which fails to comply with the requirements of the Contract Documents.

#### 1.8 RESPONSIBILITIES/AUTHORITY

- A. Special Inspection:
  - 1. Special Inspector and Agents of Special Inspections:

- a. Sign the Statement of Special Inspection in conjunction with other responsible parties prior to commencing construction.
  - b. Inspect the work assigned for conformance with the contract documents and applicable material and workmanship provisions of the code. Perform inspection in a timely manner to avoid delay of work.
  - c. Bring nonconforming items to the immediate attention of the Contractor and/or Construction Manager for correction, then, if uncorrected after a reasonable period of time, to the attention of the Structural Engineer of Record, the Building Official, and to the Owner.
  - d. Submit inspection reports to the Contractor and/or Construction Manager, the Structural Engineer of Record, Owner, and other designated persons in accordance with the Statement of Special Inspection.
  - e. Submit a final signed report stating whether the work requiring Special Inspection was, to the best of the Special Inspector's knowledge, in conformance with the contract documents and the applicable workmanship provisions of the code.
2. Architect:
    - a. Expedite resolution of construction issues.
  3. Structural Engineer of Record:
    - a. Identify items requiring Special Inspection and define qualifications of special inspector required for work.
    - b. Prepare and sign the Statement of Special Inspection in conjunction with other responsible parties prior to commencing construction.
    - c. Review reports issued by Special Inspector.
    - d. Assist in resolution of construction issues identified by Special Inspector.
  4. Testing Agency:
    - a. When engaged as a special inspector, provide Special Inspection services as noted in Item 1.8.A.1.
    - b. Copy Special Inspector on all materials testing reports.
  5. Contractor/Construction Manager:
    - a. Arrange and attend all pre-construction meetings to review scope of Special Inspection. Include the Building Official, Owner, Architect, Structural Engineer of Record, Special Inspector, Testing Agency and other parties concerned.
    - b. Post or make available the Statement of Special Inspection within the project site office. Provide timely notification to those parties designated on the schedule so they may properly prepare for and schedule their work.
    - c. Provide special inspector access to the approved plans and specifications at the project site.
    - d. Review all reports issued by special inspector.
    - e. Retain at the project site all reports submitted by the special inspector for review by the building official upon request.
    - f. Correct, in a timely manner, deficiencies identified in inspection reports.
    - g. Provide safe access to the work requiring inspection.
    - h. Provide labor and facilities to provide access to the work and to facilitate inspection.
    - i. Sign the Contractor's Statement of Responsibility, if required, prior to commencing construction.
  6. Fabricator/Supplier:
    - a. Submit one copy of all material certificates and other quality assurance documents as required in the Statement of Special Inspections to the Special Inspector.
  7. Building Official:

- a. Accept and sign completed Statement of Special Inspection.
  - b. Review the final report submitted by special inspector.
  - c. Determine work, which, in the Building Officials opinion, involves unusual hazards or conditions (IBC 1704.13 – Special Cases).
8. Owner:
- a. Provide and pay cost of Special Inspection services.
  - b. Provide special inspector with Contract Documents and accepted shop drawings.
  - c. Provide special inspector with full access to the site at all times.
  - d. Sign the Statement of Special Inspection in conjunction with other responsible parties prior to commencing construction.

#### 1.9 INSPECTION NOTES

- A. Contractor and/or Construction Manager provide minimum of 24 hours notice for all items requiring inspection. Do not construct items requiring inspection services until testing and inspection services are available. Do not enclose or obscure items requiring inspection services until inspection services are performed.

#### 1.10 LIMITS ON AUTHORITY

- A. The Special Inspector may not release, revoke, alter, or increase the requirements of the Contract Documents.
- B. The Special Inspector will not have control over the Contractor and/or Construction Manager means or methods of construction.
- C. The Special Inspector shall not be responsible for construction site safety.
- D. The Special Inspector has no authority to stop the work.

#### 1.11 DAILY RECORDS AND REPORTS

- A. Detailed daily reports shall be prepared by Special Inspector and Agents of Special Inspection of each inspection and submitted to the Special Inspector. Reports shall include, but not be limited to:
  1. date of inspection
  2. name of inspector or agent
  3. location of specific areas inspected
  4. description of inspection and results
  5. applicable ASTM standard
  6. weather conditions
  7. identification of product and specification section
- B. Any discrepancies from the Contract Documents found during a Special Inspection shall be immediately reported to the Contractor and/or Construction Manager. If the discrepancies are not corrected, the Special Inspector shall notify the Structural Engineer of Record and Owner. Reports shall document all discrepancies identified and the corrective action taken.

- C. The Testing Company/Testing Laboratory shall immediately notify the Special Inspector of any test results which fail to comply with the requirements of the Contract Documents.

#### 1.12 MONTHLY REPORTS

- A. Monthly reports shall be prepared by the Special Inspector. Reports shall include, but not be limited to:
  - 1. Summary of elements inspected during that month.
  - 2. Copies of all discrepancies noted during that month.
  - 3. Report of status of discrepancies including resolution of discrepancies.
  - 4. Summary of all material certifications and quality assurance documents collected and reviewed during that month.

#### 1.13 FINAL REPORT OF SPECIAL INSPECTIONS

- A. The Final Report of Special Inspections shall be completed by the Special Inspector and submitted to the Structural Engineer of Record, Owner, Contractor and/or Construction Manager, and Building Official prior to the issuance of a Certificate of Use and Occupancy.
- B. The Final Report of Special Inspections will certify that all required inspections have been performed and will itemize any discrepancies and how those discrepancies were resolved.

PART 2 PRODUCTS (not applicable)

PART 3 EXECUTION (not applicable)

Attached are the following forms:

- 1. Statement of Special Inspections provided on Structural Drawings
- 2. Qualifications of Inspectors and Testing Technicians provided on Structural Drawings



**SECTION 01 50 00  
TEMPORARY FACILITIES AND CONTROLS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Temporary telecommunications services.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

**1.02 TEMPORARY UTILITIES - SEE SECTION 01 51 00**

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

**1.03 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
  - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
  - 2. Telephone Land Lines: One line, minimum; one handset per line.
  - 3. Internet Connections: Minimum of one; DSL modem or faster.
  - 4. Email: Account/address reserved for project use.
  - 5. Mobile Device: One minimum.
- C. Contractor will pay for own telecommunications services.
- D. WiFi Access: Provide WiFi for use by Architect and Engineer until time of Substantial Completion.

**1.04 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.

**1.05 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations.

**1.06 FENCING**

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

**1.07 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.

**1.08 SECURITY**

- A. Provide security and facilities to protect Work, and Contractor's operations from unauthorized entry, vandalism, or theft.

**1.09 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. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

**1.10 WASTE REMOVAL**

- A. See Section 01 74 19 - 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.

**1.11 PROJECT IDENTIFICATION**

- A. Provide project identification sign of design and construction indicated on drawings.
- B. Erect on site at location established by Architect .
- C. No other signs are allowed without Owner permission except those required by law.

**1.12 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 51 00  
TEMPORARY UTILITIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

**1.02 REFERENCE STANDARDS**

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

**1.03 TEMPORARY ELECTRICITY**

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
- D. Provide main service disconnect and over-current protection at convenient location and meter.
- E. Permanent convenience receptacles may be utilized during construction.
- F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

**1.04 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES**

- A. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.
- B. Provide and maintain 1 watt/sq ft (10.8 watt/sq m) lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide and maintain 0.25 watt/sq ft (2.7 watt/sq m) H.I.D. lighting to interior work areas after dark for security purposes.
- D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may be utilized during construction.

**1.05 TEMPORARY HEATING**

- A. Cost of Energy: By Contractor.
- B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.

**1.06 TEMPORARY COOLING**

- A. Cost of Energy: By Contractor.
- B. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
- C. Maintain maximum ambient temperature of 80 degrees F (26 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.

**1.07 TEMPORARY VENTILATION**

- A. Cost: By Contractor.
- B. Utilize appropriate ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

**1.08 TEMPORARY WATER SERVICE**

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 52 13  
FIELD OFFICES AND SHEDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary field offices for use of Contractor.
- B. Maintenance and removal.

**PART 2 PRODUCTS**

**2.01 MATERIALS, EQUIPMENT, FURNISHINGS**

- A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

**2.02 CONSTRUCTION**

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove at completion of Work.
- C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy requirements.
- D. Exterior Materials: Weather resistant, finished in one color.
- E. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- F. Lighting for Offices: 50 fc (538 lx) at desk top height, exterior lighting at entrance doors.
- G. Fire Extinguishers: Appropriate type fire extinguisher at each office.

**2.03 ENVIRONMENTAL CONTROL**

- A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions.

**2.04 CONTRACTOR OFFICE AND FACILITIES**

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Telephone: As specified in Section 01 50 00.
- C. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- D. Other Furnishings: Contractor's option.
- E. Equipment: Six adjustable band protective helmets for visitors, one 10 inch (250 mm) outdoor weather thermometer .

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

**3.02 INSTALLATION**

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.

**3.03 MAINTENANCE AND CLEANING**

- A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.
- B. Maintain approach walks free of mud, water, and snow.

**3.04 REMOVAL**

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

**END OF SECTION**

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**SECTION 01 57 13  
TEMPORARY EROSION AND SEDIMENT CONTROL****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.
- D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

**1.02 REFERENCE STANDARDS**

- A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc-Type Apparatus; 2021.
- B. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2022.
- C. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2015 (Reapproved 2023).
- D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.
- E. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile; 2021a.
- F. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2017 (Reapproved 2021).
- G. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; Current Edition.
- H. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; 1995.
- I. USDA TR-55 - Urban Hydrology for Small Watersheds; USDA Natural Resources Conservation Service; 2015.
- J. NCDENR Erosion Control Handbook NC Department of Environment and Natural Resources.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Comply with requirements of EPA (NPDES) for erosion and sedimentation control, as specified by the NPDES, for Phases I and II, and in compliance with requirements of Construction General Permit (CGP), whether the project is required by law to comply or not.
- B. Also comply with all more stringent requirements of State of NC Erosion and Sedimentation Control Manual.
- C. Comply with all requirements of NC DENR for erosion and sedimentation control .
- D. Runoff Calculation Standard for Urban Areas: USDA TR-55.
- E. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
- F. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
  - 1. Owner will obtain permits and pay for securities required by authority having jurisdiction.
  - 2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.
- G. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

- H. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
  - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
  - 2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 10 years.
- I. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
  - 1. Control movement of sediment and soil from temporary stockpiles of soil.
  - 2. Prevent development of ruts due to equipment and vehicular traffic.
  - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- J. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
  - 1. Prevent windblown soil from leaving the project site.
  - 2. Prevent tracking of mud onto public roads outside site.
  - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
  - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- K. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
  - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
  - 2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.
- L. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
  - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- M. Open Water: Prevent standing water that could become stagnant.
- N. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.
- C. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.
- D. Maintenance Instructions: Provide instructions covering inspection and maintenance for temporary measures that must remain after Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Mulch: Use one of the following:
  - 1. Straw or hay.
  - 2. Wood waste, chips, or bark.
  - 3. Erosion control matting or netting.
  - 4. Cutback asphalt.

5. Polyethylene film, where specifically indicated only.
- B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.
- C. Bales: Air dry, rectangular straw bales.
  1. Cross Section: 14 by 18 inches (350 by 450 mm), minimum.
  2. Bindings: Wire or string, around long dimension.
- D. Bale Stakes: One of the following, minimum 3 feet (1 m) long:
  1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot (1.98 kg per linear m).
  2. Wood, 2 by 2 inches (50 by 50 mm) in cross section.
- E. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
  1. Average Opening Size: 30 U.S. Std. Sieve (0.600 mm), maximum, when tested in accordance with ASTM D4751.
  2. Permittivity:  $0.05 \text{ sec}^{-1}$ , minimum, when tested in accordance with ASTM D4491/D4491M.
  3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
  4. Tensile Strength: 100 pounds-force (450 N), minimum, in cross-machine direction; 124 pounds-force (550 N), minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
  5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
  6. Tear Strength: 55 pounds-force (245 N), minimum, when tested in accordance with ASTM D4533/D4533M.
  7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
  8. Manufacturers:
    - a. TenCate: [www.tencate.com/#sle](http://www.tencate.com/#sle).
    - b. North American Green: [www.nagreen.com/#sle](http://www.nagreen.com/#sle).
    - c. Propex Geosynthetics: [www.geotextile.com/#sle](http://www.geotextile.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Silt Fence Posts: One of the following, minimum 5 feet (1500 mm) long:
  1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot (1.98 kg per linear m).
  2. Softwood, 4 by 4 inches (100 by 100 mm) in cross section.
- G. Gravel: See Section 32 11 23 for aggregate.
- H. Riprap: See Section 31 37 00.
- I. Concrete: See Section 03 30 00.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

### **3.02 PREPARATION**

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

### **3.03 SCOPE OF PREVENTIVE MEASURES**

- A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.
- B. Construction Entrances: Traffic-bearing aggregate surface.
  1. Width: As shown on plan.
  2. Length: As shown on plan.
  3. Provide at each construction entrance from public right-of-way.

4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.
- C. Linear Sediment Barriers: Made of silt fences.
  1. Provide linear sediment barriers:
    - a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
    - b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
    - c. Along the toe of cut slopes and fill slopes.
    - d. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart (at maximum of 60 m apart).
    - e. Across the entrances to culverts that receive runoff from disturbed areas.
  2. Space sediment barriers with the following maximum slope length upslope from barrier:
    - a. Slope of Less Than 2 Percent: 100 feet (30 m)..
    - b. Slope Between 2 and 5 Percent: 75 feet (23 m).
    - c. Slope Between 5 and 10 Percent: 50 feet (15 m).
    - d. Slope Between 10 and 20 Percent: 25 feet (7.5 m).
    - e. Slope Over 20 Percent: 15 feet (4.5 m).
- D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
  1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
- E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.
- F. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.
- G. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
  1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.
- H. Temporary Seeding: Use where temporary vegetated cover is required.

### 3.04 INSTALLATION

- A. Traffic-Bearing Aggregate Surface:
  1. Excavate minimum of 6 inches (150 mm).
  2. Place and compact at least 6 inches (150 mm) of 1 1/2 to 3 1/2 inch (40 to 90 mm) diameter stone.
- B. Silt Fences:
  1. Store and handle fabric in accordance with ASTM D4873/D4873M.
  2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch (405 mm) high barriers with minimum 36 inch (905 mm) long posts spaced at 6 feet (1830 mm) maximum, with fabric embedded at least 4 inches (100 mm) in ground.
  3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch (710 mm) high barriers, minimum 48 inch (1220 mm) long posts spaced at 6 feet (1830 mm) maximum, with fabric embedded at least 6 inches (150 mm) in ground.
  4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet (6 m), use nominal 32 inch (810 mm) high barriers with woven wire reinforcement and steel posts spaced at 4 feet (1220 mm) maximum, with fabric embedded at least 6 inches (150 mm) in ground.
  5. Repair/re-Install silt fence with top of fabric at nominal height and embedment as specified.
  6. Embed bottom of fabric in a trench on the upslope side of fence, with 6 inches (150 mm) of fabric laid flat on bottom of trench facing upslope; backfill trench and compact.
  7. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches (460 mm), with extra post.
  8. Fasten fabric to wood posts using one of the following:



- a. Four nails per post with 3/4 inch (19 mm) diameter flat or button head, 1 inch (25 mm) long, and 14 gauge, 0.083 inch (2.11 mm) shank diameter.
  - b. Five staples per post with at least 17 gauge, 0.0453 inch (1.150 mm) wire, 3/4 inch (19 mm) crown width and 1/2 inch (12 mm) long legs.
9. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
- C. Straw Bale Rows:
1. Install bales in continuous rows with ends butting tightly, with one bale at each end of row turned uphill.
  2. Install bales so that bindings are not in contact with the ground.
  3. Embed bales at least 4 inches (100 mm) in the ground.
  4. Anchor bales with at least two stakes per bale, driven at least 18 inches (450 mm) into the ground; drive first stake in each bale toward the previously placed bale to force bales together.
  5. Fill gaps between ends of bales with loose straw wedged tightly.
  6. Place soil excavated for trench against bales on the upslope side of the row, compacted.
- D. Mulching Over Large Areas:
1. Dry Straw and Hay: Apply 2-1/2 tons per acre (6350 kg per hectare); anchor using dull disc harrow.
  2. Wood Waste: Apply 6 to 9 tons per acre (15,200 to 20,800 kg per hectare).
  3. Asphalt: Apply at 1200 gallons per acre (11,000 L per hectare).
  4. Erosion Control Matting: Comply with manufacturer's instructions.
- E. Mulching Over Small and Medium Areas:
1. Dry Straw and Hay: Apply 4 to 6 inches (100 to 150 mm) depth.
  2. Wood Waste: Apply 2 to 3 inches (50 to 75 mm) depth.
  3. Erosion Control Matting: Comply with manufacturer's instructions.
- F. Temporary Seeding:
1. When hydraulic seeder is used, seedbed preparation is not required.
  2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
  3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft (0.5 kg per 100 sq m).
  4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft (6 to 8 kg per 100 sq m).
  5. Incorporate fertilizer into soil before seeding.
  6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch (12 to 25 mm) deep.
  7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
  8. Repeat irrigation as required until grass is established.

### 3.05 MAINTENANCE

- A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches (13 mm) or more rainfall at the project site, and daily during prolonged rainfall.
- B. Repair deficiencies immediately.
- C. Silt Fences:
1. Promptly replace fabric that deteriorates unless need for fence has passed.
  2. Remove silt deposits that exceed one-third of the height of the fence.
  3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- D. Straw Bale Rows:
1. Promptly replace bales that fall apart or otherwise deteriorate unless need has passed.
  2. Remove silt deposits that exceed one-half of the height of the bales.

- 3. Repair bale rows that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- E. Clean out temporary sediment control structures weekly and relocate soil on site.
- F. Place sediment in appropriate locations on site; do not remove from site.

**3.06 CLEAN UP**

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

**END OF SECTION**

**SECTION 01 58 13  
TEMPORARY PROJECT SIGNAGE****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Project identification sign.
- B. Project informational signs.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Responsibility to provide signs.

**1.03 QUALITY ASSURANCE**

- A. Design sign and structure to withstand 50 miles/hr (80 km/hr) wind velocity.
- B. Sign Painter: Experienced as a professional sign painter for minimum three years.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawing: Show content, layout, lettering, color, foundation, structure, sizes and grades of members.

**PART 2 PRODUCTS****2.01 SIGN MATERIALS**

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch (19 mm) thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized.
- D. Paint and Primers: Exterior quality, two coats; sign background of color as selected.
- E. Lettering: Exterior quality paint, contrasting colors.

**2.02 PROJECT IDENTIFICATION SIGN**

- A. One painted sign each of construction, design, and content indicated on drawings, location to be designated by Architect.
  - 1. Job Sign shall be two sided "sandwich" construction over posts.
- B. Content - As shown on plans and:
  - 1. Project number, title, logo and name of Owner as indicated on Contract Documents.
  - 2. Names and titles of Architect and Consultants.
  - 3. Name of Prime Contractor and major Subcontractors.
- C. Graphic Design, Colors, Style of Lettering: As shown on plans.

**2.03 PROJECT INFORMATIONAL SIGNS**

- A. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering to provide legibility at 100 foot (30 m) distance.
- B. Provide at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as Work progress requires.
- C. Provide municipal traffic agency directional traffic signs to and within site.

**PART 3 EXECUTION****3.01 INSTALLATION**

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Erect at location of high public visibility adjacent to main entrance to site.

- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.
- E. Paint exposed surfaces of sign, supports, and framing.

**3.02 MAINTENANCE**

- A. Maintain signs and supports clean, repair deterioration and damage.

**3.03 REMOVAL**

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

**END OF SECTION**

**SECTION 01 60 00  
PRODUCT REQUIREMENTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 REFERENCE STANDARDS**

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.03 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 Notice to Proceed.
  - 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****2.01 EXISTING PRODUCTS**

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

**2.02 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
  - 1. Made using or containing CFC's or HCFC's.

**2.03 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 with a Provision for Substitutions:  
Submit a request for substitution for any manufacturer not named.

#### **2.04 MAINTENANCE MATERIALS**

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

### **PART 3 EXECUTION**

#### **3.01 SUBSTITUTION LIMITATIONS**

- A. See Section 01 25 00 - Substitution Procedures.

#### **3.02 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.

#### **3.03 TRANSPORTATION AND HANDLING**

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

#### **3.04 STORAGE AND PROTECTION**

- A. 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 74 19.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- E. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

- F. For exterior storage of fabricated products, place on sloped supports above ground.
- G. Provide off-site storage and protection when site does not permit on-site storage or protection.
- H. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- I. Comply with manufacturer's warranty conditions, if any.
- 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**

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**SECTION 01 70 00  
EXECUTION AND CLOSEOUT REQUIREMENTS****PART 1 GENERAL****1.01 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. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- I. General requirements for maintenance service.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- 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.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

**1.03 QUALIFICATIONS**

- A. For surveying work, employ a land surveyor registered 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. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,
- 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.

**1.04 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. Provide water barriers as required to protect site from soil erosion.
- C. Perform dewatering activities, as required, for the duration of the project.
- D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- E. 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.

1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- F. 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.
- 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.

### **1.05 COORDINATION**

- A. See Section 01 10 00 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- 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.

### **3.02 PREPARATION**

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

### **3.03 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 seven 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, Design-Builder, participants, and those affected by decisions made.

### **3.04 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Control datum for survey is that indicated on drawings.
- 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 recognized engineering survey practices.
- 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. 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.

### **3.05 GENERAL INSTALLATION REQUIREMENTS**

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

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

### 3.06 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as indicated.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
  - 2. Remove items indicated on drawings.
  - 3. Relocate items indicated on drawings.
  - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
  - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- C. 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.
- D. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
  - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
  - 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
  - 3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
- E. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- F. Refinish existing surfaces as indicated:
  - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
  - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- G. Clean existing systems and equipment.
- H. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- I. Do not begin new construction in alterations areas before demolition is complete.
- J. Comply with all other applicable requirements of this section.

### 3.07 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. 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.
- D. 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.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- J. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  2. Match color, texture, and appearance.
  3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.08 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.

### **3.09 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.

**3.10 SYSTEM STARTUP**

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

**3.11 DEMONSTRATION AND INSTRUCTION**

- A. See Section 01 79 00 - Demonstration and Training.

**3.12 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC.

**3.13 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, 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.

**3.14 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
  - 1. Provide copies to Architect.
- B. Substantial Completion.
  - 1. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
  - 2. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
  - 3. 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.
4. Submit necessary warranties, bonds, maintenance agreements, final certifications and similar documents as warranted by the project.
  5. Obtain and submit releases enabling Owner use of the space; include necessary permits and similar releases.
  6. Change construction cores to permanent cores and deliver keys to owner.
  7. Complete start-up testing of systems, operating instructions for owner's assigned personnel.
  8. Complete final cleaning and touch-up requirements.
  9. Provide copy of contractor's completed punch list.
    - a. Contractor is responsible for completing his own punch list prior to inspection.
  10. Accompany Architect on preliminary final inspection to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.
  11. Architect will proceed with inspection or notify contractor of discrepancies.
    - a. Architect will suspend inspection in the event that the project is found not to be ready for inspection.
  12. Architect will prepare Certificate of Substantial Completion following inspection and correction of any deficiencies.
- C. Final Inspection/Acceptance.
1. Notify Architect when project is complete.
  2. Final inspection will not be scheduled until all contracts are completed unless approved otherwise or allowed by exception in General Conditions.
  3. Notify Architect that punch list items have been corrected and project is ready for a final formal inspection.
  4. Architect will certify in writing that all punch list items have been completed and schedule formal final inspection with the Owner.
  5. The Architect will furnish written notice of the final formal inspection not less than seven (7) days prior to the inspection.
  6. Architect will coordinate Final Formal inspection with all parties.
  7. Upon acceptance of project by the Owner the Architect will provide Certificate of Compliance.
- D. Owner will occupy all of the building as specified in Section 01 10 00.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

### **3.15 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 74 19  
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 GENERAL****1.01 WASTE MANAGEMENT REQUIREMENTS**

- A. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- B. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- C. 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.
- D. 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.

**1.02 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. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- G. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- H. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

**PART 2 PRODUCTS - NOT USED****PART 3 EXECUTION****3.01 WASTE MANAGEMENT PROCEDURES**

- A. See Section 01 30 00 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 50 00 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 60 00 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 70 00 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

**END OF SECTION**

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**SECTION 01 78 00  
CLOSEOUT SUBMITTALS****PART 1 GENERAL****1.01 SECTION INCLUDES**

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

**1.02 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. 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 two sets of revised final documents in final form within 10 days after final inspection.
- C. 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 Final Acceptance or Beneficial Occupancy, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Final Acceptance or Beneficial Occupancy, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED****PART 3 EXECUTION****3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. 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 Drawings and 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.

### **3.02 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.

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

- A. For Each Product, Applied Material, and Finish:
  1. Product data, with catalog number, size, composition, and color and texture designations.
  2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

### **3.04 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. 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.
- E. 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.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.

- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- L. Include test and balancing reports.
- M. Additional Requirements: As specified in individual product specification sections.

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

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 2 inch (50 mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
  - 1. Project Directory.
  - 2. Table of Contents, of all volumes, and of this volume.
  - 3. Operation and Maintenance Data: Arranged by system, then by product category.
    - a. Source data.
    - b. Product data, shop drawings, and other submittals.
    - c. Operation and maintenance data.
    - d. Field quality control data.
    - e. Photocopies of warranties and bonds.

### **3.06 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 Final Acceptance or Beneficial Occupancy.
- 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 (216 by 279 mm) 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**

**SECTION 01 79 00  
DEMONSTRATION AND TRAINING****PART 1 GENERAL****1.01 SUMMARY**

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
  - 1. All software-operated systems.
  - 2. HVAC systems and equipment.
  - 3. Plumbing equipment.
  - 4. Electrical systems and equipment.
  - 5. Landscape irrigation.
  - 6. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
  - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
  - 2. Finishes, including flooring, wall finishes, ceiling finishes.
  - 3. Fixtures and fittings.
  - 4. Items specified in individual product Sections.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
  - 1. Submit to Architect for transmittal to Contractor.
  - 2. Submit not less than four weeks prior to start of training.
  - 3. Revise and resubmit until acceptable.
  - 4. Provide an overall schedule showing all training sessions.
  - 5. Include at least the following for each training session:
    - a. Identification, date, time, and duration.
    - b. Description of products and/or systems to be covered.
    - c. Name of firm and person conducting training; include qualifications.
    - d. Intended audience, such as job description.
    - e. Objectives of training and suggested methods of ensuring adequate training.
    - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
    - g. Media to be used, such as slides, hand-outs, etc.
    - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
  - 1. Include applicable portion of O&M manuals.
  - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
  - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:
  - 1. Identification of each training session, date, time, and duration.
  - 2. Sign-in sheet showing names and job titles of attendees.
  - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

**1.03 QUALITY ASSURANCE**

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.

1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

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

## **PART 3 EXECUTION**

### **3.01 DEMONSTRATION - GENERAL**

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

### **3.02 TRAINING - GENERAL**

- A. Conduct training on-site unless otherwise indicated.
- B. Owner will provide classroom and seating at no cost to Contractor.
- C. Provide training in minimum two hour segments.
- D. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- E. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  1. The location of the O&M manuals and procedures for use and preservation; backup copies.
  2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  3. Typical uses of the O&M manuals.
- F. Product- and System-Specific Training:
  1. Review the applicable O&M manuals.
  2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
  4. Provide hands-on training on all operational modes possible and preventive maintenance.
  5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
  6. Discuss common troubleshooting problems and solutions.
  7. Discuss any peculiarities of equipment installation or operation.
  8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
  9. Review recommended tools and spare parts inventory suggestions of manufacturers.
  10. Review spare parts and tools required to be furnished by Contractor.
  11. Review spare parts suppliers and sources and procurement procedures.



- G. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**

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**SECTION 03 15 00  
CONCRETE ACCESSORIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Installation of PVC joint cap for expansion joints.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Submit manufacturer's product data and application instructions.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturer's instructions.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. W. R. MEADOWS, INC.: [www.wrmeadows.com](http://www.wrmeadows.com).
- B. BoMetals, Inc.: [www.bometals.com](http://www.bometals.com).
- C. Chaney Enterprises: [www.chaneyenterprises.com](http://www.chaneyenterprises.com).
- D. Substitutions: See Section 01 60 00 – Product Requirements.

**2.02 MATERIALS**

- A. Expansion Joint Cap: Made of long-lasting PVC that is non-corrosive, flexible, and compatible with expansion joint fillers and joint sealants to provide an effective expansion and contraction joint system.
- B. Product: SNAP-CAP Expansion Joint Cap by W. R. MEADOWS Basis of Design or approved substitution.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Examine surfaces to receive expansion joint cap. Notify architect if surfaces are not acceptable. Do not begin installation until unacceptable conditions have been corrected.
- B. Prior to installation, ensure compatibility of materials to be in contact with expansion joint cap.

**3.02 INSTALLATION**

- A. Install at all exterior locations where indicated on drawings and where expansion joints abut the building.
- B. Slide expansion joint cap over the top of the expansion joint filler.
- C. Place the concrete and screed to finish grade.
- D. When concrete is cured, insert a screwdriver through the top of expansion joint cap, pull free and discard.
- E. Apply compatible joint sealant according to joint sealant manufacturer's instructions.

**END OF SECTION**

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## CAST-IN-PLACE CONCRETE

### 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 cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Slabs-on-grade.
  - 3. Concrete toppings.
  - 4. Equipment pads and bases.
  - 5. Site retaining walls.
- B. Related Sections:
  - 1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
  - 2. Division 32 Section "Concrete Paving" for concrete pavement and walks.
  - 3. Division 32 Section "Decorative Concrete Paving" for decorative concrete pavement and walks.

#### 1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: Fly ash and other pozzolans; subject to compliance with requirements.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

- D. Cold-weather/Hot-weather Concrete Placement Procedure Plan: Indicate steps and procedures to be undertaken during concrete placements during cold and hot weather conditions.
- E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
  - 1. Location of construction joints is subject to approval of the Architect.
- F. Qualification Data: For Installer.
- G. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.
  - 5. Waterstops.
  - 6. Curing compounds.
  - 7. Floor and slab treatments.
  - 8. Bonding agents.
  - 9. Adhesives.
  - 10. Vapor retarders.
  - 11. Semirigid joint filler.
  - 12. Joint-filler strips.
  - 13. Repair materials.
- H. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
  - 1. Aggregates.
- I. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- J. Field quality-control reports.
- K. Minutes of preinstallation conference.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Installer with a successful record of a minimum of five (5) years of projects completed in similar size, construction type and scope as this project.
  - 1. An installer who employs personnel qualified as ACI-certified Flatwork Technician and Finisher and an on site supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

- C. Mix Design Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  - 1. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specifications for Structural Concrete"
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
  - 3. ACI 318, "Building Code Requirements for Structural Concrete."
- G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- H. Preinstallation Conference: Conduct conference.
  - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete subcontractor.
    - e. Special concrete finish subcontractor.
    - f. Project Special Inspector (if required).
  - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, embedded items, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

## PART 2 - PRODUCTS

## 2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

## 2.2 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed.
- D. Plain-Steel Wire: ASTM A 82 as drawn.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.



### 2.3 REINFORCEMENT ACCESSORIES

- A. Smooth Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

### 2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class F.
- B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 5 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
  - 1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C 330, 3/4-inch nominal maximum aggregate size.
- D. Water: ASTM C 94, potable.

### 2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Use of admixtures is at the contractor's discretion. When used provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494, Type A.
  - 2. Retarding Admixture: ASTM C 494, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

## 2.6 WATERSTOPS

- A. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BoMetals, Inc.
    - b. Greenstreak.
    - c. Paul Murphy Plastics Company.
    - d. Vinylex Corp.
  2. Profile: Ribbed without center bulb.
  3. Dimensions: 4 inches by 3/16 inch thick; nontapered.
- B. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP.
    - b. CETCO; Volclay Waterstop-RX.
    - c. Concrete Sealants Inc.; Conseal CS-231.
    - d. Greenstreak; Swellstop.
    - e. Henry Company, Sealants Division; Hydro-Flex.
    - f. JP Specialties, Inc.; Earth Shield Type 20.

## 2.7 VAPOR RETARDERS

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.
1. Products: Subject to compliance with requirements, provide one of the following the following:
    - a. Carlisle Coatings & Waterproofing, Inc.; Blackline 400.
    - b. Fortifiber Building Systems Group; Moistop Ultra 10.
    - c. Grace Construction Products, W. R. Grace & Co.; Florprufe 120.
    - d. Insulation Solutions, Inc.; Viper VaporCheck 10.
    - e. Meadows, W. R., Inc.; Perminator 10 mil.
    - f. Raven Industries Inc.; Vapor Block 10.
    - g. Reef Industries, Inc.; Griffolyn 10 mil Green.
    - h. Stego Industries, LLC; Stego Wrap 10 mil Class A.
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

## 2.8 LIQUID FLOOR TREATMENTS

- A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ChemMasters; Chemisil Plus.
    - b. ChemTec Int'l; ChemTec One.
    - c. Conspec by Dayton Superior; Intraseal.
    - d. Curecrete Distribution Inc.; Ashford Formula.
    - e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
    - f. Edoco by Dayton Superior; Titan Hard.
    - g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
    - h. Kaufman Products, Inc.; SureHard.
    - i. L&M Construction Chemicals, Inc.; Seal Hard.
    - j. Meadows, W. R., Inc.; LIQUI-HARD.
    - k. Metalcrete Industries; Floorsaver.
    - l. Nox-Crete Products Group; Duro-Nox.
    - m. Symons by Dayton Superior; Buff Hard.
    - n. US SPEC, Division of US Mix Products Company; US SPEC Industriseal.
    - o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.

## 2.9 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Axim Italcementi Group, Inc.; CATEXOL CimFilm.
    - b. BASF Construction Chemicals - Building Systems; Confilm.
    - c. ChemMasters; SprayFilm.
    - d. Conspec by Dayton Superior; Aquafilm.
    - e. Dayton Superior Corporation; Sure Film (J-74).
    - f. Edoco by Dayton Superior; BurkeFilm.
    - g. Euclid Chemical Company (The), an RPM company; Eucobar.
    - h. Kaufman Products, Inc.; Vapor-Aid.
    - i. Lambert Corporation; LAMBCO Skin.
    - j. L&M Construction Chemicals, Inc.; E-CON.
    - k. Meadows, W. R., Inc.; EVAPRE.
    - l. Metalcrete Industries; Waterhold.
    - m. Nox-Crete Products Group; MONOFILM.
    - n. Sika Corporation; SikaFilm.
    - o. SpecChem, LLC; Spec Film.
    - p. Symons by Dayton Superior; Finishing Aid.
    - q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
    - r. Unitex; PRO-FILM.
    - s. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Anti-Hydro International, Inc.; AH Clear Cure WB.
  - b. BASF Construction Chemicals - Building Systems; Kure-N-Seal WB.
  - c. ChemMasters; Safe-Cure & Seal 20.
  - d. Conspec by Dayton Superior; Cure and Seal WB.
  - e. Cresset Chemical Company; Crete-Trete 309-VOC Cure & Seal.
  - f. Dayton Superior Corporation; Safe Cure and Seal (J-18).
  - g. Edoco by Dayton Superior; Spartan Cote WB II.
  - h. Euclid Chemical Company (The), an RPM company; Aqua Cure VOX; Clearseal WB 150.
  - i. Kaufman Products, Inc.; Cure & Seal 309 Emulsion.
  - j. Lambert Corporation; Glazecote Sealer-20.
  - k. L&M Construction Chemicals, Inc.; Dress & Seal WB.
  - l. Meadows, W. R., Inc.; Vocomp-20.
  - m. Metalcrete Industries; Metcure.
  - n. Nox-Crete Products Group; Cure & Seal 150E.
  - o. Symons by Dayton Superior; Cure & Seal 18 Percent E.
  - p. TK Products, Division of Sierra Corporation; TK-2519 WB.
  - q. Vexcon Chemicals, Inc.; Starseal 309.

D. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A certified by curing and sealing compound manufacturer to not interfere with bonding of floor covering.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. BASF Construction Chemicals - Building Systems; Kure 1315.
  - b. ChemMasters; Polyseal WB.
  - c. Conspec by Dayton Superior; Sealcure 1315 WB.
  - d. Edoco by Dayton Superior; Cureseal 1315 WB.
  - e. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
  - f. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
  - g. Lambert Corporation; UV Safe Seal.
  - h. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
  - i. Meadows, W. R., Inc.; Vocomp-30.
  - j. Metalcrete Industries; Metcure 30.
  - k. Right Pointe; Right Sheen WB30.
  - l. Symons by Dayton Superior; Cure & Seal 31 Percent E.
  - m. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

## 2.10 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Reglets: Fabricate reglets of not less than 0.022-inch- thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

- E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

## 2.11 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109.

## 2.12 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  - 1. Fly Ash: 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
  - 1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious materials ratio below 0.50.

## 2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

### A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.55.
3. Slump Limit: 4 inches plus or minus 1 inch at point of delivery (prior to pumping).
4. Slump Limit for concrete containing high-range water-reducing admixture or plasticizing admixture: 8 inches maximum for concrete with approved design mix slump of 3 to 5 inches before adding high-range water-reducing admixture or plasticizing admixture.
5. Air Content: 2 percent, plus or minus 1.5 percent at point of delivery (prior to pumping).

### B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.55.
3. Slump Limit: 4 inches plus or minus 1 inch at point of delivery (prior to pumping).
4. Slump Limit for concrete containing high-range water-reducing admixture or plasticizing admixture: 8 inches maximum for concrete with approved design mix slump of 3 to 5 inches before adding high-range water-reducing admixture or plasticizing admixture.
5. Air Content: 2 percent, plus or minus 1.5 percent at point of delivery (prior to pumping).
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent at point of delivery (prior to pumping).

### C. Concrete Toppings, Equipment Pads and Bases: Proportion lightweight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Calculated Equilibrium Unit Weight: 115 lb/cu. ft., plus or minus 3 lb/cu. ft. as determined by ASTM C 567.
3. Slump Limit: 4 inches plus or minus 1 inch at point of delivery (prior to pumping).
4. Slump Limit for concrete containing high-range water-reducing admixture or plasticizing admixture: 8 inches maximum for concrete with approved design mix slump of 3 to 5 inches before adding high-range water-reducing admixture or plasticizing admixture.
5. Air Content: Do not exceed 3 percent.

## 2.14 FABRICATING REINFORCEMENT

### A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.15 CONCRETE MIXING

### A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

### PART 3 - EXECUTION

#### 3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
  1. Class A, 1/8 inch for smooth-formed finished surfaces.
  2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  1. Install keyways, reglets, recesses, and the like, for easy removal.
  2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Provide 3/4 inch chamfer at all exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures as indicated.

### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. 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-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.4 SHORES

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring.

### 3.5 VAPOR RETARDERS

- A. Granular Course: Cover subgrade with granular fill, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch.
- B. Sheet Vapor Retarders: Cover granular course with sheet vapor retarder. Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.



### 3.6 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced at a maximum of 48 inches on center in each direction to minimize sagging. Lap edges and ends of adjoining sheets 8" minimum. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.7 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  - 3. Locate joints for slabs on metal deck as indicated on drawings.
  - 4. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 6. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Control Joints in Slabs-on-Grade: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before slab is eight hours old.

- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
  2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
  3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install smooth dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of smooth dowel length to prevent concrete bonding to one side of joint.

### 3.8 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

### 3.9 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect unless water is held back at plant and amount of held back water is printed on the batch ticket, subject to limitations of ACI 301.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations 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 lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  2. Maintain reinforcement in position on chairs during concrete placement.
  3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  4. Slope surfaces uniformly to drains where required.
  5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures. Contractor will submit cold-weather concrete placement plan that will be used to undertake cold-weather concrete placement techniques when required.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 305 and as follows. Contractor will submit hot-weather concrete placement plan that will be used to undertake hot-weather concrete placement techniques when required.
1. Maintain concrete temperature below 90 deg F at time of placement.

### 3.10 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, 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.

2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- 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.

### 3.11 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
  1. Apply scratch finish to surfaces indicated, to receive concrete floor toppings, and to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
  1. Apply float finish to surfaces indicated, to receive trowel finish, to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  1. Apply a trowel finish to surfaces indicated, exposed to view, to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
    - a. For Slabs on Grade: Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15.
    - b. For Slabs on metal deck: Specified overall values of flatness, F(F) 30; with minimum local values of flatness, F(F) 24.
    - c. Overall values of flatness and levelness are to be determined for each individual area of concrete placed at one time.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated and where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### 3.12 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the 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 at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

### 3.13 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including basement walls, underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period additional curing is at contractor's option. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for seven days.

Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- a. Use moisture-retaining covers to cure concrete slab surfaces. Moisture-retaining covers may be used to cure all other concrete at contractor's option.
2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - a. Cure concrete other than concrete slab surfaces with a curing compound at the contractor's option.
3. Curing and Sealing Compound: Apply uniformly to floors and slabs only where indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### 3.14 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.15 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area 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.
  3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas 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.
  4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.16 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain composite sample(s) for each day's pour of each concrete mixture exceeding 5 cu. yd per the following:

Concrete Delivered	Composite Samples Obtained
Less than 5 cubic yards	None
5 cubic yards to 49 cubic yards	1 (take from first load delivered)
50 cubic yards to 100 cubic yards	1
Over 100 cubic yards	1 for each 100 cubic yards or fraction thereof

- a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143; one test at point of placement (back of concrete truck) prior to conveyance by pump, bucket, etc. for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173 volumetric method, for structural lightweight concrete; one test at point of placement (back of concrete truck) prior to conveyance by pump, bucket, etc. for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test at point of placement (back of concrete truck) prior to conveyance by pump, bucket, etc. for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31.
  - a. Cast and laboratory cure five, 6 inch by 12 inch (or seven 4 inch by 8 inch) standard cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39; test one 6 by 12 inch (or one 4 by 8) laboratory-cured specimen at 7 days and two 6 by 12 (or three 4 by 8 inch) laboratory-cured specimens at 28 days and hold two 6 by 12 (or three 4 by 8 inch) laboratory-cured specimens in reserve for 56 day test if required.
  - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive



- strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
  10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
  11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
  12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- C. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

END OF SECTION 03 30 00



**SECTION 03 30 05  
MVRA FOR CAST-IN-PLACE CONCRETE****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Moisture vapor reducing admixture (MVRA) for cast-in-place concrete.

**1.02 REFERENCE STANDARDS**

- A. 302.2R-06 - Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring.
- B. ACI 305R - Guide to Hot Weather Concreting; 2010.
- C. ACI 306R - Guide to Cold Weather Concreting; 2016.
- D. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2019, with Editorial Revision (2022).
- E. ASTM D5084 - Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter; 2016a.
- F. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.
- G. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting two weeks prior to the start of the work of this section; require attendance by all affected installers.
  - 1. Review and discuss:
    - a. MVRA project specific quality control procedures.
    - b. Concrete mix designs.
    - c. Procedures for ensuring quality of concrete materials.
    - d. Testing laboratory responsible for concrete design mixtures, sampling and testing.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Mix Design: Submit MVRA manufacturer approval of proposed concrete mix design.
- D. Material Certificate: Certify that products of this section meet or exceed specified requirements.
- E. Material Test Report: Document that products of this section comply with specified requirements.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications:
  - 1. Firm experienced in manufacture of concrete MVRA.
  - 2. Capable of providing test reports indicating compliance with specified performance requirements and with ASTM C494/C494M testing protocols, from independent AASHTO approved laboratory.
  - 3. Able to provide on-site technical assistance if requested.
- B. Ready Mixed Concrete Manufacturer Qualifications:
  - 1. Firm experienced in manufacturing ready-mixed concrete products.
  - 2. Comply with ASTM C94/C94M requirements for production facilities and equipment.
  - 3. Manufacturer certified according to NRMCA certification procedures.
- C. Slab Moisture Testing and Evaluation:
  - 1. Personnel performing laboratory tests: Certified in conduct of ASTM D5084 under supervision of licensed geotechnical engineer.

2. Determination of whether concrete slab is prepared to receive flooring, coatings, or roofing rests with MVRA manufacturer.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in original, undamaged containers with labels intact.
- B. Comply with manufacturer's written MVRA handling instructions prior to mixing.
- C. Comply with manufacturer's written MVRA storage instructions.

#### **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's lifetime warranty against concrete induced moisture vapor failure, providing coverage for:
  1. Repair or removal of failed flooring or roofing.
  2. Placement of topical moisture remediation system.
  3. Replacement of flooring or roofing materials to match original including material and labor.
- C. Provide manufacturer's adhesion warranty, matching terms of adhesive or primer manufacturer's material adhesion warranty.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. ISE Logik Industries, Inc: [www.iselogik.com](http://www.iselogik.com).
  1. MVRA 900 Basis of Design or approved substitution.
- B. Specialty Products Group: [www.spggogreen.com](http://www.spggogreen.com).
  1. Vapor Lock 20/20.
- C. Bone Dry Products, Inc: [www.bonedryproducts.com](http://www.bonedryproducts.com).
  1. Bone Dry Pro Admix.
- D. Barrier One: [www.barrierone.com](http://www.barrierone.com).
  1. MVRA CPS.
- E. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 MOISTURE VAPOR REDUCING ADMIXTURE**

- A. Concrete Moisture Vapor Reduction Admixture (MVRA):
  1. Physical characteristics:
    - a. Toxicity: None.
    - b. Odor: None.
    - c. Flammability: None.
    - d. Volatile Organic Compound (VOC) content: 0 grams per liter.
    - e. Freeze temperature: 32 degrees F (0 degrees C).
- B. Product: MVRA 900 by ISE Logik Industries Basis of Design or approved substitution.

#### **2.03 ACCESSORY MATERIALS**

- A. Underslab Vapor Retarder: See Section 07 26 00.

#### **2.04 MIXING**

- A. Moisture Vapor Reducing Admixture (MVRA) for new concrete, slabs below grade, slabs on grade, elevated slabs, roof deck, stair treads and landings, and exterior balconies.
- B. Add MVRA to concrete mix in accordance with manufacturer's instructions.
- C. Add MRVA directly to freshly mixed concrete at end of the batch process with tail water.
- D. Ready-Mixed Concrete:
  1. Measure, batch, mix, and deliver concrete with MVRA in accordance with ASTM C94/C94M.
  2. Furnish batch ticket information showing dosage of MVRA.
- E. Site Mixing:

1. Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M.
  2. Add MVRA where it makes direct contact with ready mix, then rotate drum of batch truck on high for at least seven minutes prior to discharge.
- F. Freshening onsite with held back mix water is acceptable if in accordance with ACI guidelines and if amount does not exceed original water to cementitious material ratio or instructions of Structural Engineer.
- G. Use water reducing admixtures to achieve desired slump.
- H. Use of other admixtures in same batch as MVRA is acceptable if each admixture is added separately.
- I. Do not use shrink reducing admixtures.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Dispense MVRA according to mix design and supplier's written instructions.
- B. Add MVRA to concrete according to manufacturer's written instructions.
- C. Place and cure concrete as specified in Section 03 30 00.

#### **3.02 CURING**

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306R-10 for cold-weather protection and ACI 305R-10 for hot-weather protection during curing.
- B. Cure concrete slabs to receive moisture sensitive coatings according to ACI 302.2R-06 by one or more of following methods:
  1. Moisture-retaining cover curing.
  2. Self-dissipating curing compound.

#### **3.03 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. MVRA Manufacturer: Pre-test manufactured production lots for conformance with published limits of hydraulic conductivity per ASTM D5084 prior to shipping.
- C. Project specific quality control process required by MVRA manufacturer necessary to convey concrete moisture vapor emission flooring failure warranty and stand-alone adhesion warranty.
- D. Project team: Upon request, provide batch tickets indicating presence and dosage of MVRA in mix.

**END OF SECTION**

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**SECTION 03 35 11  
CONCRETE FLOOR FINISHES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Clear coatings.

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with concrete floor placement and concrete floor curing.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

**1.04 MOCK-UP**

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- B. Mock-Up Size: 10 feet (3 m) square.
- C. Locate where directed.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

**1.06 FIELD CONDITIONS**

- A. Maintain light level equivalent to a minimum 200 W light source at 8 feet (2.5 m) above the floor surface over each 20 foot (6 m) square area of floor being finished.
- B. Do not finish floors until interior heating system is operational.
- C. Maintain ambient temperature of 50 degrees F (10 degrees C) minimum.

**PART 2 PRODUCTS****2.01 CONCRETE FLOOR FINISH APPLICATIONS**

- A. Clear Coating:
  - 1. Use at following locations: as indicated in drawings.

**2.02 COATINGS**

- A. Low Gloss Clear Coating: Transparent, nonyellowing, acrylic polymer-based coating.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

**3.02 GENERAL**

- A. Apply materials in accordance with manufacturer's instructions.

**3.03 COATING APPLICATION**

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.

- C. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

**END OF SECTION**



**SECTION 04 05 11  
MASONRY MORTARING AND GROUTING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Mortar for masonry.
- B. Grout for masonry.

**1.02 REFERENCE STANDARDS**

- A. ASTM C5 - Standard Specification for Quicklime for Structural Purposes; 2018.
- B. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.
- C. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2024.
- D. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- E. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- F. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- G. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
- H. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- I. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2023.
- J. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- K. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry; 2020.
- L. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2019a.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.
- C. Samples: Submit two samples of mortar, illustrating mortar color and color range.
- D. Reports: Submit reports on mortar indicating compliance of mortar to property requirements of ASTM C270 and test and evaluation reports per ASTM C780.
- E. Reports: Submit reports on grout indicating compliance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C1019.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Manufacturer's Installation Instructions: Submit packaged dry mortar manufacturer's installation instructions.

**1.04 QUALITY ASSURANCE**

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

**1.06 FIELD CONDITIONS**

- A. Cold and Hot Weather Requirements: Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

**PART 2 PRODUCTS****2.01 MORTAR AND GROUT APPLICATIONS**

- A. At Contractor's option, mortar and grout may be field-mixed from packaged dry materials, made from factory premixed dry materials with addition of water only, or ready-mixed.
- B. Mortar Color:
  - 1. Masonry: Natural gray unless otherwise indicated.
  - 2. Brick: Color as selected by Architect from manufacturer's full range.
- C. Mortar Mix Designs: ASTM C270, Property Specification.
  - 1. Masonry below grade and in contact with earth: Type S.
  - 2. Exterior Masonry Veneer: Type N.
  - 3. Exterior Cavity Walls: Type S mortar with Type N pointing mortar.
  - 4. Exterior, Load-bearing Masonry: Type N.
  - 5. Exterior, Non-loadbearing Masonry: Type N.
  - 6. Interior, Load-bearing Masonry: Type N.
  - 7. Interior, Non-loadbearing Masonry: Type O.
- D. Grout Mix Designs:
  - 1. Bond Beams and Lintels: 3,000 psi (21 MPa) strength at 28 days; 8-10 inches (200-250 mm) slump; provide premixed type in accordance with ASTM C 94/C 94M.
    - a. Fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less.
    - b. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

**2.02 MATERIALS**

- A. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
  - 1. Color: Mineral pigments added as required to produce approved color sample.
- B. Portland Cement: ASTM C150/C150M.
  - 1. Type: Type I - Normal; ASTM C150/C150M.
  - 2. Color: Color as required to produce approved color sample.
- C. Masonry Cement: ASTM C91/C91M.
  - 1. Type: Type N; ASTM C91/C91M.
  - 2. Colored Mortar: Premixed cement as required to match Architect's color sample.
- D. Hydrated Lime: ASTM C207, Type S.
- E. Quicklime: ASTM C5, non-hydraulic type.
- F. Mortar Aggregate: ASTM C144.
- G. Grout Aggregate: ASTM C404.
- H. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
  - 1. Color(s): As selected by Architect from manufacturer's full range.
- I. Water: Clean and potable.

**2.03 MORTAR MIXING**

- A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.
- B. Maintain sand uniformly damp immediately before the mixing process.
- C. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.
- D. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

- E. Do not use anti-freeze compounds to lower the freezing point of mortar.
- F. If water is lost by evaporation, re-temper only within two hours of mixing.

#### **2.04 GROUT MIXING**

- A. Mix grout in accordance with ASTM C94/C94M.
- B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.
- C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- D. Do not use anti-freeze compounds to lower the freezing point of grout.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Plug clean-out holes for grouted masonry with brick masonry units. Brace masonry to resist wet grout pressure.

#### **3.02 INSTALLATION**

- A. Install mortar and grout to requirements of section(s) in which masonry is specified.
- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not install grout in lifts greater than 16 inches (400 mm) without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

#### **3.03 GROUTING**

- A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of Contract Documents.
- B. Low-Lift Grouting:
  - 1. Limit height of pours to 12 inches (300 mm).
  - 2. Limit height of masonry to 16 inches (400 mm) above each pour.
  - 3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
  - 4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.
- C. High-Lift Grouting:
  - 1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
  - 2. Place grout for spanning elements in single, continuous pour.

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

- A. An independent testing agency will perform field tests, in accordance with provisions of Section 01 40 00 - Quality Requirements.
- B. Test and evaluate mortar in accordance with ASTM C780 procedures.
- C. Test and evaluate grout in accordance with ASTM C1019 procedures.

**END OF SECTION**

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**SECTION 04 20 00  
UNIT MASONRY****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Concrete block.
- B. Clay facing brick.
- C. Reinforcement and anchorage.
- D. Accessories.

**1.02 PRICE AND PAYMENT PROCEDURES**

- A. See Section 01 21 00 - Allowances, for cash allowances affecting this section.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- C. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.
- D. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2022.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
- F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2023.
- G. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.
- H. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2023.
- I. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2023a.
- J. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- K. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- L. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- M. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale); 2023.
- N. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- O. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2024.
- P. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- Q. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2023.
- R. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- S. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
- T. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015, with Editorial Revision (2022).
- U. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- V. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.
- W. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- X. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

- Y. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

#### **1.06 QUALITY ASSURANCE**

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum five years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

#### **1.07 MOCK-UPS**

- A. Construct a masonry wall as a mock-up panel sized 8 feet (2.4 m) long by 6 feet (1.8 m) high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Locate where directed.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

### **PART 2 PRODUCTS**

#### **2.01 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 (400 by 200 mm) and nominal depths as indicated on drawings for specific locations.
  - 2. Special Shapes: Provide nonstandard blocks configured for corners.
  - 3. Load-Bearing Units: ASTM C90, lightweight.
    - a. Hollow block, as indicated.
    - b. Exposed Faces: Manufacturer's standard color and texture.
  - 4. Nonloadbearing Units: ASTM C129.
    - a. Hollow block, as indicated.
    - b. Lightweight.

#### **2.02 BRICK UNITS**

- A. Facing Brick: ASTM C216, Type FBX, Grade MW.
  - 1. Color and texture to match Architect's approved sample.
  - 2. Nominal size: Modular.
  - 3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

#### **2.03 MORTAR AND GROUT MATERIALS**

- A. Mortar and Grout: As specified in Section 04 05 11.

**2.04 REINFORCEMENT AND ANCHORAGE**

- A. Manufacturers:
  - 1. Heckmann Building Products, Inc.: [www.heckmannbuildingprods.com](http://www.heckmannbuildingprods.com).
  - 2. Blok-Lok Limited: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
  - 3. Hohmann & Barnard, Inc: [www.h-b.com/sle](http://www.h-b.com/sle).
  - 4. WIRE-BOND [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa), deformed billet bars; galvanized.
- C. Single Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Ladder.
  - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
  - 3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not less than 5/8 inch (16 mm) of mortar coverage on each exposure.
- D. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Ladder, with adjustable ties spaced at 16 in (406 mm) on center.
  - 2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
  - 3. Size: 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods and adjustable components of 0.1875 inch (4.8 mm) wire, width of components as required to provide not less than 5/8 inch (16 mm) of mortar coverage from each masonry face.
  - 4. Vertical adjustment: Not more than 1 1/4 inches (32 mm).
- E. 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.
  - 1. Anchor plates: Not less than 0.075 inch (1.91 mm) 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.
  - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch (4.75 mm) thick.
  - 3. Vertical adjustment: Not less than 3-1/2 inches (89 mm).

**2.05 FLASHINGS**

- A. EPDM Flashing: ASTM D4637/D4637M, Type I, 0.040 inch (1.0 mm) thick.

**2.06 ACCESSORIES**

- A. Backer Rod: Closed cell polyethylene; oversized 50 percent to joint width; self expanding; maximum lengths available.
- B. Joint Filler: Closed cell expanded rubber; oversized 50 percent to joint width; self expanding; maximum lengths available.
  - 1. Performance Characteristics:
    - a. Density: 3.5 - 5.0 p.c.f. per ASTM D 1667.
    - b. Compression deflection 25%: 1.5 - 3.0 psi per ASTM D 1056.
    - c. Tensile strength: 40 psi per ASTM D 412.
    - d. Elongation: 100% per ASTM D 412.
    - e. Water absorption: 5% maximum per ASTM D 1056.
- 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.
- D. Weeps:
  - 1. Type: Preformed aluminum vents with sloping louvers Molded PVC grilles, insect resistant.
  - 2. Color(s): As selected by Architect from manufacturer's full range.
- E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

**PART 3 EXECUTION****3.01 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.

**3.02 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.

**3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

**3.04 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 (200 mm).
  - 3. Mortar Joints: Concave.
- D. Brick Units:
  - 1. Bond: Running.
  - 2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
  - 3. Mortar Joints: Concave.

**3.05 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.

**3.06 WEEPS/CAVITY VENTS**

- A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

**3.07 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 diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### 3.08 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry Back-Up: Embed anchors in masonry back-up to bond veneer at maximum 2-2/3 sq ft (0.25 sq m) of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- B. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 2-2/3 sq ft (0.25 sq m) of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

### 3.09 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 (152 mm), minimum, into adjacent masonry or turn up flashing ends at least 1 inch (25.4 mm), minimum, to form watertight pan at nonmasonry 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 (203 mm) minimum on vertical surface of backing:
  - 1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.
- C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
- D. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

### 3.10 LINTELS

- A. Install loose steel lintels over openings.
- B. Maintain minimum 6 inch bearing on each side of opening, unless noted otherwise on structural.
- C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout.

### 3.11 GROUTED COMPONENTS

- A. Lap splices minimum 48 bar diameters.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) 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 (300 mm) either side of opening.

### 3.12 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 (300 mm) from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

### 3.13 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.
- D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

### **3.14 CUTTING AND FITTING**

- A. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### **3.15 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - 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.

### **3.16 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.

### **3.17 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**

## COLD-FORMED METAL FRAMING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Interior load-bearing wall framing.
- B. Related Sections include the following:
  - 1. Division 09 Section "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- C. Welding certificates.
- D. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
  - 1. Steel sheet.
  - 2. Expansion anchors.
  - 3. Power-actuated anchors.
  - 4. Mechanical fasteners.
  - 5. Vertical deflection clips.
  - 6. Miscellaneous structural clips and accessories.
- E. Research/Evaluation Reports: For cold-formed metal framing.

## 1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
- D. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
- E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Allied Studco.
  - 2. AllSteel Products, Inc.
  - 3. California Expanded Metal Products Company.
  - 4. Clark Steel Framing.
  - 5. Consolidated Fabricators Corp.; Building Products Division.
  - 6. Craco Metals Manufacturing, LLC.

7. Custom Stud, Inc.
8. Dale/Incor.
9. Design Shapes in Steel.
10. Dietrich Metal Framing; a Worthington Industries Company.
11. Formetal Co. Inc. (The).
12. Innovative Steel Systems.
13. MarinoWare; a division of Ware Industries.
14. Quail Run Building Materials, Inc.
15. SCAFECO Corporation.
16. Southeastern Stud & Components, Inc.
17. Steel Construction Systems.
18. Steeler, Inc.
19. Super Stud Building Products, Inc.
20. United Metal Products, Inc.

## 2.2 MATERIALS

- A. Steel Sheet: ASTM A 1003, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  1. Grade: As indicated.
  2. Coating: G90 or equivalent.
- B. Steel Sheet for Clips: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:
  1. Grade: 50.
  2. Coating: G90.

## 2.3 INTERIOR LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  1. Minimum Base-Metal Thickness: As indicated.
  2. Flange Width: As indicated, 1-5/8 inches minimum.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
  1. Minimum Base-Metal Thickness: As indicated, matching steel studs minimum.
  2. Flange Width: 1-1/4 inches minimum.
- C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:
  1. Minimum Base-Metal Thickness: As indicated.

2. Flange Width: As indicated, 1-5/8 inches minimum.
- D. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dietrich Metal Framing; a Worthington Industries Company.
    - b. MarinoWare, a division of Ware Industries.
    - c. SCAFCO Corporation
    - d. The Steel Network, Inc.
- E. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dietrich Metal Framing; a Worthington Industries Company.
    - b. MarinoWare, a division of Ware Industries.
    - c. SCAFCO Corporation
    - d. The Steel Network, Inc.
  2. Minimum Base-Metal Thickness: 0.0428 inch.
  3. Flange Width: 1 inch plus the design gap for 1-story structures.
- 2.4 CEILING JOIST FRAMING
- A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: As indicated, 0.0329 inch minimum.
  2. Flange Width: 1-5/8 inches, minimum.
- 2.5 FRAMING ACCESSORIES
- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.

## 2.6 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts, and carbon-steel nuts; and flat, hardened-steel washers.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
  1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

## 2.7 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20.
- B. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- C. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

## 2.8 FABRICATION

- A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
  1. Fabricate framing assemblies using jigs or templates.

2. Cut framing members by sawing or shearing; do not torch cut.
  3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
  4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Install load bearing shims between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.
- B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud locations.



## 3.3 INSTALLATION, GENERAL

- A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
  - 2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- I. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

## 3.4 INTERIOR LOAD-BEARING WALL INSTALLATION

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
  - 1. Anchor Spacing: As indicated.
- B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
  - 1. Stud Spacing: As indicated.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.
- E. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
  - 1. Frame wall openings with not less than a double stud at each jamb of frame as indicated. Fasten jamb members together to uniformly distribute loads.
  - 2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- F. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
  - 1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- G. Install horizontal bridging in stud system, spaced as indicated. Fasten at each stud intersection.
  - 1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of 2 screws into each flange of the clip angle for framing members up to 6 inches deep.
- H. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

- I. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

- A. Testing: A qualified independent testing and inspecting agency will perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed 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 that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00



**SECTION 05 50 00  
METAL FABRICATIONS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Shop fabricated steel items.
- B. Steel framing and supports for mechanical and electrical equipment.
- C. Steel framing and supports for applications where framing and supports are not specified in other Sections.

**1.02 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- H. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- J. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2022).
- L. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- M. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- N. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- O. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- P. SSPC-SP 2 - Hand Tool Cleaning; 2018.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - 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.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

**1.04 QUALITY ASSURANCE**

- A. Design supports 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. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

**PART 2 PRODUCTS****2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

**2.02 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

**2.03 FABRICATED ITEMS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Lintels: As detailed; prime paint finish.

**2.04 FINISHES - STEEL**

- A. Prime paint steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete and items to be imbedded in masonry.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

**2.05 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

**PART 3 EXECUTION****3.01 EXAMINATION**

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

**3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.

**3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on shop 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.

**3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

**END OF SECTION**

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**SECTION 06 10 00  
ROUGH CARPENTRY****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Roofing nailers.
- B. Preservative treated wood materials.
- C. Miscellaneous framing and sheathing.
- D. Communications and electrical room mounting boards.
- E. Concealed wood blocking, nailers, and supports.
- F. Miscellaneous wood nailers, furring, and grounds.

**1.02 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2024.
- E. PS 1 - Structural Plywood; 2023.
- F. PS 2 - Performance Standard for Wood Structural Panels; 2018.
- G. PS 20 - American Softwood Lumber Standard; 2021.
- H. SPIB (GR) - Standard Grading Rules; 2021.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.04 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****2.01 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](http://www.alsc.org), and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
  - 4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
- B. Lumber fabricated from old growth timber is not permitted.

**2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

**2.03 CONSTRUCTION PANELS**

- A. Roof Sheathing: PS 2 type, rated Structural I Sheathing.
  - 1. Bond Classification: Exterior.
  - 2. Span Rating: 24/16..
  - 3. Performance Category: As required by roof membrane manufacturer, 19/32 PERF CAT minnum.
- B. Wall Sheathing: PS 2 type.
  - 1. Bond Classification: Exterior.
  - 2. Grade: Structural I Sheathing.
  - 3. Span Rating: 24.
  - 4. Performance Category: 7/16 PERF CAT.
  - 5. Edge Profile: Square edge.
- C. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

**2.04 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

**2.05 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Preservative Treatment:
  - 1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber in contact with masonry or concrete.
  - 2. Preservative Pressure Treatment of Plywood Above Grade: AWWA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
    - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.

**PART 3 EXECUTION****3.01 PREPARATION**

- A. Coordinate installation of rough carpentry members specified in other sections.

**3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.

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

### 3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Specifically, provide blocking and framing for the proper installation of the following:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.
  - 7. Televisions.
- E. Provide wood ground along base of wall at floor, 1 1/2 inches tall by thickness of wallboard, continuous behind all rubber base.
  - 1. Finish face of ground shall be flush with finish face of wallboard.
  - 2. Set wallboard tight to top of ground.

### 3.04 INSTALLATION OF CONSTRUCTION PANELS

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  - 1. At long edges use sheathing clips where joints occur between roof framing members.
  - 2. Nail panels to framing; staples are not permitted.
- B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
- C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.
  - 4. Size and Location: As indicated on drawings.

### 3.05 TOLERANCES

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

### 3.06 CLEANING

- A. Waste Disposal: See Section 01 74 19 - Construction Waste Management and Disposal.
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
- 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**

## SHOP-FABRICATED WOOD TRUSSES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Wood roof trusses.
- B. Allowances: Provide wood truss bracing under the Metal-Plate-Connected Truss Bracing Allowance as specified in Section 01 21 00 "Allowances."

#### 1.3 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

#### 1.4 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for trusses.
  - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
  - 2. Indicate sizes, stress grades, and species of lumber.
  - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
  - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
  - 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
  - 6. Show splice details and bearing details.
- B. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For metal connector-plate manufacturer, professional engineer.

- B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss fabricating firm.

## 1.6 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
  - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
  - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
  - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
  - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
  - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal-plate-connected wood trusses.
- B. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
  - 1. Design Loads: As indicated.

2. Maximum Deflection Under Design Loads:
  - a. Roof Trusses: Vertical deflection of  $1/240$  of span.
- C. Comply with applicable requirements and recommendations of the following publications:
  1. TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction."
  2. TPI DSB, "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."
  3. TPI BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

## 2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  1. Factory mark each piece of lumber with grade stamp of grading agency.
  2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
  3. Provide dressed lumber, S4S.
  4. Provide dry lumber with [19][15] percent maximum moisture content at time of dressing.
- B. Minimum Chord Size for Roof Trusses: 2 by 6 inches nominal for both top and bottom chords.
- C. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 06 10 00 "Rough Carpentry."

## 2.3 METAL CONNECTOR PLATES

- A. Source Limitations: Obtain metal connector plates from single manufacturer.
- B. General: Fabricate connector plates to comply with TPI 1.
- C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.
  1. Use for interior locations unless otherwise indicated.

## 2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.

2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

- B. Nails, Brads, and Staples: ASTM F 1667.

## 2.5 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 94 percent zinc dust by weight.

## 2.6 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
  1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

## 2.7 SOURCE QUALITY CONTROL

- A. Special Inspections: A qualified special inspector to perform special inspections.
  1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
  2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate does not comply with the Contract Documents.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.



- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- G. Securely connect each truss ply required for forming built-up girder trusses.
  - 1. Anchor trusses to girder trusses as indicated.
- H. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
  - 1. Install bracing to comply with Section 06 10 00 "Rough Carpentry."
  - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- I. Install wood trusses within installation tolerances in TPI 1.
- J. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- K. Replace wood trusses that are damaged or do not meet requirements.
  - 1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

### 3.2 REPAIRS AND PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- C. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

END OF SECTION 06 17 53



**SECTION 06 41 00  
ARCHITECTURAL WOOD CASEWORK****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Countertops.
- C. Hardware.
- D. Factory finishing.
- E. Preparation for installing utilities.

**1.02 REFERENCE STANDARDS**

- A. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- B. BHMA A156.9 - Cabinet Hardware; 2020.
- C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

**1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
  - 1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
  - 2. Single Source Responsibility: Provide and install this work from single fabricator.

**1.06 MOCK-UPS**

- A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
- B. Locate where directed.
- C. Mock-up may remain as part of the work.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect units from moisture damage.

**1.08 FIELD CONDITIONS**

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Single Source Responsibility: Provide and install this work from single fabricator.

**2.02 CABINETS**

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Cabinets:
  - 1. Finish - Exposed Exterior Surfaces: Decorative laminate.
  - 2. Finish - Exposed Interior Surfaces: Decorative laminate.
  - 3. Finish - Semi-Exposed Surfaces: Decorative laminate
  - 4. Finish - Concealed Surfaces: Manufacturer's option.
  - 5. Door and Drawer Front Edge Profiles: Decorative laminate.
  - 6. Casework Construction Type: Type A - Frameless.
  - 7. Grained Face Layout for Cabinet and Door Fronts: Flush panel.
    - a. Premium Grade:
      - 1) Provide vertical run and match for doors, drawer fronts and false fronts within each cabinet unit and for entire project.
      - 2) Provide well-matched doors, drawer fronts and false fronts across multiple cabinet faces in one elevation.
      - 3) Cathedral Grain: Point grain crown up and run in the same direction for entire project.
  - 8. Adjustable Shelf Loading: 50 psf (24.4 gm/sq cm).
    - a. Deflection: L/144.
  - 9. Cabinet Style: Flush overlay.
  - 10. Cabinet Doors and Drawer Fronts: Flush style.
  - 11. Drawer Side Construction: Fabricator's option per AWI grade specified.
  - 12. Drawer Construction Technique: Fabricator's option per AWI grade specified.

**2.03 WOOD-BASED COMPONENTS**

- A. Wood fabricated from old growth timber is not permitted.

**2.04 LAMINATE MATERIALS**

- A. Manufacturers:
  - 1. Arborite: [www.arborite.com/#sle](http://www.arborite.com/#sle).
  - 2. Formica Corporation: [www.formica.com/#sle](http://www.formica.com/#sle).
  - 3. Panolam Industries International, Inc: [www.panolam.com/#sle](http://www.panolam.com/#sle).
  - 4. Wilsonart LLC: [www.wilsonart.com/#sle](http://www.wilsonart.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as indicated.
  - 1. Vertical Surfaces: VGS, 0.028 inch (0.71 mm) nominal thickness, color as selected, finish as selected.
  - 2. Cabinet Liner: CLS, 0.020 inch (0.51 mm) nominal thickness, color as selected, finish as selected.
- D. Allow for three colors as selected by Architect from manufacturer's full range for laminate.

**2.05 COUNTERTOPS**

- A. Quartz Countertops: See Section 12 36 61.
- B. Solid Surface Window Sills: Specified in Section 06 65 10.

**2.06 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed

locations.

- D. Concealed Joint Fasteners: Threaded steel.
- E. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.

## 2.07 HARDWARE

- A. Cabinet Hardware: Comply with BHMA A156.9 for hardware types and grades indicated below:
  - 1. Hardware Types: As indicated on drawings.
  - 2. Product Grade: Grade 2.
- B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, satin chrome finish, for nominal 1 inch (25 mm) spacing adjustments.
- C. Vanity Brackets: Fixed, ADA-compliant, face-of-stud mounting.
  - 1. Material and Shape: Steel; formed compound shapes.
    - a. Finish: Manufacturer's standard, factory-applied, textured powder coat.
    - b. Color: Black.
  - 2. Products:
    - a. A&M Hardware, Inc; ADA Vanity Brackets: [www.aandmhardware.com/#sle](http://www.aandmhardware.com/#sle).
    - b. Rakks/Rangine Corporation; ADA Compliant EHV Vanity Supports: [www.rakks.com/#sle](http://www.rakks.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Drawer and Door Pulls: "U" shaped wire pull, aluminum with satin finish, 4 inch centers ("U" shaped wire pull, aluminum with satin finish, 100 mm centers).
- E. Cabinet Catches and Latches:
  - 1. Type: Magnetic catch.
- F. Drawer Slides:
  - 1. Type: Full extension.
  - 2. Static Load Capacity: As indicated below.
    - a. Standard Drawer Pound Class: 100.
    - b. File Drawer Pound Class: 150.
  - 3. Mounting: Side mounted.
  - 4. Stops: Integral type.
  - 5. Features: Provide self closing/stay closed type.
  - 6. Manufacturers:
    - a. Accuride International, Inc: [www accuride.com/#sle](http://www accuride.com/#sle).
    - b. Grass America Inc: [www.grassusa.com/#sle](http://www.grassusa.com/#sle).
    - c. Knappe & Vogt Manufacturing Company: [www.knappeandvogt.com/#sle](http://www.knappeandvogt.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- G. Hinges: European style concealed self-closing type, steel with nickel-plated finish.
  - 1. Manufacturers:
    - a. Blum, Inc: [www.blum.com/#sle](http://www.blum.com/#sle).
    - b. Grass America Inc: [www.grassusa.com/#sle](http://www.grassusa.com/#sle).
    - c. Hardware Resources: [www.hardwareresources.com/#sle](http://www.hardwareresources.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.08 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.

- E. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
  - 1. Provide sequence matching across each elevation.
- F. Provide cutouts for plumbing fixtures, inserts, outlet boxes, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

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

#### **3.02 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim for this purpose.
- F. Secure cabinets and counter bases to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

#### **3.03 ADJUSTING**

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

#### **3.04 CLEANING**

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

**END OF SECTION**

**SECTION 06 65 10  
SOLID SURFACE FABRICATIONS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Window sills.

**1.02 REFERENCE STANDARDS**

- A. ASTM E 84-10b - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM D 256-10 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
- C. ASTM D 638-10 - Standard Test Method for Tensile Properties of Plastics.
- D. ASTM D 696-08 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer.
- E. ASTM D 2583-07 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
- F. ASTM D 790-10 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- G. ASTM D 648-07 - Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
- H. ASTM D 792-08 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
- I. ASTM D 2565-99(2008) - Standard Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications.
- J. ASTM G 21-09 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- K. ANSI Z 124.3-2005 - American National Standard for Plastic Lavatories.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each type of product indicated.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components.
  - 1. Includes full size details, edge details, thermoforming requirements, attachments, etc.
  - 2. Show locations and sizes of furring, blocking, including concealed blocking and reinforcing specified in other sections.
  - 3. Show locations and sizes of cutouts and holes for all items installed in solid surface.
- D. Samples: Submit minimum 6 inch by 6 inch sample in specified color and gloss.
  - 1. Cut sample and seam together for representation of inconspicuous seam.
  - 2. Indicate full range of color and pattern variation.
- E. Product Data: Indicate product description, fabrication information and compliance with specified performance requirements.
- F. Maintenance Data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions.
- G. Installer's Qualification Statement.
- H. Manufacturer's Qualification Statement.
- I. Evaluation Service Reports: Show compliance with specified requirements.
- J. See Section 01 70 00 - Execution and Closeout Requirements.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this project, with not less than three years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Do not deliver components to site until areas are ready for installation.
- B. Store components indoors per manufacturer's instructions prior to installation.
- C. Handle materials so as to prevent damage. Provide protective coverings to prevent damage or staining following installation for the duration of the project.

**1.06 FIELD CONDITIONS**

- A. During and after installation maintain temperature and humidity conditions in building spaces at the same levels planned for occupancy.
  - 1. Maintain relative humidity planned for the building and an ambient temperature between 65 and 75 degrees fahrenheit for a minimum of 48 hours prior to installation.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Final Acceptance.
- C. Provide ten year manufacturer warranty from Date of Final Acceptance.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Corian: [www.dupont.com](http://www.dupont.com).
  - 1. Basis of Design or approved substitution.
- B. LG Hausys America: [www.lghausys.com](http://www.lghausys.com).
- C. Wilsonart: [www.wilsonart.com](http://www.wilsonart.com)
- D. Hudson: [www.hudsonsolidsurfaces.com](http://www.hudsonsolidsurfaces.com)
- E. Staron: [www.staron.com](http://www.staron.com)
- F. Substitutions: See Section 01 60 00-Product Requirements.

**2.02 MATERIALS**

- A. Solid surface components
  - 1. Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified.
  - 2. Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.
- B. Thickness: 1/2 inch
- C. Edge treatment: See plans for specific locations where more than one edge treatment is specified.
  - 1. Double Eased - 1/8 inch top edge and 1/8 inch bottom edge.
- D. Color: Cirrus White by Corian or approved substitution.

**2.03 ACCESSORIES**

- A. Joint adhesive: Manufacturer's standard one-or two-part adhesive kit to create inconspicuous, nonporous joints.
- B. Sealant: Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone - any type), UL-listed silicone sealant in colors matching components.



**2.04 FABRICATION**

- A. Shop assembly
  - 1. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.
  - 2. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints and without voids.
    - a. Reinforce with strip of solid polymer material, 2" wide.
  - 3. Provide factory cutouts for plumbing fittings and bath accessories as indicated in the plans and on the shop drawings.
  - 4. Rout and finish component edges with clean, sharp returns.
    - a. Rout cutouts, radii and contours to template.
    - b. Smooth edges.
    - c. Repair or reject defective and inaccurate work.
- B. Finish: Surfaces shall have a uniform finish.
  - 1. Matte: Standard finish for high traffic areas.
  - 2. Satin: Standard finish for darker patterns.
  - 3. Semi-gloss: Higher sheen with greater reflectance for lower traffic areas.
  - 4. Gloss: Maximum sheen and reflectance for light traffic areas or vertical applications.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
  - 1. Provide product in the largest pieces available.
  - 2. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.
    - a. Exposed joints/seams shall not be allowed.
  - 3. Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.
  - 4. Cut and finish component edges with clean, sharp returns.
  - 5. Anchor securely to base cabinets or other supports.
  - 6. Carefully dress joints smooth, remove surface scratches and clean entire surface.
  - 7. Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.
- B. Backsplashes and sidesplashes:
  - 1. Install using manufacturer's standard color-matched silicone sealant.
    - a. Install in accordance with manufacturer's instructions.

**3.03 REPAIR**

- A. Repair or replace damaged work which cannot be repaired to Architect's satisfaction.

**3.04 CLEANING & PROTECTION**

- A. Keep components clean during installation.
- B. Remove adhesives, sealants and other stains.
- C. Protect surfaces from damage until Date of Final Acceptance. Repair or replace damaged components that cannot be repaired to the architect's satisfaction.

**3.05 PROTECTION**

- A. Protect installed materials from subsequent construction operations.

**END OF SECTION**

**SECTION 07 21 00  
THERMAL INSULATION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Board insulation and integral vapor retarder at cavity wall construction, perimeter foundation wall, and exterior wall behind brick/precast veneer wall finish.
- B. Batt insulation in exterior wall construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

**1.02 REFERENCE STANDARDS**

- A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2024.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

**1.04 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS****2.01 APPLICATIONS**

- A. Insulation Inside Masonry Cavity Walls: Polyisocyanurate board.
- B. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.
- C. Insulation in Wood Framed Walls (at trusses: Batt insulation with no vapor retarder.

**2.02 FOAM BOARD INSULATION MATERIALS**

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, comply with ASTM C1289.
  - 1. Classifications:
    - a. Type I: Faced with aluminum foil on both major surfaces of the core foam.
      - 1) Class 1 - Non-reinforced core foam.
      - 2) Compressive Strength: 16 psi (110 kPa), minimum.
      - 3) Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 9.5 (1.67), minimum, at 75 degrees F (24 degrees C).
  - 2. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
  - 3. Board Thickness: 1.5 inch (37.5 mm).

**2.03 MINERAL FIBER BLANKET INSULATION MATERIALS**

- A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
  - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Thermal Resistance: R-value (RSI-value) of 19 (3.34) or as noted on plans.
5. Facing: Unfaced.

#### **2.04 ACCESSORIES**

- A. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
- C. Adhesive: Type recommended by insulation manufacturer for application.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

#### **3.02 BOARD INSTALLATION AT CAVITY WALLS**

- A. Install boards to fit snugly between wall ties.
- B. Install boards horizontally on walls.
  1. Install in running bond pattern.
  2. Butt edges and ends tightly to adjacent boards and protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- D. Place 6 inches (152 mm) 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.

#### **3.03 BATT INSTALLATION**

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

#### **3.04 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

**SECTION 07 21 19  
FOAMED-IN-PLACE INSULATION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Foamed-in-place insulation.
  - 1. In masonry cavity walls.

**1.02 REFERENCE STANDARDS**

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- F. FM 4880 - Examination Standard for Class 1 Fire Rating of Building Panels or Interior Finish Materials; 2022.
- G. NFPA 275 - Standard Method of Fire Tests for the Evaluation of Thermal Barriers; 2022.
- H. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.
- I. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction; Current Edition, Including All Revisions.
- J. UL 1715 - Standard for Safety Fire Test of Interior Finish Material; Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, insulation properties, and preparation requirements.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.

**1.05 FIELD CONDITIONS**

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
- B. Do not apply foam when temperature is within 5 degrees F (2.78 degrees C) of dew point.

**PART 2 PRODUCTS****2.01 MATERIALS**

- A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  - 1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and fire protection requirements.
    - a. Fire Protection: Provide 15-minute thermal barrier of 1/2 inch (12.7 mm) gypsum board or equivalent material complying with NFPA 275 test method, or foamed-in-place insulation

either exposed or with covering that complies with FM 4880, NFPA 286, UL 1040, or UL 1715.

2. Thermal Resistance: R-value (RSI-value) of 5.0 (0.88), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature when tested in accordance with ASTM C518.
3. Water Vapor Permeance: Vapor retarder; 2 perms (115 ng/(Pa s sq m)), maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
4. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
5. Air Permeance: 0.04 cfm per square foot (0.2 L/(s/sq m)), maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf (75 Pa).
6. Closed Cell Content: At least 90 percent.
7. Surface Burning Characteristics: Flame spread/smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
8. Products:
  - a. BASF Corporation; WALLTITE US: [www.spf.basf.com/#sle](http://www.spf.basf.com/#sle).
  - b. Carlisle Spray Foam Insulation; SealTite PRO One Zero: [www.carlisesfi.com/#sle](http://www.carlisesfi.com/#sle).
  - c. Gaco Western; GacoOnePass F1850R: [www.gaco.com/#sle](http://www.gaco.com/#sle).
  - d. Johns Manville; JM Corbond IV Closed Cell Spray Polyurethane Foam: [www.jm.com/#sle](http://www.jm.com/#sle).
9. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.02 ACCESSORIES**

- A. Primer: As required by insulation manufacturer.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

### **3.02 APPLICATION**

- A. Apply insulation in accordance with manufacturer's instructions.

### **END OF SECTION**

**SECTION 07 26 00  
UNDERSLAB VAPOR RETARDER****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Application of an underslab vapor retarder.

**1.02 REFERENCE STANDARDS**

- A. ASTM E 1745-09 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
- B. ASTM E 154-99 (2005) - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover. .
- C. ASTM E 96-05 - Standard Test Methods for Water Vapor Transmission of Materials.
- D. ASTM E 1643-09 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- E. ASTM F 1249-06 - Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
- F. ASTM D 1709-09 - Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method.
- G. ASTM D 1434-82(2009) - Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting.
- H. ACI 302.1R-96 Vapor Barrier Component (plastic membrane) is not less than 15 mils thick.
- I. ACI 302.2R-06 - Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

**1.03 SUBMITTALS**

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.
- C. Submit certified test reports showing compliance with specified performance characteristics and physical properties.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean dry area in accordance with manufacturer's instructions.
- C. Stack membrane on smooth ground or wood platform to eliminate warping.
- D. Protect materials during handling and application to prevent damage or contamination.
- E. Ensure membrane is stamped with manufacturer's name, product name and membrane thickness at intervals of no more than 85" (220 cm).

**1.05 ENVIRONMENTAL REQUIREMENTS**

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Do not apply on frozen ground.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Stego Industries LLC: Product - Stego Wrap 15: [www.stegoindustries.com](http://www.stegoindustries.com).
- B. W.R. Meadows: Product - Perminator 15: [www.wrmeadows.com](http://www.wrmeadows.com).
- C. Layfield Group: Product - VaporFlex 15: [www.layfieldgeosynthetics.com](http://www.layfieldgeosynthetics.com).
- D. Inteplast Group: Product - Barrier-Bac VB-350: [www.barrierbac.com](http://www.barrierbac.com).
- E. Reef Industries, Inc.: Product - Griffolyn 15 Mil: [www.reefindustries.com](http://www.reefindustries.com).

- F. Raven Industries: Product - Vaporblock VB15:www.ravenefd.com.
- G. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.02 MATERIALS**

- A. Vapor Retarder membrane: Meet or exceed all requirements of ASTM E1745-09 Class A, B, and C and the following:
  - 1. Maximum Permeance ASTM E96: 0.018 Perms.
  - 2. Water Vapor Transmission Rate ASTM F1249 calibrated to ASTM E96 (water method): 0.0012 grains/ft<sup>2</sup>/hr.
  - 3. Resistance to Organisms and Substrates in Contact with Soil ASTM E154, Section 13: 0.027 Perms.
  - 4. Tensile Strength ASTM E154, Section 9: 64 LBS. Force/Inch.
  - 5. Puncture Resistance ASTM D1709, Method B: 2,200 Grams minimum.
  - 6. Water Vapor Retarder ASTM E1745: 0.007 perms minimum - Meets or exceeds Class A, B and C.
  - 7. Thickness of Retarder (plastic) ACI 302.1R-96: Not less than 15 mils.

## **2.03 ACCESSORIES**

- A. Seam Tape:
  - 1. High Density Polyethylene Tape with pressure sensitive adhesive.
    - a. Width: 4 inches (101.6 mm) minimum.
- B. Pipe Boots:
  - 1. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.
- C. Pointing Mastic:
  - 1. Pre-mixed, cold applied, polymeric single component sealing compound.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

### **3.02 SURFACE PREPARATION**

- A. Prepare surfaces in accordance with manufacturers instructions.

### **3.03 APPLICATION**

- A. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-10.
- B. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
- C. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.

**END OF SECTION**



**SECTION 07 27 26  
FLUID-APPLIED MEMBRANE AIR BARRIERS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fluid-applied membrane air barriers.

**1.02 REFERENCE STANDARDS**

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-- Tension; 2016 (Reapproved 2021).
- B. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2020).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.
- F. ASTM E2357 - Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies; 2024.
- G. ASTM G154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials; 2016.
- H. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, and limitations.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Warranty Documentation: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

**1.04 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.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to project site in original packaging with seals unbroken and properly labeled.
- B. Store materials in their original undamaged packaging within clean, dry, and protected location at a temperature less than 90 degrees F (32 degrees C).

**1.06 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by materials manufacturer before, during, and after installation.
  - 1. Do not apply air barrier products when air or substrate temperatures are above 100 degrees F (38 degrees C) or below 20 degrees F (minus 6 degrees C).
  - 2. Allow wet substrates to dry prior to applying air barrier products.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Fluid-Applied Membrane Air Barrier:
  - 1. Dow: [www.dow.com/#sle](http://www.dow.com/#sle).
  - 2. W.R. Meadows, Inc.: [www.wrmeadows.com](http://www.wrmeadows.com).
  - 3. Carlisle Coatings & Waterproofing: [www.carlisle.com](http://www.carlisle.com).
  - 4. Prosoco: [www.prosoco.com](http://www.prosoco.com).
  - 5. Grace Construction Products: [www.graceconstruction.com](http://www.graceconstruction.com).
  - 6. TK Products: [www.tkproducts.com](http://www.tkproducts.com).
  - 7. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 FLUID-APPLIED MEMBRANE AIR BARRIER ASSEMBLY**

- A. Fluid-Applied Membrane Air Barrier: Single-component, vapor permeable, 100 percent silicone elastomeric air barrier.
  - 1. Dry Film Thickness (DFT): 15 mils, 0.015 inch (0.381 mm), minimum.
  - 2. Air Permeance: 0.004 cfm/sq ft (0.02 L/sec sq m) maximum leakage when tested at 1.57 psf (75 Pa) pressure difference in accordance with ASTM E2178.
  - 3. Vapor Permeance: 10 perms (574 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M using Desiccant Method at 73.4 degrees F (23 degrees C).
  - 4. Air Barrier Leakage: Not greater than 0.04 cfm/sq ft (0.2 L/sq m) of surface area at pressure of 1.57 psf (75 Pa) when tested in accordance with ASTM E2357.
  - 5. Ultraviolet (UV) Exposure: Rated for up to 5,000 hours of exposure in accordance with ASTM G154; not less than 12 months.
  - 6. Elongation: Greater than 600 percent, when tested in accordance with ASTM D412.
  - 7. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
  - 8. Fire Propagation Characteristics: Provide air barrier coatings and accessory materials that are tested for compliance with NFPA 285 when used within exterior wall assembly.
- B. Primer: Water-based silicone adhesion promoter.
- C. Preformed Transition Strips and Molded Corners: Semi-rigid silicone elastomer extrusion, tear resistant, with tapered edges; applied and adhered with sealant.
  - 1. Elongation: Greater than 400 percent, when tested in accordance with ASTM D412.
  - 2. Tensile Strength: Greater than 800 psi (5.5 MPa), when tested in accordance with ASTM D412.
  - 3. Tear Strength: Greater than 200 psi (16 kN/m), when tested in accordance with ASTM D624.

**2.03 ACCESSORIES**

- A. Thinners and Cleaners: As recommended by material manufacturer.
- B. Crack Fillers: Provide substrate manufacturer's recommended crack fillers or sealants compatible with air barrier assembly components and adjacent materials.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that surfaces and conditions are ready to accept work of this section.
- B. Verify that surfaces are clean, dry, and free of frost, dust, dirt, grease, oil, curing compounds, form release agents, laitance, efflorescence, mildew, excess alkalinity, and other conditions affecting performance of this work.

**3.02 PREPARATION**

- A. Protect work of other trades against damage from application of air barrier coatings.

- B. Protect adjacent surfaces not designated to receive air barrier coatings; provide protection for pedestrians, vehicles, landscaping, and surrounding areas to prevent contact with coating materials.
- C. Clean substrates to remove contaminants and foreign material by pressure cleaning, wire brushing, grinding or other method recommended by air barrier coatings manufacturer.
- D. Prepare substrates in accordance with air barrier coating manufacturer's written instructions.
- E. Repair deteriorated or damaged substrates, repair masonry joints, and fill cracks, voids, honeycombs, and other defects using materials as recommended by air barrier coating manufacturer, and allow patching materials to fully cure.
  - 1. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
  - 2. Fill cracks larger than 1/16 inch (1.6 mm) wide using applicable joint sealant, and fill cracks larger than 1 inch (25.4 mm) wide using joint sealant and compatible bond breaker where movement is expected.
- F. Primer: Apply primer to substrates where required based upon preinstallation testing and air barrier coating manufacturer's recommendations, using application methods and rate of application recommended by manufacturer; allow primer to fully dry prior to application of air barrier coating.

### 3.03 APPLICATION

- A. Apply air barrier system materials in accordance with manufacturer's instructions.
- B. Transition Strips and Silicone Sealants: Install with approved sealants in accordance with manufacturer's written instructions.
  - 1. Form sealed joints to windows, wall framing systems, door and louver frames, roofing system perimeters, and at interface with other adjacent materials utilizing compatible components that form air barrier assembly.
- C. Air Barrier Coating: Apply air barrier coating using application methods and rate of application recommended by manufacturer, using nap roller or airless sprayer, in accordance with requirements of authorities having jurisdiction (AHJ).
  - 1. Provide wet application not less than 30 mils, 0.030 inch (0.76 mm) thick, or more as required by substrate conditions, with dry film thickness (DFT) not less than 15 mils, 0.015 inch (0.38 mm) thick.

### 3.04 CLEANING

- A. During completion of this work, remove overspray and excess material, using materials and methods approved by manufacturer that will not damage adjacent materials.
- B. Clean and repair adjacent surfaces damaged by air barrier coating application.

### 3.05 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Allow air barrier coatings to fully cure before exposure to traffic or other construction operations.

**END OF SECTION**

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**SECTION 07 54 00  
THERMOPLASTIC MEMBRANE ROOFING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Adhered system with thermoplastic roofing membrane.
- B. Insulation, flat.
- C. Deck sheathing.
- D. Cover boards.
- E. Flashings.

**1.02 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 C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
- D. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing; 2021.
- E. NRCA (RM) - The NRCA Roofing Manual; 2024.
- F. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.
  - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

**1.04 DESIGN CRITERIA**

- A. Wind Uplift Performance:
  - 1. Roof system is designed to withstand wind uplift forces as calculated using the current revision of ASCE-7.
  - 2. Roof system is designed to achieve 135-psf of uplift testing.
  - 3. Provide a 100 mph wind speed warranty.
- B. Fire Resistance Performance:
  - 1. Roof system will achieve a UL Class A rating when tested in accordance with UL-790.
  - 2. Thermal Performance: Roof system will achieve a minimum R-value not less than 25.
  - 3. Drainage: Provide a roof system with positive drainage where all standing water dissipates within 48 hours after precipitation ends.
- C. Building Codes:
  - 1. Roof system will meet the requirements of all federal, state and local code bodies having jurisdiction.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Submit drawings that indicate joint or termination detail conditions and conditions of interface with other materials.

- D. Samples for Verification: Submit two samples 4 by 4 inches (102 by 102 mm) in size illustrating actual product, color, and patterns.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. 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.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum twenty years of documented experience.
- B. Installer Qualifications:
  - 1. All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
  - 2. Installer must be capable of extending the Manufacturer's Labor and Materials guarantee.
  - 3. Installer must be capable of extending the Manufacturer's No Dollar Limit guarantee.

#### **1.07 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.
- C. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- D. Safety Data Sheets (SDS) must be on location at all times during the transportation, storage and application of materials.
- E. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- F. Protect foam insulation from direct exposure to sunlight.

#### **1.08 FIELD CONDITIONS**

- A. Do not apply roofing membrane during unsuitable weather.
- B. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
- C. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- D. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- E. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- F. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- G. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- H. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

- I. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

### 1.09 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. 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.
  1. Warranty Term: 30 year, 100 MPH Total System
  2. For repair and replacement include costs of both material and labor in warranty.
  3. Coverage is to be extended to include roof edge metal water tightness in accordance with terms stated in the Warranty document.
  4. Accidental Puncture Coverage: 16 man-hours per year
  5. Hail coverage: 2" diameter hail
- C. The Contractor (Roofing System Installer) shall warrant the materials and workmanship of the roofing system against leakage and defects due to faulty materials, workmanship and contract negligence for a period of two (2) years following acceptance of the project by the Owner.
- D. The Roofing System Manufacturer shall inspect the installation and warrant the materials and workmanship of the roofing system against leakage for a minimum period of thirty (30) years following acceptance of the project by the Owner.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Thermoplastic Polyolefin (TPO) Membrane Roofing Materials:
  1. Basis of Design: Carlisle SynTec Systems; FleeceBACK Fully Adhered TPO: [www.carlisle-syntec.com/#sle](http://www.carlisle-syntec.com/#sle).
  2. GAF: [www.gaf.com/#sle](http://www.gaf.com/#sle).
  3. GenFlex Roofing Systems, LLC: [www.genflex.com/#sle](http://www.genflex.com/#sle).
  4. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
  5. Mule-Hide Products Co, Inc: [www.mulehide.com/#sle](http://www.mulehide.com/#sle).
  6. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.02 MEMBRANE ROOFING AND ASSOCIATED MATERIALS

- A. Membrane Roofing Materials:
  1. TPO membrane with a 55-mil fleece bonded to the underside.
    - a. Basis of Design: Carlisle SynTec Systems; Sure-Weld FleeceBACK Fully Adhered TPO: [www.carlisesyntec.com](http://www.carlisesyntec.com)
  2. Color: White.
  3. Membrane Thickness: 135 mil nominal / 80 mil over fleece.
  4. Sheet Dimensions:
    - a. Width: 12 feet (3.66 m) maximum.
    - b. Length: 100 feet (30.5 m) maximum.
  5. Performance:
    - a. Breaking Strength: FB 100 - 300 lbf (1.3 kN) minimum / FB 115 - 400 (1.8 kN) minimum.
    - b. Tear Strength: 55 lbf/in (245 N/m ) minimum.
    - c. Elongation: 25 percent.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Flexible Flashing Material: Same material as membrane.

### 2.03 DECK SHEATHING

- A. Parapet sheathing (roof side): Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 5/8 inch (16 mm) thick.
  1. Basis of Design: Georgia-Pacific;DensDeck Prime: [www.densdeck.com](http://www.densdeck.com).

**2.04 COVER BOARDS**

- A. Cover Boards: Water-resistant and silicone treated gypsum panel with embedded fiberglass facer on both sides, and pre-primed one side..
  - 1. Thickness: 5/8 inch (15.9 mm).
    - a. Basis of Design: Georgia-Pacific; DensDeck Prime: [www.densdeck.com](http://www.densdeck.com)..

**2.05 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 2 - Faced with coated glass fiber mat facers on both major surfaces of the core foam.
      - 2) Compressive Strength: Classes 1-2-3, Grade 2, 20 psi (138 kPa), minimum.
      - 3) Density: 2 lb per cubic foot (24 kg/cu m) minimum.
  - 2. Board Size: 48 by 48 inches (1220 by 1220 mm).
  - 3. Board Thickness: As required to achieve R25 total.
  - 4. Basis of Design: Carlisle SynTec Systems; SecurShield Polyiso: [www.carlisesyntec.com](http://www.carlisesyntec.com)

**2.06 ACCESSORIES**

- A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- B. Membrane Flashing, Pre-molded Corner Flashing, & Joint Covers: As recommended by membrane manufacturer. Color to match membrane.
- C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
- D. Membrane Adhesive: As recommended by membrane manufacturer.
- E. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
- F. Insulation Adhesive: As recommended by insulation manufacturer.

**PART 3 EXECUTION****3.01 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 nailing strips and reglets are in place.

**3.02 PREPARATION - WOOD DECK**

- A. Verify flatness and tightness of joints in wood decking; fill knot holes with latex filler.
- B. Clean surfaces thoroughly prior to installation.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- D. Do not commence work until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment.

**3.03 INSTALLATION, GENERAL**

- A. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.
- B. Do not apply roofing membrane during cold or wet weather conditions.



- C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- 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.

### 3.04 INSTALLATION - INSULATION, UNDER MEMBRANE

- A. Insulation - System Design
  - 1. Base Layer:
    - a. Type: Shield Polyiso.
    - b. Size: 4'x4'
    - c. Thickness: 2.2 inches.
    - d. Attachment Method: Polyurethane Adhesive Ribbons 4"oc in the field and 4"oc in the perimeter and corner or as required to achieve uplift requirements and manufacturer's system warranty.
  - 2. Top Layer:
    - a. Type: Polyiso.
    - b. Size: 4'x4'
    - c. Thickness: 2.2 inches.
    - d. Attachment Method: Polyurethane Adhesive Ribbons 4"oc in the field and 4"oc in the perimeter and corner or as required to achieve uplift requirements and manufacturer's system warranty.
  - 3. Coverboard:
    - a. Type: Gypsum core with embedded facers.
    - b. Size: 4'x4'
    - c. Thickness: 5/8 inches.
    - d. Attachment Method: Polyurethane Adhesive Ribbons 4"oc in the field and 4"oc in the perimeter and corner or as required to achieve uplift requirements and manufacturer's system warranty.
- B. Insulation Placement
  - 1. Install insulation or membrane underlayment in multiple layers over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch (6 mm). Stagger joints both horizontally and vertically if multiple layers are provided.
  - 2. Secure insulation to the substrate with the required mechanical fasteners or insulation adhesive in accordance with the manufacturer's current application guidelines.
  - 3. Do not install wet, damaged or warped insulation boards.
  - 4. Stagger joints in one direction unless joints are to be taped. Install insulation boards snug. Gaps between board joints shall not exceed 1/4 inch (6 mm). Fill all gaps in excess of 1/4 inch (6 mm) with same insulation material.
  - 5. Wood nailers must be at least 3 1/2 inches (89 mm) wide or 1 inch (25 mm) wider than adjacent metal flange. Thickness must equal that of insulation but not less than 1 inch (25 mm) thickness.
  - 6. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.
  - 7. Do not install any more insulation than will be completely waterproofed each day.
- C. Insulation and Coverboard Attachment
  - 1. Install insulation layers, maximum 4 feet by 4 feet (1220 mm by 1220 mm), applied with polyurethane adhesive, coverage rate as necessary to achieve the specified attachment and uplift rating. Press each board firmly into place after adhesive develops strings when touched, typically 1-1/2 to 2 minutes after adhesive was applied, and roll with a weighted roller. Add temporary weight and use relief cuts to ensure boards are well adhered. Stagger the joints of additional layers by a minimum of 6 inches (152 mm).

- D. Do not install more insulation than can be covered with membrane in same day.

### 3.05 INSULATION AND COVERBOARD ATTACHMENT

- A. Install insulation layers, maximum 4 feet by 4 feet (1220 mm by 1220 mm), applied with adhesive, coverage rate as necessary to achieve the specified attachment and uplift rating. Press each board firmly into place after adhesive develops strings when touched, typically 1-1/2 to 2 minutes after adhesive was applied, and roll with a weighted roller. Add temporary weight and use relief cuts to ensure boards are well adhered. Stagger the joints of additional layers by a minimum of 6 inches (152 mm).

### 3.06 INSTALLATION - PARAPET MEMBRANE PLACEMENT AND ATTACHMENT

- A. Position the roofing membrane over the acceptable substrate. Fold membrane sheet back lengthwise so half the underside of the membrane is exposed.
- B. Apply approved Bonding Adhesive in accordance with the manufacturer's published instructions, to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be hot air welded over the adjoining sheet. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
  - 1. Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.
  - 2. Fold back the unbonded half of the sheet lengthwise and repeat the bonding procedures.
- C. Position adjoining sheets to allow a minimum overlap of 2 inches.
- D. Hot-air weld the roofing membrane sheets using the Automatic Hot Air Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's hot air welding procedures. Provide a test weld sample made from a piece of scrap TPO to eliminate the need to remove a section from a completed seam. At all splice intersections, roll the seam with a silicone roller to ensure a continuous hot air welded seam.
- E. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches and complete the bonding procedures as stated previously.

### 3.07 INSTALLATION - MEMBRANE PLACEMENT AND ATTACHMENT

- A. Position and unroll successive sheets and align to provide for a minimum 3 inch (76 mm) wide splice.
- B. Fold adjacent sheets in half lengthwise to expose an approximate 12 foot (3657 mm) wide substrate area.
- C. Membrane which will have the adjacent sheet spliced over it should be adhered to the substrate first. In this fashion, selvage edge splice area will not be contaminated by setting splice edge into the adhesive.
- D. Spray or extrude polyurethane adhesive at 4"oc ribbons onto the substrate and allow to foam up approximately 1/8 inch (3 mm). Wait for the adhesive to achieve "string" when a small object is lifted out of the adhesive.
- E. Place the membrane into adhesive after adhesive develops strings when touched, typically 1-1/2 to 2 minutes after adhesive was applied and roll with a weighted roller. Add temporary weight and use relief cuts to ensure boards are well adhered.
- F. Apply polyurethane adhesive at 4"oc ribbons to the substrate and continue process described above until all sheets are fully bonded, allowing for necessary splice overlaps at selvage edges. At end laps (along the width of the sheet) membrane shall be butted together which will be overlaid with 6 inch wide Sure-Weld Reinforced Membrane hot air welded along all edges. Pressure-Sensitive Cover strip is not permitted in this situation.

### 3.08 SEAM WELDING

- A. Hot-air weld membrane using an Automatic Hot Air Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's current guidelines. At all splice intersections, roll the seam with a silicone roller to ensure a continuous hot air welded seam.

- B. When utilizing membrane greater than 45-mil thickness, overlay all splice intersections with a T-Joint Cover per roofing manufacturer.
- C. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes).
- D. Repair all seam deficiencies the same day they are discovered.
- E. Apply Cut Edge Sealant on all cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete. Cut Edge Sealant is not required on vertical splices.

### **3.09 FLASHING**

- A. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using reinforced membrane or prefabricated accessories approved per roofing manufacturer. As approved by roofing manufacturer a non-reinforced membrane may be used for flashing pipe penetrations, Sealant Pockets, and scuppers, as well as inside and outside corners, when the use of pre-molded or prefabricated accessories is not feasible.
- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

### **3.10 CLEANING**

- A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

### **3.11 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**

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**SECTION 07 62 00  
SHEET METAL FLASHING AND TRIM****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings and counterflashings and other items indicated.
- B. Sealants for joints within sheet metal fabrications.

**1.02 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); 2022.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- D. CDA A4050 - Copper in Architecture - Handbook; current edition.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.03 ADMINISTRATIVE REQUIREMENTS**

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

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples 12 inch (300 mm) in size illustrating metal finish color.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

**PART 2 PRODUCTS****2.01 SHEET MATERIALS**

- A. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 0.040 inch (1.0 mm) thick; plain finish shop pre-coated with fluoropolymer coating.
  - 1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; pretreated metal with two-coat system including primer and color coat with at least 70 percent PVDF coating.
  - 2. Color: As selected by Architect from manufacturer's full range of colors.

**2.02 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 (13 mm); 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 (450 mm) long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

### **2.03 ACCESSORIES**

- A. Primer Type: Zinc chromate.
- B. Concealed Sealants: Non-curing butyl sealant.
- C. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- D. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

## **PART 3 EXECUTION**

### **3.01 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.

### **3.02 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 (0.38 mm).

### **3.03 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.
- D. Seal metal joints watertight.

**END OF SECTION**

**SECTION 07 65 23  
EPDM THROUGH-WALL FLASHING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. EPDM through-wall flashing and accessory products.
- B. Materials and installation methods for EPDM through-wall flashing assemblies as indicated on drawings.
- C. Through-wall flashing and accessories for installation in cavity wall construction in the following locations:
  - 1. Wall bases.
  - 2. Window sills.
  - 3. Heads of openings.
  - 4. Shelf angles.
  - 5. Above projections.
  - 6. At other discontinuities in the cavity.

**1.02 REFERENCE STANDARDS**

- A. ASTM D 412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
- B. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials.
- C. ASTM D 746 Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
- D. ASTM D 624 Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- E. ASTM D 741 Methods of Measuring Dimensions of Rigid Rods Used in Electrical Insulation
- F. ASTM D 4637 Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane
- G. ASTM D 1149 Standard Test Method for Rubber Deterioration-Surface Ozone Cracking in a Chamber

**1.03 SUBMITTALS**

- A. Provide in accordance with Section 01 30 00 - Administrative Requirements.
- B. Shop drawings showing locations of through-wall flashing and details of all typical conditions.
- C. Manufacturer's technical data sheets and material safety data sheets for Product and Accessories.
- D. Manufacturer's installation instructions.
- E. Manufacturer's documentation of volatile organic compounds (VOC) content Product and Accessories.
- F. Certification of compatibility by Manufacturer, listing all materials on the Project with which the Product and Accessories may come into contact.
- G. Samples of through-wall flashing minimum 6 inch by 6 inch size.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Installer shall be experienced in applying the same or similar materials and shall be specifically approved in writing by Manufacturer.
- B. Single-Source Responsibility: Obtain Product and Accessories from single manufacturer.
- C. Product and Accessories shall comply with all state and local regulations controlling use of volatile organic compounds (VOCs ).
- D. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed Product unless it has been inspected, tested and approved.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, lot number and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by Manufacturer.
- C. Protect stored materials from direct sunlight.
- D. Avoid spillage. Immediately notify Architect if spillage occurs and start clean up procedures. Clean spills and leave area as it was prior to spill.

**1.06 WASTE MANAGEMENT AND DISPOSAL**

- A. Place materials defined as hazardous or toxic waste in designated containers.
- B. Ensure emptied containers are stored safely for disposal away from children.

**1.07 PROJECT CONDITIONS**

- A. Applicator shall have full, safe access to area.
- B. Apply Product and Accessories within temperature ranges indicated in Manufacturer's literature.

**1.08 WARRANTIES**

- A. Provide the Manufacturer's minimum five year material warranty.

**PART 2 PRODUCTS****2.01 MANUFACTURER**

- A. Carlisle Coatings & Waterproofing, Incorporated: [www.carlisle-ccw.com](http://www.carlisle-ccw.com).
  - 1. Basis of Design or approved substitution.
- B. Hohmann & Barnard, Inc.: [www.h-b.com](http://www.h-b.com).
- C. Heckman Building Products, Inc.: [www.heckmanbuildingproducts.com](http://www.heckmanbuildingproducts.com).
- D. Wire-bond: [www.wirebond.com](http://www.wirebond.com).
- E. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 PERFORMANCE REQUIREMENTS**

- A. Provide a membrane constructed to perform as a through-wall flashing durably integrated with the wall assemblies water resistive barrier and cavity drainage system. The installed through-wall flashing shall perform as a liquid water drainage plane to discharge incidental condensation or water penetration to the exterior through the cavity drainage system.
- B. Provide a water proof EPDM membrane through-wall flashing of minimum 0.040 inch (40 mils) thickness consisting of cured, dimensionally-stable, non-reinforced EPDM with talc removed from surfaces. It shall meet the following requirements:
  - 1. Tensile Strength: Not less than 1,600 psi, ASTM D 412.
  - 2. Tensile Elongation: Not less than 500 percent, ASTM D 412.
  - 3. Brittleness Temperature: Not more than minus 65 degrees F, ASTM D 746.
  - 4. Tear Resistance: Not less than 200 lbf, ASTM D 624, Die C.
  - 5. Resistance to Water: Not more 2 percent volume change after 7 days immersion at 158 degrees F, ASTM D 741.
  - 6. Water Vapor Permeance: Not more than 0.06 Perm, ASTM E-96, Method B.
  - 7. Resistance to UV: No cracks, ASTM D 4637.
  - 8. Ozone Resistance: No cracks, ASTM D 1149.
- C. Product: Carlisle Pre-Kleened EPDM Thru-Wall Flashing or approved substitution.

**2.03 ACCESSORIES**

- A. Basis of Design by Carlisle Coatings & Waterproofing, Incorporated or approved substitution.
  - 1. Splice Tape: SURE-SEAL™ SecurTape or equal by manufacturer.
  - 2. Splice Compound: SURE-SEAL™ In-Seam Sealant or equal by manufacturer.
  - 3. Splice Tape Primer: SURE-SEAL™ HP 250 Primer or equal by manufacturer.



4. Splice Cleaner: Per manufacturer.
5. Bonding Adhesive: Water-based : SURE-SEAL™ Aqua Base 120 or equal by manufacturer.
6. Corners: Formed pre-manufactured Inside/Outside Corners.
7. Lap Sealant: SURE-SEAL™ Lap Sealant or equal by manufacturer.
8. Termination Bar: SURE-SEAL™ Termination Bar or equal by manufacturer.
9. Mastic: SURE-SEAL™ Water Cutoff Mastic or equal by manufacturer.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Apply Product and Accessories according to Manufacturer's instructions and drawings.
- B. Apply Product to sound substrate. Do not apply over mechanically-attached water resistive barrier such as felt, paper or house wrap.
- C. Adhere, fasten or cast in place vertical termination of Product according to Manufacturer's instructions and drawings.
- D. Form watertight splices between neighboring pieces of Product using Splice Tape or Splice Compound, according to instructions in Manufacturer's literature.
- E. Install Product with kick-out at flat pitch, or preferably sloped to provide drainage to the exterior. Surfaces shall not be oriented so that water can pond on the through-wall flashing

#### **3.02 SCHEDULE**

- A. Install Product during or after construction of back-up wall.
- B. Install Product before or during installation of brick veneer.
- C. Lap water resistive barrier over vertical termination of Product on back-up wall. Lap and secure water resistive barrier according to water resistive barrier manufacturer's instructions and drawings.
- D. Integrate Product with adhered membrane air barrier, damp proofing or water-resistive barrier on back-up wall according to Manufacturer's instructions and drawings.

#### **3.03 REPAIR AND PROTECTION**

- A. Protect Product from damage during application and remainder of construction period.
- B. Inspect before covering and make repairs as necessary. Remove and replace damaged material.

**END OF SECTION**

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**SECTION 07 71 00  
ROOF SPECIALTIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Roof specialties, including copings and reglets.

**1.02 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); 2022.
- 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; 2024.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - 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. Samples: Submit two appropriately sized samples of reglets, coping.
- E. Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

**1.04 WARRANTY**

- A. Standard Warranty: Warranted materials shall be free of defects in material and workmanship for five years after shipment.
- B. 30-Year Excel Warranty: Manufacturer shall guarantee that a standard size roof edge and coping system, when installed per manufacturer's instructions, will not blow off, leak, or cause membrane failure in wind conditions up to 110 mph.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Roof Edge Flashings, Copings and Reglets:
  - 1. Architectural Products Co: [www.archprod.com](http://www.archprod.com).
  - 2. W.P. Hickman Company: [www.wph.com](http://www.wph.com).
  - 3. Metal-Era Inc: [www.metalera.com](http://www.metalera.com).
  - 4. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
  - 5. Metal Roofing Systems, Inc.: [www.metalroofingsystems.com](http://www.metalroofingsystems.com).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 COMPONENTS**

- A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
  - 1. Fabricated to sizes required; mitered, welded corners; concealed fasteners.
  - 2. Profile: As indicated on plans.
  - 3. 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.
  - 4. Material: Formed aluminum sheet, 0.050 inch (1.3 mm) thick, minimum.
  - 5. Finish: 70 percent polyvinylidene fluoride.
  - 6. Color: To be selected by Architect from manufacturer's full range.
  - 7. Performance Characteristics. Provide products conforming to the following.

- a. Fascia shall consist of continuous anchor cleat and an exterior pre-finished fascia of size and profile as indicated on the drawings.
  - b. Vertical face leg height: Standard 4" (100 mm) nominal unless indicated otherwise on plans.
  - c. Anchor cleat: Continuous - standard 10'-0" (3048 mm) length of commercial type G90 galvanized steel.
  - d. Fasteners: Stainless steel 1-1/2" ring shank nails as provided by the fabricator. No exposed fasteners permitted.
8. Accessories.
- a. Provide matching accessories as required and as detailed.
- B. Copings.
1. Fabricated to sizes required; mitered, welded corners; concealed fasteners.
  2. Configuration: Concealed hold down cleat at both legs; internal splice piece at joints of same material, thickness and finish as cap; concealed stainless steel fasteners.
  3. Wall Width: As indicated on drawings.
  4. Outside Face Height: As indicated on drawings.
  5. Inside Face Height: As indicated on drawings.
  6. Profile: As indicated on plans.
  7. Material: Formed aluminum sheet, 0.050 inch (1.3 mm) thick, minimum.
  8. Finish: 70 percent polyvinylidene fluoride.
  9. Color: To be selected by Architect from manufacturer's full range.
  10. Performance characteristics: Provide products conforming to the following.
    - a. Coping sections shall expand and contract freely while mechanically locked in place on continuous anchor cleats.
    - b. Coping sections shall lock to anchor cleats by mechanical pressure from support chairs.
    - c. All coping cover joints shall be underlaid with gutter/support chairs capable of draining water.
    - d. Length: Minimum of 10'-0" (3048 mm) by width as shown on details.
    - e. Vertical face and back leg heights: Standard 4" (100 mm) nominal unless indicated otherwise on plans.
    - f. Internal splice plates: Concealed with matching finish to maintain outside face continuity.
    - g. Coping Cleat: 20 gauge galvanized steel anchor cleat; 12" (305 mm) wide at 3'-0" on center - mechanically fastened.
    - h. Gutter/support chair: Metal Gutter Chair in color and finish to match coping cap.
    - i. Fasteners: Stainless steel screw type with a minimum pull-out resistance of 240# (109 kg) as supplied by the manufacturer per substrate application. No exposed fasteners shall be permitted.
  11. Accessories.
    - a. Corners, end caps, custom pieces as indicated and as required shall be shop fabricated.
    - b. All corners shall be shop mitred, seamed and made watertight.
- C. Reglets - Masonry.
1. Performance characteristics: Provide products conforming to the following.
    - a. Masonry reglet shall consist of a two piece system comprising a formed reglet and formed counterflashing.
    - b. Metal - Reglet: .050 Aluminum (minimum).
      - 1) Copper at all copper roof locations.
    - c. Metal - Counterflashing: .040 Aluminum (minimum).
    - d. Fasteners: Type, material and spacing per manufacturer. No exposed fasteners permitted.
    - e. Finish: Pre-coat Kynar 500.
    - f. Color: As selected by Architect from manufacturer's full range.
  2. Accessories: Provide matching end caps, inside and outside corners per project conditions.
  3. Product: (Basis of Design or approved substitution).
    - a. W.P. Hickman Company; Drive-Lock In Wall Counter Flashing: [www.wph.com](http://www.wph.com).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

- D. Reglets - Surface Mounted.
1. Performance characteristics: Provide products conforming to the following.
    - a. Surface mounted reglet shall consist of a two piece system comprising a formed reglet and formed counterflashing.
    - b. Metal - Reglet: .050 Aluminum (minimum).
      - 1) Copper at all copper roof locations.
    - c. Metal - Counterflashing: .040 Aluminum (minimum).
    - d. Fasteners: Type, material and spacing per manufacturer.
    - e. Finish: Pre-coat Kynar 500.
    - f. Color: As selected by Architect from manufacturer's full range.
  2. Accessories: Provide matching end caps, inside and outside corners per project conditions.
  3. Product: (Basis of Design or approved substitution).
    - a. W.P. Hickman Company; Drive-Lock To Wall Counter Flashing: [www.wph.com](http://www.wph.com).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.03 FINISHES

- A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

### 2.04 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.
- C. Custom fabricated joints and covers as required by project conditions and as noted on plans.

### 2.05 PRODUCT HANDLING

- A. All materials shall be delivered in the manufacturer's original sealed, labeled containers.
- B. Store materials in a dry, protected, well-vented area. The contractor shall report damaged material immediately to the delivering carrier and note such damage on the carrier's freight bill of lading.
- C. Remove protective plastic surface film (where applicable) immediately after installation.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.
- B. Verify that other trades with related work are complete before installation.
- C. Mounting surfaces shall be straight and secure; substrates shall be of proper width.
- D. Refer to the construction documents, shop drawings and manufacturer's installation instructions.
- E. Coordinate installation with roof membrane manufacturer's instructions before starting.

### 3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Seal joints within components when required by component manufacturer.
- C. Anchor components securely.
- D. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- E. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.
- F. Coordinate installation of flashing flanges into reglets.

### END OF SECTION

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**SECTION 07 71 23  
MANUFACTURED GUTTERS AND DOWNSPOUTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Pre-finished aluminum gutters and downspouts.
- B. Precast concrete splash pads.

**1.02 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); 2022.
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- C. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.03 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.
- C. Maintain one copy of each document on site.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- C. Samples: Submit two samples, \_\_\_\_ inch (\_\_\_\_ mm) long illustrating component design, finish, color, and configuration.

**1.05 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****2.01 MATERIALS**

- A. Pre-Finished Aluminum Sheet: ASTM B209/B209M; 0.50 inch (1.27 mm) thick.
  - 1. Finish: Plain, shop pre-coated with polyvinylidene fluoride (PVDF) coating.
  - 2. Color: As selected by Architect from manufacturer's full range..

**2.02 COMPONENTS**

- A. Gutters: Profile as indicated on drawings, contemporary profile when not indicated.
- B. Downspouts: Profile as indicated on drawings - smooth, size as indicated on drawings.
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
  - 1. Anchoring Devices: Type recommended by fabricator.
  - 2. Gutter Supports: Brackets.
  - 3. Downspout Supports: Brackets.
- D. Fasteners: Stainless steel.

**2.03 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. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

**2.04 FINISHES**

- A. Fluoropolymer Coating: Superior Performance Organic Finish, AAMA 2605, multiple coat, thermally cured fluoropolymer finish system; color as indicated.

**2.05 ACCESSORIES**

- A. Splash Pads: Precast concrete type, profiles size(s) as indicated; minimum 3,000 psi (21 MPa) compressive strength at 28 days, with minimum 5 percent air entrainment.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

**3.02 PREPARATION**

- A. Paint concealed sheet metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch (0.381 mm).

**3.03 INSTALLATION**

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Slope gutters 1/2" maximum per 40 feet.
- D. Set splash pans under downspouts.

**END OF SECTION**



**SECTION 07 84 00  
FIRESTOPPING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

**1.02 REFERENCE STANDARDS**

- A. ITS (DIR) - Directory of Listed Products; Current Edition.
- B. FM 4991 - Approval Standard of Firestop Contractors; 2013.
- C. FM (AG) - FM Approval Guide; Current Edition.
- D. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).
- E. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

**1.04 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
  - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at [www.icc-es.org](http://www.icc-es.org) will be considered as constituting an acceptable test report.
  - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
  - 1. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
  - 2. Verification of minimum three years documented experience installing work of this type.
  - 3. Verification of at least five satisfactorily completed projects of comparable size and type.
  - 4. Licensed by local authorities having jurisdiction (AHJ).

**1.05 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

**PART 2 PRODUCTS****2.01 MATERIALS**

- A. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- B. Fire Ratings: Refer to drawings for required systems and ratings.

**2.02 FIRESTOPPING SYSTEMS**

- A. Firestopping at Uninsulated Metallic Pipe and Conduit Penetrations, of diameter 4 inches (100 mm) or less: Caulk or putty.
- B. Firestopping at Combustible Pipe and Conduit Penetrations, of diameter 4 inches (100 mm) or less: Any material meeting requirements.
- C. Firestopping at Cable Tray Penetrations: Any material meeting requirements.
- D. Firestopping at Cable Penetrations, not in Conduit or Cable Tray: Caulk or putty.

**2.03 MATERIALS**

- A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant; conforming to the following:
  - 1. Elongation: 600 percent.
  - 2. Adhesion and Bond To Substrate: 25 psi (172 kPa).
  - 3. Density: 85 lb/cu ft (1370 kg/cu m).
  - 4. Durability and Longevity: Permanent.
  - 5. Color: Gray or red.
  - 6. Manufacturers:
    - a. A/D Fire Protection Systems Inc: [www.adfire.com](http://www.adfire.com).
    - b. 3M Fire Protection Products: [www.3m.com/firestop](http://www.3m.com/firestop).
    - c. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
    - d. Specified Technologies, Inc: [www.stifirestop.com](http://www.stifirestop.com).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Foam Firestopping: Multiple component silicone foam compound; conforming to the following:
  - 1. Density: 18-25 lb/cu ft (288-400 kg/cu m).
  - 2. Durability and Longevity: Permanent.
  - 3. Color: Dark grey.
  - 4. Manufacturers:
    - a. 3M Fire Protection Products: [www.3m.com/firestop](http://www.3m.com/firestop).
    - b. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
    - c. Specified Technologies, Inc: [www.stifirestop.com](http://www.stifirestop.com).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers; conforming to the following:
  - 1. Density: 6-8 lb/cu ft (96-128 kg/cu m).
  - 2. Durability and Longevity: Permanent.
  - 3. Color: Black.
  - 4. Manufacturers:
    - a. A/D Fire Protection Systems Inc: [www.adfire.com](http://www.adfire.com).
    - b. Hilti, Inc.: [www.us.hilti.com](http://www.us.hilti.com).
    - c. Thermafiber, Inc.: [www.thermafiber.com](http://www.thermafiber.com).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
- E. Fiber Firestopping: Mineral fiber insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening; conforming to the following:
  - 1. Durability and Longevity: Permanent.

2. Manufacturers:
  - a. A/D Fire Protection Systems Inc: [www.adfire.com](http://www.adfire.com).
  - b. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - c. Thermafiber, Inc: [www.thermafiber.com](http://www.thermafiber.com).
  - d. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Firestop Devices - Wrap Type: Mechanical device with incombustible filler and sheet stainless steel jacket, intended to be installed after penetrating item has been installed; conforming to the following:
  1. Durability and Longevity: Permanent ; suitable for pedestrian traffic.
  2. Manufacturers:
    - a. RectorSeal: [www.rectorseal.com](http://www.rectorseal.com).
    - b. 3M Fire Protection Products: [www.3m.com/firestop](http://www.3m.com/firestop).
    - c. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
    - d. Specified Technologies, Inc: [www.stifirestop.com](http://www.stifirestop.com).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- G. Intumescent Putty: Compound that expands on exposure to surface heat gain; conforming to the following:
  1. Potential Expansion: Minimum 1000 percent.
  2. Durability and Longevity: Permanent.
  3. Color: Black, dark gray, or red.
  4. Manufacturers:
    - a. RectorSeal: [www.rectorseal.com](http://www.rectorseal.com).
    - b. 3M Fire Protection Products: [www.3m.com/firestop](http://www.3m.com/firestop).
    - c. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
    - d. Specified Technologies, Inc: [www.stifirestop.com](http://www.stifirestop.com).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Reusable Firestopping: Removable intumescent compressible shapes, pillows, or blocks specifically tested in removable configuration; conforming to the following:
  1. Density: 24.9 lb/cu ft (399 kg/cu m).
  2. Durability and Longevity: Permanent.
  3. Manufacturers:
    - a. RectorSeal: [www.rectorseal.com](http://www.rectorseal.com).
    - b. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
    - c. Nelson FireStop Products: [www.nelsonfirestop.com](http://www.nelsonfirestop.com).
    - d. Specified Technologies, Inc: [www.stifirestop.com](http://www.stifirestop.com).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

### **3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

**3.04 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

**3.05 PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**

**SECTION 07 92 00  
JOINT SEALANTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).
- B. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).
- C. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2022.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.
- G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  - 2. List of backing materials approved for use with the specific product.
  - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  - 4. Substrates the product should not be used on.
  - 5. Substrates for which use of primer is required.
  - 6. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
  - 7. Sample product warranty.
  - 8. Certification by manufacturer indicating that product complies with specification requirements.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Nonsag Sealants:
  - 1. Adhesives Technology Corporation: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
  - 2. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).

3. Dow: [www.dow.com/#sle](http://www.dow.com/#sle).
4. Henry Company: [www.henry.com/#sle](http://www.henry.com/#sle).
5. Hilti, Inc: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
6. Momentive Performance Materials, Inc (formerly GE Silicones): [www.momentive.com/#sle](http://www.momentive.com/#sle).
7. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
8. Sika Corporation: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).
9. Specified Technologies Inc: [www.stifirestop.com/#sle](http://www.stifirestop.com/#sle).
10. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
11. W.R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
12. Substitutions: See Section 01 60 00 - Product Requirements.

B. Self-Leveling Sealants:

1. Adhesives Technology Corporation: [www.atcepoxy.com/#sle](http://www.atcepoxy.com/#sle).
2. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
3. Dow: [www.dow.com/#sle](http://www.dow.com/#sle).
4. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
5. Sika Corporation: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).
6. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
7. W.R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
8. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 JOINT SEALANT APPLICATIONS

A. Scope:

1. Exterior Joints:
  - a. Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed.
  - b. Seal the following joints:
  - c. Exterior joints to be sealed included, but are not limited to:
    - 1) Wall expansion and control joints.
    - 2) Joints between doors, windows, and other frames or adjacent construction.
    - 3) Joints between different exposed materials.
    - 4) Openings below ledge angles in masonry..
2. Interior Joints:
  - a. Do not seal interior joints unless specifically indicated to be sealed.
  - b. Interior joints to be sealed include, but are not limited to, the following items:
    - 1) Joints between door frames and window frames and adjacent construction.
    - 2) In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping penetrations, and other openings.
      - (a) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated.
    - 3) In sound-rated wall and ceiling assemblies, seal joints between wall assemblies and ceiling assemblies; between wall assemblies and other construction; between ceiling assemblies and other construction.
      - (a) Exception: Such gaps and openings in gypsum board finished stud walls and suspended ceilings.
3. Do Not Seal:
  - a. Intentional weep holes in masonry.
  - b. Joints indicated to be covered with manufactured expansion joint cover assemblies or other sealing devices.
  - c. Joints where sealant is specified to be furnished and installed by manufacturer of product to be sealed.
  - d. Joints where sealant installation is specified in other sections.
  - e. Joints between suspended ceilings and walls.

B. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.

2. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
- C. Interior Wet Areas: Bathrooms and restrooms; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.
- D. Sound-Rated Assemblies: Walls and ceilings identified as STC-rated, sound-rated, or acoustical.

### **2.03 JOINT SEALANTS - GENERAL**

- A. Colors: As selected by Architect from manufacturer's full range.

### **2.04 NONSAG JOINT SEALANTS**

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
  1. Movement Capability: Plus and minus \_\_\_\_ percent, minimum.
  2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
  3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
  4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
  5. Color: To be selected by Architect from manufacturer's full range.
- B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
  1. Color: White.
- C. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
  1. Movement Capability: Plus and minus 25 percent, minimum.
  2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  3. Color: To be selected by Architect from manufacturer's full range.
- D. Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
  1. Movement Capability: Plus and minus 25 percent, minimum.
  2. Color: To be selected by Architect from manufacturer's full range.
- E. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
  1. Color: To be selected by Architect from manufacturer's full range.
  2. Grade: ASTM C834; Grade - NF.

### **2.05 SELF-LEVELING JOINT SEALANTS**

- A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
  1. Movement Capability: Plus and minus 25 percent, minimum.
  2. Color: Gray.

### **2.06 ACCESSORIES**

- A. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- B. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- C. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- D. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that joints are ready to receive work.

- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

**3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

**3.03 INSTALLATION**

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Install acoustical sealant application work in accordance with ASTM C919.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

**END OF SECTION**



**SECTION 08 11 13  
HOLLOW METAL DOORS AND FRAMES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Hurricane-resistant hollow metal doors and frames.
- F. Hollow metal borrowed lites glazing frames.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames; 2019.
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2024.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- F. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- H. 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; 2023, with Editorial Revision.
- I. 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; 2023.
- J. 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).
- K. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- L. FBC TAS 201 - Impact Test Procedures; Testing Application Standard; 1994.
- M. FBC TAS 202 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure; Testing Application Standard; 1994.
- N. FBC TAS 203 - Criteria for Testing Products Subject To Cyclic Wind Pressure Loading; Testing Application Standard; 1994.
- O. FLA (PAD) - Florida Building Code Online - Product Approval Directory; Current Edition.
- P. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- Q. ITS (DIR) - Directory of Listed Products; Current Edition.
- R. Miami (APD) - Approved Products Directory; Miami-Dade County; Current Edition.
- S. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- T. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- U. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.

- V. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- W. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- X. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- Y. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.
- Z. UL (DIR) - Online Certifications Directory; Current Edition.
- AA. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- BB. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

### **1.03 SUBMITTALS**

- A. See Section 01 30 00 - 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 standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Samples: Submit two samples of metal, 2 by 2 inches (51 by 51 mm) in size, showing factory finishes, colors, and surface texture.
- E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.

### **1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Maintain at project site copies of reference standards relating to installation of products specified.

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

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.
- C. Doors and frames must be properly marked with door opening mark number to correspond with the schedule.
- D. Deliver all steel doors with corrugated edge protection and palletized to provide protection during transit and job storage.
- E. Inspect doors and frames upon delivery for damage. Minor damage is to be repaired, provided the repair is equal to new work and acceptable to the architect.
- F. Store doors and frames at the job site under cover. Place units on wood sills on the floor in a manner that will prevent rust and damage. Avoid the use of non-vented plastic or canvas shelters, which could create a humidity chamber. If the wrapper on the door becomes wet, remove the carton immediately. Provide a 1/4 inch space between stacked doors to promote air circulation.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door, an Assa Abloy Group company: [www.assaabloydss.com](http://www.assaabloydss.com).
  - 2. Fleming Door Products, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 3. Mesker, dormakaba Group: [www.meskeropeningsgroup.com/#sle](http://www.meskeropeningsgroup.com/#sle).
  - 4. Republic Doors, an Allegion brand: [www.republicdoor.com/#sle](http://www.republicdoor.com/#sle).
  - 5. De La Fontaine Inc: [www.delafontaine.com](http://www.delafontaine.com).
  - 6. Steelcraft, an Allegion brand: [www.allegion.com/#sle](http://www.allegion.com/#sle).
  - 7. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
  - 4. Door Edge Profile: Manufacturers standard for application indicated.
  - 5. Typical Door Face Sheets: Flush.
  - 6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

**2.03 HOLLOW METAL DOORS**

- A. Interior Doors , Fire-Rated Doors:
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 3 - Extra Heavy-duty.
    - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
  - 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
    - a. Provide units listed and labeled by UL (DIR) or ITS (DIR).
    - b. Attach fire rating label to each fire rated unit.
  - 3. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
  - 4. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
  - 5. Door Finish: Factory primed and field finished.
- B. Exterior Doors , Hurricane-Resistant Doors:
  - 1. Comply with Florida Building Code (FBC) test protocols for High Velocity Hurricane Zone (HVHZ) FBC TAS 201, FBC TAS 202 and FBC TAS 203.
  - 2. Design and size door and frame components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M.
    - a. Design Wind Loads: Comply with requirements of ASCE 7.
    - b. Wind-Borne Debris Resistance: Door and frame components shall have FLA (PAD) approval or Miami (APD) approval for Large and Small Missile impact and pressure cycling at design wind loads.

3. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
  - a. Level 3 - Extra Heavy-duty.
  - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
  - c. Model 1 - Full Flush.
  - d. Door Face Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
4. Door Core Material: Polystyrene.
  - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
5. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
6. Door Finish: Factory primed and field finished.
7. Weatherstripping: Refer to Section 08 71 00.

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

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Exterior Door Frames: Full profile/continuously welded type.
  1. Frame Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum.
  2. Frame Finish: Factory primed and field finished.
  3. Weatherstripping: Separate, see Section 08 71 00.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
  1. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
  2. Frame Finish: Factory primed and field finished.
- D. Interior Door/Window Frames, Fire-Rated: Full profile/continuously welded type.
  1. Fire Rating: Same as door/window, labeled.
  2. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
  3. Frame Finish: Factory primed and field finished.
- E. Hurricane-Resistant Door Frames: With same hurricane resistance as door; full profile/continuously welded construction, ground smooth, fully prepared and reinforced for hardware installation.
- F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- H. Transom Bars: Fixed, of profile same as jamb and head.
- I. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- J. Frames Wider than 48 inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

#### **2.05 FINISHES**

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

#### **2.06 ACCESSORIES**

- A. Glazing: As specified in Section 08 80 00, factory installed.
- B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered corners; prepared for countersink style tamper proof screws.
- C. Astragals for Double Doors: Specified in Section 08 71 00.
- D. 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.
- E. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

**PART 3 EXECUTION****3.01 EXAMINATION**

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

**3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

**3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Install door hardware as specified in Section 08 71 00.
- E. Comply with glazing installation requirements of Section 08 80 00.
- F. Coordinate installation of electrical connections to electrical hardware items.
- G. Touch up damaged factory finishes.

**3.04 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

**3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.
- B. Final Adjustments: Adjust operating doors and hardware items just prior to final inspection and acceptance by the Owner and Architect. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are damaged, bowed or otherwise unacceptable.
- C. Prime Coat Touch-Up: Immediately after erection, sand smooth rusted or damaged areas of prime coat, and apply touch-up of compatible air-drying primer.

**3.06 PROTECTION**

- A. Provide protective measures required throughout the construction period to ensure that door and frame units will be without damage or deterioration, other than normal weathering, at time of acceptance.

**END OF SECTION**

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**SECTION 08 14 16  
FLUSH WOOD DOORS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Flush wood doors; flush and flush glazed configuration; fire-rated and non-rated.

**1.02 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; 2021, with Errata.
- C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- D. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- E. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata (2022).

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
  - 1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- D. Samples: Submit two samples of door construction, 12 by 12 inch ( 300 by 300 mm) in size cut from top corner of door.
- E. Samples: Submit two samples of door veneer, 12 by 12 inch (300 by 300 mm) in size illustrating wood grain, stain color, and sheen.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Manufacturer's qualification statement.
- H. Installer's qualification statement.
- I. Specimen warranty.
- J. Warranty, executed in Owner's name.

**1.04 QUALITY ASSURANCE**

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
  - 1. Work shall be in accordance with the Grade or the Grades Specified of the Architectural Woodwork Standards.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
  - 1. Company with at least one project within past five years with value of woodwork within at least 20 percent of cost of woodwork for this project.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- D. Single Source Responsibility: A single manufacturer shall provide and install the work of this Section.

**1.05 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.

- D. Deliver materials only when the project is ready for installation and the general contractor has provided a clean storage area.
- E. Maintain indoor temperature and humidity within the range recommended by the Architectural Woodwork Standards for the location of the project.
- F. Coordinate fabrication, delivery, and installation with the general contractor and other applicable trades.

### 1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
  - 1. Masonite Architectural: [www.architectural.masonite.com](http://www.architectural.masonite.com)
    - a. Basis of Design or approved substitution.
  - 2. Marshfield DoorSystems, Inc: [www.marshfielddoors.com/#sle](http://www.marshfielddoors.com/#sle).
  - 3. VT Industries, Inc: [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).
  - 4. Chappell Door Company: [www.chappelldoor.net](http://www.chappelldoor.net).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.02 DOORS

- A. All Interior Doors: See drawings for locations and additional requirements.
  - 1. Quality Standard: Premium Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
  - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches (44 mm) 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 UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
  - 3. Wood veneer facing with factory transparent finish.

### 2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

### 2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Select White Maple, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
  - 1. Vertical Edges: Same species as face veneer.
  - 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet (3 m) of each other when doors are closed.

### 2.05 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.
  - 2. Provide solid blocking for other throughbolted hardware.
- C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.



- D. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E. Interior glazed opening doors shall be true one-piece lumber.
- F. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- G. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- H. Provide edge clearances in accordance with the quality standard specified.

## **2.06 FINISHES - WOOD VENEER DOORS**

- A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
  - 1. Transparent:
    - a. Manufacturers standard, in compliance with performance duty level indicated.
    - b. Stain: As selected by Architect from manufacturer's full range.
    - c. Sheen: As selected by Architect from manufacturer's full range.
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing.

## **2.07 ACCESSORIES**

- A. Door Window Frames: Door window frames with glazing securely fastened within door opening.
  - 1. Size: As indicated on drawings.
- B. Glazing: See Section 08 80 00.
- C. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink style tamper proof screws.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality 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.

### **3.03 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
  - 1. Door fit in rated assemblies shall be in strict compliance with fire rating limitations.
  - 2. No door shall be undercut more than 3/4 inch (19 mm).
  - 3. Undercut clearances:
    - a. From top of decorative floor covering: 1/2 inch (12.7 mm).
    - b. From top of non-combustible floor: 3/4 inch (19 mm) maximum.
    - c. From top of non-combustible sill or threshold: 3/8 inch (9.5 mm) maximum.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

### **3.04 ADJUSTING**

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

B. Adjust closers for full closure.

**END OF SECTION**

**SECTION 08 31 00  
ACCESS DOORS AND PANELS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Ceiling-mounted access units.

**1.02 REFERENCE STANDARDS****1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
- D. Manufacturer's Installation Instructions: Indicate installation requirements.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

**PART 2 PRODUCTS****2.01 CEILING MOUNTED ACCESS UNITS**

- A. Manufacturers:
  - 1. ACUDOR Products Inc: [www.acudor.com/#sle](http://www.acudor.com/#sle).
  - a. Product, FB-5060 basis of design or approved equal.
  - 2. Babcock-Davis: [www.babcockdavis.com/#sle](http://www.babcockdavis.com/#sle).
  - 3. Best Access Doors: [www.bestaccessdoors.com/#sle](http://www.bestaccessdoors.com/#sle).
  - 4. Karp Associates, Inc: [www.karpinc.com/#sle](http://www.karpinc.com/#sle).
  - 5. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Ceiling-Mounted Units: Factory-fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
  - 1. Material: Steel.
  - 2. Style: Exposed frame with door surface flush with frame surface.
  - 3. Door Style: 12 gauge, .1046 inch (2.66 mm) Single thickness with rolled or turned in edges.
  - 4. Frames: 12 gauge, .1046 inch (2.66 mm), minimum thickness.
  - 5. Heavy-Duty Single Steel Sheet Door Panels: 14-gauge, 0.0747-inch (1.89 mm) minimum thickness.
  - 6. Steel Finish: Primed.
  - 7. Primed and Factory Finish: Polyester powder coat; color as selected by Architect from manufacturer's standard colors.
  - 8. Door/Panel Size: As indicated on the drawings.
  - 9. Hardware:
    - a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
    - b. Latch/Lock: Tamperproof tool-operated cam latch.
    - c. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.
    - d. Gasketing: Extruded neoprene, around perimeter of door panel.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that rough openings are correctly sized and located.

- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

**3.02 PREPARATION**

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

**3.03 INSTALLATION**

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

**END OF SECTION**

**SECTION 08 36 13  
SECTIONAL DOORS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Overhead sectional doors, electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

**1.02 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; 2023.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- D. 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).
- E. DASMA 102 - American National Standard Specifications for Sectional Doors; 2018.
- F. ITS (DIR) - Directory of Listed Products; Current Edition.
- G. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2008 (Reaffirmed 2020).
- H. NEMA MG 1 - Motors and Generators; 2021.
- I. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL (DIR) - Online Certifications Directory; Current Edition.
- L. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Samples: Submit two panel finish samples, 12 by 12 inch (300 by 300 mm) in size, illustrating color and finish.
- E. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- F. Operation Data: Include normal operation, troubleshooting, and adjusting.
- G. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- C. Comply with applicable code for motor and motor control requirements.

- D. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

### **1.05 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for warranty requirements.
- B. Extended Correction Period: Correct defective work within a 2-year period commencing on Date of Substantial Completion.
- C. Manufacturer Warranty: Provide 5-year manufacturer warranty for electric operating equipment. Complete forms in Owner's name and register with manufacturer.
- D. 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.

### **1.06 DELIVERY, STORAGE & HANDLING**

- A. Comply with Division 1 Product Requirements Section.
- B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Raynor Garage Doors: [www.raynor.com/#sle](http://www.raynor.com/#sle).
- B. Clopay Corporation: [www.clopaydoor.com](http://www.clopaydoor.com).
  - 1. Product: Model 3200 Basis of Design or approved substitution.
- C. Wayne-Dalton, a Division of Overhead Door Corporation: [www.wayne-dalton.com/#sle](http://www.wayne-dalton.com/#sle).
- D. Overhead Door: [www.overheaddoor.com](http://www.overheaddoor.com).
- E. C.H.I. Overhead Doors: [www.chiohd.com](http://www.chiohd.com).
- F. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 PERFORMANCE REQUIREMENTS**

- A. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.

### **2.03 STEEL DOORS**

- A. Doors: Flush steel, insulated; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
  - 1. Door Panels: Steel construction; outer steel sheet of 24 gauge, 0.0239 inch (0.61 mm) minimum thickness, light ribbed profile; inner steel sheet of 28 gauge, 0.015 inch (0.38 mm) minimum thickness, flat profile; core reinforcement sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; polyurethane insulation.
  - 2. Door Nominal Thickness: 2 inches (51 mm) thick.
  - 3. Exterior Finish:
    - a. Factory finished with standard factory finish; custom color as selected by architect.
  - 4. Interior Finish:
    - a. Factory finished with standard factory finish; color as selected from manufacturers standard line.
  - 5. Electric Operation: Electric control station.

**2.04 COMPONENTS**

- A. Track: Rolled galvanized steel, 0.090 inch (2.3 mm) minimum thickness; 2 inch (50 mm) wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch (6 mm) thick.
- B. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.
- C. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- D. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- E. Head Weatherstripping: EPDM rubber seal, one piece full length.
- F. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.
- G. Lock: Inside side mounted, adjustable keeper, spring activated latch bar with feature to retain in locked or retracted position; interior and exterior handle.
- H. Lock Cylinders: Keyed alike.

**2.05 MATERIALS**

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface.
- B. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- C. Insulation: Foamed-in-place polyurethane, bonded to facing.
  - 1. R-value of 9.1 (RSI-value of 1.6).

**2.06 ELECTRIC OPERATION**

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
  - 1. Provide interlock switches on motor operated units.
- B. Electric Operators:
  - 1. Mounting: Side mounted on cross head shaft.
  - 2. Motor Enclosure:
    - a. Exterior Doors: NEMA MG 1, Type 4; open drip proof.
  - 3. Motor Rating: 1/3 hp (250 W); continuous duty.
  - 4. Motor Voltage: 120 volts, single phase, 60 Hz.
  - 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
  - 6. Controller Enclosure: NEMA 250, Type 1.
  - 7. Opening Speed: 12 inches per second (300 mm/s).
  - 8. Brake: Adjustable friction clutch type, activated by motor controller.
  - 9. Manual override in case of power failure.
  - 10. See Section 26 05 83 for electrical connections.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.
- D. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
  - 1. 24 volt circuit.
  - 2. Surface mounted, at interior door jamb.
  - 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
    - a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
- E. Safety Edge: Located at bottom of sectional door panel, full width; electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object; hollow neoprene covered to provide weatherstrip seal.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.
- C. Do not proceed with installation of doors, operators, controls and accessories until unacceptable conditions are corrected.

**3.02 PREPARATION**

- A. Prepare opening to permit correct installation of door unit to perimeter air and vapor barrier seal.
- B. Apply primer to wood frame.

**3.03 INSTALLATION**

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.
- F. Install perimeter trim.

**3.04 TOLERANCES**

- A. Maximum Variation from Plumb: 1/16 inch (1.5 mm).
- B. Maximum Variation from Level: 1/16 inch (1.5 mm).
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch (3 mm) from 10 ft (3 m) straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

**3.05 ADJUSTING**

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.

**3.06 CLEANING**

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

**3.07 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.
- B. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

**END OF SECTION**



**SECTION 08 43 16**  
**IMPACT RESISTANT ALUMINUM ENTRANCES AND STOREFRONTS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Impact resistant aluminum-framed storefront, with impact resistant glazing.
  - 1. All exterior locations.
- B. Impact resistant aluminum doors .
  - 1. All exterior locations.
- C. Weatherstripping.

**1.02 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2004.
- B. AAMA 505 - Dry Shrinkage and Composite Performance Thermal Cycling Test Procedure.
- C. AAMA 506 - Voluntary Specification for Impact and Cycle Testing of Fenestration Products.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.
- E. AAMA 701/702 - Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals.
- F. AAMA 1801 - Voluntary Specification for the Acoustical Rating of Windows, Doors, Skylights and Glazed Wall Sections.
- G. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2010.
- H. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2008.
- I. ASTM B 456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- J. ASTM B 633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- K. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
- L. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- M. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.
- N. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002 (Reapproved 2010).
- O. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- P. ASTM E 1425 - Standard Practice for Determining the Acoustical Performance of Windows, Doors, Skylight, and Glazed Wall Systems.
- Q. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- R. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

**1.03 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.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, 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.
- D. Design Data: Provide framing member structural and physical characteristics, dimensional limitations.
- E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- F. Samples:
  - 1. Selection Sample: Color charts consisting of actual product pieces, demonstrating full range of available colors, for initial color selection.
  - 2. Verification Samples: Submit two samples 6x6 inches (150x150 mm) in size illustrating finished aluminum surface.
  - 3. Fabrication Samples: Of each vertical to horizontal intersection of aluminum-framed systems, made from 12" (300mm) lengths of full size components and showing details of the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Expansion provisions.
    - d. Glazing.
    - e. Flashing and drainage.
- G. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- H. Report of field testing for water leakage.
- I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.05 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 at Design-Builder.
- B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.
- C. Source Limitations: Obtain aluminum framed storefront system through one source from a single manufacturer.

**1.06 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.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

**1.07 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

- B. Field Measurements: Verify actual dimensions of aluminum framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

### 1.08 WARRANTY

- A. See Section 01 70 00 - Execution and Closeout Requirements, 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

### 2.01 MANUFACTURERS

- A. Kawneer North America: [www.kawneer.com](http://www.kawneer.com).
  - 1. Product - Exterior Storefront: IR 501 T, Basis of Design or approved substitution.
  - 2. Product - Exterior Doors: 500 Heavy Wall IR, Basis of Design or approved substitution.
- B. YKK AP America Inc: [www.ykkap.com](http://www.ykkap.com).
- C. United States Aluminum Corp: [www.usalum.com](http://www.usalum.com).
- D. Tubelite, Inc.: [www.tubeliteinc.com](http://www.tubeliteinc.com).
- E. EFCO Corporation: [www.efcocorp.com](http://www.efcocorp.com).
- F. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.02 STOREFRONT

- A. Impact Resistant Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
  - 1. Glazing Rabbet: For 1 5/16 inch (33 mm) impact resistant glazing.
  - 2. Glazing Position: Centered (front to back).
  - 3. Vertical Mullion Dimensions: 2 3/4 inches wide by 5 inches deep (69.8 mm wide by 127 mm deep).
  - 4. Water Leakage Test Pressure Differential: 15 lbf/sq ft (720 Pa).
  - 5. Air Infiltration Test Pressure Differential: 6.24 psf (300 Pa).
  - 6. Windborne-Debris-Impact Resistance Performance: Shall be tested in accordance with ASTM E 1886, information in ASTM E 1996 and TAS 201/203.
    - a. Large-Missile Impact: For aluminum-framed systems located within 30 feet (9.1 m) of grade.
- B. Performance Requirements:
  - 1. Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
    - a. Design Wind Loads: Determine design wind loads applicable to the project from basic wind speed indicated in miles per hour, according to ASCE 7, Section 6.5, "Method 2 - Analytical Procedure," based on mean roof height above grade indicated on drawings.
      - 1) Basic Wind Speed (MPH): 142.
      - 2) Importance Factor: 1.0.
      - 3) Exposure Category: C.
      - 4) Comply with the requirements of the current edition of the North Carolina Building Code.
  - 2. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
    - a. A static air design load of 30 psf (1436 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in

excess of 0.2% of their clear spans shall occur.

3. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
4. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft (0.3 L/s/sq m) of wall area, measured at specified differential pressure across assembly in accordance with ASTM E283.
5. Water Resistance: Test in accordance with ASTM E 331; there shall be no leakage at a minimum static air pressure differential of 10 psf (479 Pa) as defined in AAMA 501.
6. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than 0.33 (low-e).
7. Condensation Resistance Factor: Measure in accordance with AAMA 1503, the condensation resistance factor shall not be less than 68 (frame) and 70 (glass).
8. 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.
9. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
10. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

### 2.03 ENTRANCE DOORS

- A. Impact Resistant Aluminum-Framed Entrance Doors: Factory fabricated, factory finished aluminum entrance with infill, related flashings, anchorage and attachment devices.
- B. Performance Requirements:
  1. Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
    - a. Design Wind Loads: Determine design wind loads applicable to the project from basic wind speed indicated in miles per hour, according to ASCE 7, Section 6.5, "Method 2 - Analytical Procedure," based on mean roof height above grade indicated on drawings.
      - 1) Basic Wind Speed (MPH): 142.
      - 2) Importance Factor: 1.0.
      - 3) Exposure Category: C.
      - 4) Comply with the requirements of the current edition of the North Carolina Building Code.
  2. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 1.57 psf (75 Pa) for single doors and for pairs of doors. A single 3'0" x 7'0" (915 mm x 2134 mm) entrance door and frame shall not exceed 1.0 cfm/ft<sup>2</sup>. A pair of 6'0" x 7'0" (1830 mm x 2134 mm) entrance doors and frame shall not exceed 1.0 cfm/ft<sup>2</sup>.

### 2.04 COMPONENTS - STOREFRONT

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, two (2) 1/4" (6.4 mm) separations consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections, drainage holes and internal weep drainage system.
  1. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.

- D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- E. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

## 2.05 COMPONENTS - DOORS

- A. Doors: Glazed aluminum.
  - 1. Thickness: 2 inches (50 mm).
  - 2. Top Rail: 5 inches (125 mm) wide.
  - 3. Vertical Stiles: 5 inches (125 mm) wide.
  - 4. Bottom Rail: 10 inches (254 mm) wide.
  - 5. Glazing Stops: Beveled.
  - 6. Finish: Same as storefront.
- B. Major portions of the door members to be 0.188" (5 mm) nominal in thickness and glazing molding to be 0.05" (1.5 mm) thick.
- C. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.

## 2.06 MATERIALS - STOREFRONT

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- G. Exposed Flashings: 0.032 inch (0.8 mm) thick aluminum sheet; finish to match framing members.
- H. Concealed Flashings: 0.018 inch (0.5 mm) thick galvanized steel.
- I. Glass: As specified in Section 08 88 19.
- J. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- K. Glazing Accessories: As specified in Section 08 88 19.
- L. Glazing Sealants: As recommended by manufacturer for joint type, and as follows:
  - 1. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.

## 2.07 MATERIALS - DOORS

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum-framed glass door manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" wall thickness at any location for the main frame and sash members.

- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with sliding aluminum-framed glass door members, trim hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
  - 1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.
- E. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.
- F. Glass: As specified in Section 08 81 00.
- G. Glazing Accessories: As specified in Section 08 88 19.

## **2.08 ACCESSORY MATERIALS**

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Section 07 90 05 - Joint Sealants.
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

## **2.09 FINISHES**

- A. Class I Natural Anodized Finish: AAMA 611-14 Clear anodic coating coating with electrolytically deposited organic seal; not less than 0.7 mils thick.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

## **2.10 HARDWARE**

- A. Door Hardware: Storefront manufacturer's standard type to suit application.

## **2.11 FABRICATION - STOREFRONT**

- 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 components internally for door hardware .
- G. Reinforce framing members for imposed loads.
- H. 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.

## **2.12 FABRICATION - DOORS**

- A. Fabricate aluminum-framed glass entrance doors in sizes indicated. Include a complete system for assembling components and anchoring doors.
- B. Fabricate aluminum-framed glass doors that are reglazable without dismantling perimeter framing.
  - 1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" (29 mm) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.

2. Accurately fit and secure joints and corners. Make joints hairline in appearance.
  3. Prepare components with internal reinforcement for door hardware.
  4. Arrange fasteners and attachments to conceal from view.
- C. Weather Stripping: Provide weather stripping locked into extruded grooves in door panels or frames as indicated on manufacturer's drawings and details.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight sliding door installation.
  1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
  2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76 mm) of opening.
  3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
  4. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 INSTALLATION**

- A. Install system in accordance with manufacturer's instructions.
  1. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum framed storefront system, accessories, and other components.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Attach to structure to support wind and impact loads indicated.
- D. Provide alignment attachments and shims to permanently fasten system to building structure.
- E. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
  1. Install system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- F. Provide thermal isolation where components penetrate or disrupt building insulation.
- G. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
  1. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- H. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- I. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- J. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- K. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- L. Install hardware using templates provided.
- M. Install glass in accordance with Section 08 81 00, using glazing method required to achieve performance criteria.

- N. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

**3.03 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 1/16 inches per 10 ft (1.5 mm/3 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

**3.04 ADJUSTING**

- A. Adjust operating hardware for smooth operation.

**3.05 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. Wipe surfaces clean.
- C. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes.
- D. Remove excess sealant by method acceptable to sealant manufacturer.
- E. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove non-permanent labels, and clean surfaces.

**3.06 PROTECTION**

- A. Protect installed products from damage during subsequent construction.
- B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

**END OF SECTION**



## SECTION 087100 - DOOR HARDWARE

## 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 commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Sliding doors.
  - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Electromechanical door hardware.
  - 3. Automatic operators.
  - 4. Cylinders specified for doors in other sections.
- C. Related Sections:
  - 1. Division 06 Section "Rough Carpentry".
  - 2. Division 08 Section "Hollow Metal Doors and Frames".
  - 3. Division 08 Section "Stainless Steel Doors and Frames".
  - 4. Division 08 Section "Flush Wood Doors".
  - 5. Division 08 Section "Clad Wood Doors".
  - 6. Division 08 Section "Stile and Rail Wood Doors".
  - 7. Division 08 Section "Fiberglass Doors",
  - 8. Division 08 Section "Bullet Resistant Doors and Frame".
  - 9. Division 08 Section "Cold Storage Doors".
  - 10. Division 08 Section "Radio-Frequency Interference Shielding Doors".
  - 11. Division 08 Section "Radiation Shielding Doors and Frames".
  - 12. Division 08 Section "Attack Resistant Doors and Frames."
  - 13. Division 08 Section "Forced Entry Doors and Frames".
  - 14. Division 08 Section "Sound Control Hollow Metal Door Assemblies".
  - 15. Division 08 Section "Sound Control Wood Door Assemblies".
  - 16. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
  - 17. Division 28 Section "Access Control Hardware Devices".
  - 18. Division 28 Section "Campus Access Control Hardware Devices".
  - 19. Division 28 Section "Multi-Family Access Control".

- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  2. ICC/IBC - International Building Code.
  3. NFPA 70 - National Electrical Code.
  4. NFPA 80 - Fire Doors and Windows.
  5. NFPA 101 - Life Safety Code.
  6. NFPA 105 - Installation of Smoke Door Assemblies.
  7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
1. ANSI/BHMA Certified Product Standards - A156 Series.
  2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
  3. ANSI/UL 294 - Access Control System Units.
  4. UL 305 - Panic Hardware.
  5. ANSI/UL 437- Key Locks.

### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.

- f. Mounting locations for door hardware.
  - g. Door and frame sizes and materials.
  - h. Warranty information for each product.
4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
- 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  - 3. Review sequence of operation narratives for each unique access controlled opening.
  - 4. Review and finalize construction schedule and verify availability of materials.
  - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

## 1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

## 1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
  - 1. Ten years for mortise locks and latches.
  - 2. Ten years for extra heavy duty cylindrical (bored) locks and latches.
  - 3. Seven years for heavy duty cylindrical (bored) locks and latches.
  - 4. Five years for standard duty cylindrical (bored) locks and latches.
  - 5. Five years for exit hardware.
  - 6. Five years for manual overhead door closer bodies.
  - 7. Ten years for manual overhead door closer bodies.
  - 8. Fifteen years for manual overhead door closer bodies.
  - 9. Twenty five years for manual overhead door closer bodies.
  - 10. Ten years for heavy duty floor closers.
  - 11. Two years for shallow depth floor closers.

12. Five years for motorized electric latch retraction exit devices.
13. Two years for electromechanical door hardware, unless noted otherwise.

## 1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
  1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

### 2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
  1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

- a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
  - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
  - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
5. Manufacturers:
- a. HB Ives; An Allegion Group Company. (IV).
  - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
  - c. Best Hinges (ST).
- B. Pivots: ANSI/BHMA A156.4, Grade 1, certified. Space intermediate pivots equally not less than 25 inches on center apart or not more than 35 inches on center for doors over 121 inches high. Pivot hinges to have oil impregnated bronze bearing in the top pivot and a radial roller and thrust bearing in the bottom pivot with the bottom pivot designed to carry the full weight of the door. Pivots to be UL listed for windstorm where applicable.
1. Manufacturers:
- a. ABH (AH).
  - b. HB Ives (IV).
  - c. Norton Rixson (RF).

### 2.3 POWER TRANSFER DEVICES

- A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
1. Manufacturers:
- a. HB Ives; An Allegion Group Company. (IV). TW (12 wires) CON series.
  - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC (12 wires) Option.
  - c. Stanley Hardware (ST) – (12 wires) C Option.

- B. Electrified Quick Connect Intermediate Transfer Pivots: Provide electrified offset intermediate transfer pivot hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
1. Manufacturers:
    - a. ABH (AH) -E019-EZ (12 wires).
    - b. HB Ives (IV) -7230FPT-TW-CON (12 wires).
    - c. Norton Rixson (RF) - E-M19-QC (12 wires).
- C. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
1. Manufacturers:
    - a. ABH (AH) – PT-1000EZ Series.
    - b. Securitron (SU) - EL-CEPT Series.
    - c. Von Duprin EPT-10-CON series.
- D. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
1. Provide one each of the following tools as part of the base bid contract:
    - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
    - b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.
  2. Manufacturers:
    - a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) – (12 wires) QC-C Series.
    - b. Stanley Hardware (ST) – (12 wires) WH Series.
    - c. Von Duprin (VD) –(12 wires) CON Series.



## 2.4 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
  2. Furnish dust proof strikes for bottom bolts.
  3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
  4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
  5. Manufacturers:
    - a. HB Ives; An Allegion Group Company. (IV).
    - b. Rockwood (RO).
    - c. Trimco (TC).
- B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.
1. Manufacturers:
    - a. HB Ives; An Allegion Group Company. (IV).
    - b. Rockwood (RO).
    - c. Trimco (TC).
- C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .125 inch thick, size as indicated in hardware sets, with beveled edges, secured with internal fasteners. Exposed screws are not acceptable.
  2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
  3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
  4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
  5. Manufacturers:
    - a. HB Ives; An Allegion Group Company. 8303/8200 push/pull, 9264 Mtg Type O offset door pull (BM).
    - b. Rockwood 111x70C/70C push/pull, RM33311 Mtg Type 12XHD offset door pull (RO).
    - c. Trimco 1018/1001 push/pull, AP423 Mtg Type N offset door pull (TC).

## 2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
1. Manufacturers:
    - a. Corbin Russwin Access 3 AP, Large Format Removable Core.
    - b. Sargent Degree DG3, Large Format Removable Core.
    - c. Schlage, Primus XP, Full Size Interchangeable Core.
- C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
1. Threaded mortise cylinders with rings and cams to suit hardware application.
  2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
  4. Tubular deadlocks and other auxiliary locks.
  5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  6. Keyway: Facility Standard, owner selected.
- D. Security Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed security cylinders and keys able to be used together under the same facility master or grandmaster key system. Cylinders to be factory keyed.
1. Existing key system. Key into owner's existing Schlage Primus XP system.
  2. Manufacturers:
    - a. Corbin Russwin Access 3 AP, Large Format Removable Core.
    - b. Sargent Degree DG3, Large Format Removable Core.
    - c. Schlage, Primus XP, Full Size Interchangeable Core.
  3. Supplier shall coordinate a "Keying Conference" to define and document keying system instructions and requirements to be held with owner's rep and distributor.
  4. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
  5. Existing System: Field verify and key cylinders to match Owner's existing system.
- E. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Three (3).
  2. Master Keys (per Master Key Level/Group): Five (5).

3. Construction Keys (where required): Ten (10).
- F. Construction Keying: Provide construction master keyed cylinders.
- G. Construction Keying: Provide temporary keyed construction cylinders.
- H. Key Registration List (Bitting List):
1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
  2. Provide transcript list in writing or electronic file as directed by the Owner.

## 2.6 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
1. Mortise locks to be certified Security Grade 1.
  2. Where specified, provide status indicators with highly reflective color and wording for "locked/unlocked" or "vacant/occupied" with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1" x 0.6" with a curved design allowing a 180 degree viewing angle with protective covering to prevent tampering.
  3. Manufacturers:
    - a. Corbin Russwin (RU) ML2000 Series LWA.
    - b. Schlage (SC) -L9000 Series 03A.
    - c. Sargent Manufacturing (SA) - 8200 Series. LNJ.
- B. Electromechanical Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed, subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below and in the hardware sets.
1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.
  2. Manufacturers:
    - a. Corbin Russwin (RU) ML20900 Series.
    - b. Schlage (SC) -L EL/EU Series.
    - c. Sargent Manufacturing (SA) – 8270 Series.

- C. Electromechanical Mortise Locksets, Grade 1 (Heavy Duty, High Security Monitoring): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed, subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below.
1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.
- D. Electromechanical Multi-Point Locks: Vertical rod locking devices designed for openings requiring multiple latching points within one locking mechanism. Rods are retracted by dual mounted outside lever trim controls available in a variety of ANSI/BHMA operational functions. Option for single top latching only eliminates the need for bottom strikes. Electromechanical options include solenoid activated trim, electric latch retraction, and inside and outside lever monitoring.
1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) MP9800 Series.
    - b. Schlage (SC) -LM9300 EL/EU Series.
    - c. Sargent Manufacturing (SA) - 7000 Series.

## 2.7 AUXILIARY LOCKS

- A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.
1. Manufacturers:
    - a. Corbin Russwin (RU) DL4000 Series.
    - b. Schlage (SC) -L400 Series.
    - c. Sargent Manufacturing (SA) 4800 Series.

## 2.8 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

## 2.9 ELECTRIC STRIKES

- A. Standard Electric Strikes: Electric strikes tested to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

1. Manufacturers:

- a. HES (HS) - 1500/1600 Series.
- b. SDC (SD) -55 Series.
- c. Von Duprin (VD) -6200 Series.

- B. Surface Mounted Rim Electric Strikes: Surface mounted rim exit device electric strikes tested to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.

1. Manufacturers:

- a. Adams Rite (AD) -7800 Series.
- b. HES (HS) – 9000 Series.
- c. Von Duprin (VD) -6300 Series.

## 2.10 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as

required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
  3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
  4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
  5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
  6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
  7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
  8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
  9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
  10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.
1. Manufacturers:
    - a. Corbin Russwin (RU) -ED4000/5000 Series. Wind storm rated as required.
    - b. Von Duprin (VD) -33/99 Series. Wind storm rated as required.
    - c. Sargent Manufacturing (SA) - 80 Series. Wind storm rated as required.

- C. Extruded Aluminum Removable Mullions: ANSI/BHMA A156.3 anodized, removable mullions with malleable-iron top and bottom retainers. Mullions to be provided standard with stabilizers and imbedded weatherstrip.
1. Manufacturers:
    - a. Same as exit device manufacturer.
- D. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
1. Provide keyed removable feature where specified in the Hardware Sets.
  2. Provide stabilizers and mounting brackets as required.
  3. Provide electrical quick connection wiring options as specified in the hardware sets.
  4. Manufacturers:
    - a. Same as exit device manufacturer.

## 2.11 ELECTROMECHANICAL EXIT DEVICES

- A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.
1. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
  2. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
  3. Manufacturers:
    - a. Corbin Russwin (RU) -ED4000/5000 Series. Wind storm rated as required.
    - b. Von Duprin (VD) -33/99 Series. Wind storm rated as required.
    - c. Sargent Manufacturing (SA) – 80 Series. Wind storm rated as required.

## 2.12 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
  4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
  6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Manufacturers:
    - a. Corbin Russwin Hardware (RU) - DC6000 Series.
    - b. LCN (LC) -4010/4110 Series.
    - c. Norton Rixson (NO) - 7500 Series.

## 2.13 ELECTROHYDRAULIC DOOR OPERATORS

- A. General: Provide low energy operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.
1. Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.
- B. Standard: Certified ANSI/BHMA A156.19.
- C. Performance Requirements:
1. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.



2. Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.
- D. Configuration: Surface mounted or in-ground as required. Door operators to control single swinging and pair of swinging doors.
  - E. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19. When not in automatic mode, door operator to function as manual door closer with fully adjustable opening and closing forces, with or without electrical power.
  - F. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.
  - G. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.
  - H. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.
  - I. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    1. LCN (LC) -4630 Series.
    2. Norton Rixson (NO) - 6000 Series.
    3. Record USA (REC) -6000/8000 Series.

#### 2.14 SURFACE MOUNTED CLOSER HOLDERS

- A. Electromagnetic Door Holders: Certified ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate 12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.
  1. Manufacturers:
    - a. ABH (AH) -2300 Series.
    - b. Norton Rixson (RF) - 980/990 Series.
    - c. LCN (LC) -SEM7800 Series.

#### 2.15 ARCHITECTURAL TRIM

- A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
  - a. HB Ives (IV).
  - b. Rockwood (RO).
  - c. Trimco (TC).

## 2.16 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  1. Manufacturers:
    - a. HB Ives (IV).
    - b. Rockwood (RO).
    - c. Trimco (TC).
- C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
  1. Manufacturers:

- a. ABH (AH).
- b. Norton Rixson (RF).
- c. Rockwood (RO).

## 2.17 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
  1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
  1. National Guard Products (NG).
  2. Pemko (PE).
  3. Zero International. (ZE).

## 2.18 ELECTRONIC ACCESSORIES

- A. Key Switches: Key switches furnished standard with stainless steel single gang face plate with a 12/24VDC bi-color LED indicator. Integral backing bracket permits integration with any 1 1/4" or 1 1/2" mortise type cylinder. Key switches available as momentary or maintained action and in narrow face plate options.
  1. Manufacturers:
    - a. Schlage Electronics (SC) -653-1414 or 653-1415 Series.
    - b. SDC (SD) -700 Series.

- c. Securitron (SU) - MK Series.
- B. Push-Button Switches: Industrial grade momentary or alternate contact, back-lighted push buttons with stainless-steel switch enclosures. 12/24 VDC bi-color illumination suitable for either flush or surface mounting.
1. Manufacturers:
    - a. Schlage Electronics (SC) – 631AL Series.
    - b. SDC (SD) - 400 Series.
    - c. Securitron (SU) - PB Series.
- C. Touchless Switches: FCC certified microwave sensing switch used for REX or activation of various access control devices in place of a traditional wired switch. Unit to have an adjustable sensing zone from 4” to 24”. At exterior locations furnish foam gaskets and weather covers. Provide single gang or double gang unit as specified in the hardware sets.
1. Manufacturers:
    - a. BEA Sensors (BEA) -10MS Series.
    - b. Norton Rixson (NO) - 700 Series.
    - c. Securitron (SU) - WSS Series.
- D. Request-to-Exit Motion Sensor: Request-to-Exit Sensors motion detectors specifically designed for detecting exiting through a door from the secure area to a non-secure area. Include built-in timers (up to 60 second adjustable timing), door monitor with sounder alert, internal vertical pointability coverage, 12VDC or 24VDC power and selectable relay trigger with fail safe/fail secure modes.
1. Manufacturers:
    - a. Schlage Electronics – Scan II Series.
    - b. SDC (SD) – MD Series.
    - c. Securitron (SU) - XMS Series.
- E. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
1. Manufacturers:
    - a. Schlage Electronics (SC) 679-05HM/WD Series.
    - b. SDC (SD) -MC-4 Series.
    - c. Securitron (SU) - DPS Series.
- F. Switching Power Supplies: Provide power supplies with either single or dual voltage configurations at 12 or 24VDC. Power supplies shall have battery backup function with an integrated battery charging circuit and shall provide capability for power distribution, direct

lock control and Fire Alarm Interface (FAI) through add on modules. Power supplies shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
2. Manufacturers:
  - a. Schlage Electronics (SC) -PS902 Series.
  - b. SDC (SD) – 600 Series.
  - c. Securitron (SU) – AQD2 Series.

## 2.19 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.20 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. 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
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### 3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

### 3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
  - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

### 3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

### 3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

### 3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

### 3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
  1. Quantities listed are for each pair of doors, or for each single door.
  2. The supplier is responsible for handling and sizing all products.
  3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
5. **Substitutions of products outside of the specification are not permitted, will not be considered, and will be rejected immediately.**

Door Hardware Sets:



**HARDWARE SET 1.0**

Doors: 101A

EACH TO RECEIVE:

1	EA	Pivot Set	147 626	Rixson
1	EA	Intermediate Pivot	M19 626	Rixson
1	EA	Rim Exit Device	ED5200S K157ET 630 M107 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Door Pull	RM3311-72 Mtg-Type 12XHD US32D	Rockwood
1	EA	Surface Closer	CPS7500 689	Norton
1	EA	Drop Plate	7788 689	Norton
1	EA	Blade Stop	6891 689	Norton
1	EA	Bracket	6890 689	Norton
1	EA	Threshold	171A x 36" MSES25SS	Pemko
1	EA	Sweep	315CN x 36"	Pemko

**HARDWARE SET 2.0**

Doors: 100A

EACH TO RECEIVE:

2	EA	Hinge, Full Mortise, Hvy Wt	T4A3386xNRP 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Electric Hinge, Hvy Wt	T4A3386-QC12 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Rim Exit Device	ED5200S L957ET 630 M107 M92 MELR CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	CPS7500 689	Norton
1	EA	Threshold	171A x 36" MSES25SS	Pemko
1	EA	Gasketing	2891APK x 36" x 84"	Pemko
1	EA	Rain Guard	346C x 40"	Pemko
1	EA	Sweep	315CN x 36"	Pemko
1	EA	ElectroLynx Harness	QC-C1500P	McKinney
1	EA	ElectroLynx Harness	QC-C200P	McKinney
1	EA	Position Switch	DPS-M-GY	Securitron
1	EA	Power Supply	AQD2-8F8R2	Securitron
1	EA	Viewer	627 CRM	Rockwood

**OPERATION:**

DOOR IS NORMALLY CLOSED AND LOCKED. PRESENTING A VALID CREDENTIAL TO THE CARD READER WILL RETRACT LATCH AND SHUNT POSITION SWITCH ALLOWING INGRESS. FREE EGRESS AT ALL TIMES BY EXIT DEVICE PUSH PAD. CARD READER PROVIDED OWNER.

**HARDWARE SET 3.0**

Doors: 110

EACH TO RECEIVE:

4	EA	Hinge, Full Mortise, Hvy Wt	T4A3386xNRP 4-1/2" x 4-1/2" US32D	McKinney
2	EA	Electric Hinge, Hvy Wt	T4A3386-QC12 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Mullion	CRWS772AKM 7"2" CT6R	Corbin Russwin
1	EA	Rim Exit Device	ED5200S EO 630 M107 M92	Corbin Russwin
1	EA	Rim Exit Device	ED5200S L957ET 630 M107 M92 MELR CT6R	Corbin Russwin
2	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Cylinder	CR1080-114 A02 626 CT6R	Corbin Russwin
2	EA	Surface Closer	CPS7500T 689	Norton
1	EA	Threshold	171A x 72" MSES25SS	Pemko
1	EA	Gasketing	2891APK x 72" x 84"	Pemko
1	EA	Rain Guard	346C x 76"	Pemko
2	EA	Sweep	315CN x 36"	Pemko
2	EA	ElectroLynx Harness	QC-C1500P	McKinney
2	EA	ElectroLynx Harness	QC-C200P	McKinney
2	EA	Position Switch	DPS-M-GY	Securitron
1	EA	Power Supply	AQD2-8F8R2	Securitron

OPERATION:

DOOR IS NORMALLY CLOSED AND LOCKED. PRESENTING A VALID CREDENTIAL TO THE CARD READER WILL RETRACT LATCH AND SHUNT POSITION SWITCH ALLOWING INGRESS. FREE EGRESS AT ALL TIMES BY EXIT DEVICE PUSH PAD.  
CARD READER PROVIDED OWNER.

**HARDWARE SET 4.0**

Doors: 100B

EACH TO RECEIVE:

2	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Electric Hinge	TA2714-QC12 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Electrified Mortise Lock	ML20906-SEC LWA 626 M92 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	CPS7500 689	Norton
1	EA	Threshold	171A x 36" MSES25SS	Pemko
1	EA	Gasketing	2891APK x 36" x 84"	Pemko
1	EA	Sweep	315CN x 36"	Pemko
3	EA	Silencer	608-RKW	Rockwood
1	EA	ElectroLynx Harness	QC-C300P	McKinney
1	EA	ElectroLynx Harness	QC-C1500P	McKinney
1	EA	Position Switch	DPS-M-GY	Securitron
1	EA	Power Supply	AQD2-8F8R2	Securitron

OPERATION:

DOOR IS NORMALLY CLOSED AND LOCKED. PRESENTING A VALID CREDENTIAL TO THE CARD READER WILL UNLOCK OUTSIDE LEVER AND SHUNT POSITION SWITCH ALLOWING INGRESS. FREE EGRESS AT ALL TIMES BY INSIDE LEVER.  
CARD READER PROVIDED OWNER.

**HARDWARE SET 5.0**

Doors: 120C

EACH TO RECEIVE:

2	EA	Hinge, Full Mortise, Hvy Wt	T4A3386xNRP 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Electric Hinge, Hvy Wt	T4A3386-QC12 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Rim Exit Device	ED5200S L957ET 630 M107 M92 MELR CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	CPS7500 689	Norton
1	EA	Threshold	171A x 36" MSES25SS	Pemko
1	EA	Gasketing	2891APK x 36" x 84"	Pemko
1	EA	Rain Guard	346C x 40"	Pemko
1	EA	Sweep	315CN x 36"	Pemko
1	EA	ElectroLynx Harness	QC-C1500P	McKinney
1	EA	ElectroLynx Harness	QC-C200P	McKinney
1	EA	Position Switch	DPS-M-GY	Securitron
1	EA	Power Supply	AQD2-8F8R2	Securitron
2	EA	Viewer	627 CRM	Rockwood

OPERATION:

DOOR IS NORMALLY CLOSED AND LOCKED. PRESENTING A VALID CREDENTIAL TO THE CARD READER WILL RETRACT LATCH AND SHUNT POSITION SWITCH ALLOWING INGRESS. FREE EGRESS AT ALL TIMES BY EXIT DEVICE PUSH PAD.  
CARD READER PROVIDED OWNER.

**HARDWARE SET 6.0**

Doors: 101B, 105, 115

EACH TO RECEIVE:

2	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Electric Hinge	TA2714-QC12 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Electrified Mortise Lock	ML20906-SEC LWA 626 M92 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	7500 689 SN-134	Norton
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood
2	EA	ElectroLynx Harness	QC-C300P	McKinney
2	EA	ElectroLynx Harness	QC-C1500P	McKinney
2	EA	Position Switch	DPS-M-GY	Securitron
1	EA	Power Supply	AQD2-8F8R2	Securitron

OPERATION:

DOOR IS NORMALLY CLOSED AND LOCKED. PRESENTING A VALID CREDENTIAL TO THE CARD READER WILL UNLOCK OUTSIDE LEVER AND SHUNT POSITION SWITCH ALLOWING INGRESS. FREE EGRESS AT ALL TIMES BY INSIDE LEVER.  
CARD READER PROVIDED OWNER.



**HARDWARE SET 6.1**

Doors: 119

EACH TO RECEIVE:

2	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Electric Hinge	TA2714-QC12 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Electrified Mortise Lock	ML20906-SEC LWA 626 M92 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	7500 689 SN-134	Norton
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood
2	EA	ElectroLynx Harness	QC-C300P	McKinney
2	EA	ElectroLynx Harness	QC-C1500P	McKinney
2	EA	Position Switch	DPS-M-GY	Securitron
1	EA	Power Supply	AQD2-8F8R2	Securitron
1	EA	Viewer	627 CRM	Rockwood

OPERATION:  
DOOR IS NORMALLY CLOSED AND LOCKED. PRESENTING A VALID CREDENTIAL TO THE CARD READER WILL UNLOCK OUTSIDE LEVER AND SHUNT POSITION SWITCH ALLOWING INGRESS. FREE EGRESS AT ALL TIMES BY INSIDE LEVER.  
CARD READER PROVIDED OWNER.

**HARDWARE SET 7.0**

Doors: 108

EACH TO RECEIVE:

5	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Electric Hinge	TA2714-QC12 4-1/2" x 4-1/2" US26D	McKinney
1	Set	Flush Bolt	2845 US32D	Rockwood
1	EA	Electrified Mortise Lock	ML20906-SEC LWA 626 M92 CT6R	Corbin Russwin
2	EA	Interchangeable Core	CR8000 626	Corbin Russwin
2	EA	Surface Closer	CPS7500 689	Norton
2	EA	Silencer	608-RKW	Rockwood
1	EA	ElectroLynx Harness	QC-C300P	McKinney
1	EA	ElectroLynx Harness	QC-C1500P	McKinney
2	EA	Position Switch	DPS-M-GY	Securitron
1	EA	Power Supply	AQD2-8F8R2	Securitron

OPERATION:  
DOOR IS NORMALLY CLOSED AND LOCKED. PRESENTING A VALID CREDENTIAL TO THE CARD READER WILL UNLOCK OUTSIDE LEVER AND SHUNT POSITION SWITCH ALLOWING INGRESS. FREE EGRESS AT ALL TIMES BY INSIDE LEVER.  
CARD READER PROVIDED OWNER.

**HARDWARE SET 8.0**

Doors: 109A, 109B

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Fire Rated Rim Exit	ED5200A L955ET 630 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	PR7500 689	Norton
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET 9.0**

Doors: 109C

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Classroom Lock	ML2055 LWA 626 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Overhead Holder/Stop	9-336 630	Rixson
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET 10.0**

Doors: 106, 107

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Classroom Lock	ML2055 LWA 626 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	7500 689 SN-134	Norton
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET 10.1**

Doors: 117

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Classroom Lock	ML2055 LWA 626 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	7500 689 SN-134	Norton
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood
1	EA	Viewer	627 CRM	Rockwood

**HARDWARE SET 10.2**

Doors: 112

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Classroom Lock	ML2055 LWA 626 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	7500 689 SN-134	Norton
1	EA	Wall Stop	400 US26D	Rockwood
1	EA	Edge Guard	305 84" US32D CUTOUT-3	Rockwood
1	EA	Edge Guard	306B 84" US32D CUTOUT-1	Rockwood
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET 11.0**

Doors: 111

EACH TO RECEIVE:

6	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	Set	Flush Bolt	2845 US32D	Rockwood
1	EA	Classroom Lock	ML2055 LWA 626 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
2	EA	Surface Overhead Holder/Stop	9-336 630	Rixson
2	EA	Silencer	608-RKW	Rockwood



**HARDWARE SET 12.0**

Doors: 102, 103, 104

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Office/Entry Lock	ML2051 LWA 626 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	7500 689 SN-134	Norton
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET 13.0**

Doors: 116

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Office/Entry Lock	ML2051 LWA 626 CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET 14.0**

Doors: 114

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Privacy Set w/ Ind.	ML2030 LWA M34 626 V21	Corbin Russwin
1	EA	Surface Closer	7500 689 SN-134	Norton
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET 14.1**

Doors: 118

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Privacy Set w/ Ind.	ML2030 LWA M34 626 V21	Corbin Russwin
1	EA	Wall Stop	400 US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET 15.0**

Doors: 113

EACH TO RECEIVE:

3	EA	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2" US26D	McKinney
1	EA	Privacy Set w/ Ind.	ML2030 LWA M34 626 V21	Corbin Russwin
1	EA	Surface Overhead Holder/Stop	9-336 630	Rixson
1	EA	Surface Closer	7500 689 SN-134	Norton
3	EA	Silencer	608-RKW	Rockwood

**HARDWARE SET G-1 2.0**

Doors: 120C-ALT, 120I

EACH TO RECEIVE:

2	EA	Hinge, Full Mortise, Hvy Wt	T4A3386xNRP 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Electric Hinge, Hvy Wt	T4A3386-QC12 4-1/2" x 4-1/2" US32D	McKinney
1	EA	Rim Exit Device	ED5200S L957ET 630 M107 M92 MELR CT6R	Corbin Russwin
1	EA	Interchangeable Core	CR8000 626	Corbin Russwin
1	EA	Surface Closer	CPS7500 689	Norton
1	EA	Threshold	171A x 36" MSES25SS	Pemko
1	EA	Gasketing	2891APK x 36" x 84"	Pemko
1	EA	Rain Guard	346C x 40"	Pemko
1	EA	Sweep	315CN x 36"	Pemko
1	EA	ElectroLynx Harness	QC-C1500P	McKinney
1	EA	ElectroLynx Harness	QC-C200P	McKinney
1	EA	Position Switch	DPS-M-GY	Securitron
1	EA	Power Supply	AQD2-8F8R2	Securitron
1	EA	Viewer	627 CRM	Rockwood

**OPERATION:**

DOOR IS NORMALLY CLOSED AND LOCKED. PRESENTING A VALID CREDENTIAL TO THE CARD READER WILL RETRACT LATCH AND SHUNT POSITION SWITCH ALLOWING INGRESS. FREE EGRESS AT ALL TIMES BY EXIT DEVICE PUSH PAD. CARD READER PROVIDED OWNER.

END OF SECTION 087100



**SECTION 08 80 00  
GLAZING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Glazing units.
- B. Glazing compounds.

**1.02 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; 2015 (Reaffirmed 2020).
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- F. GANA (GM) - GANA Glazing Manual; 2022.
- G. GANA (SM) - GANA Sealant Manual; 2008.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data on Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 12 by 12 inch (300 by 300 mm) in size of glass units, showing coloration and design.
- E. Samples: Submit 6 inch (150 mm) long bead of glazing sealant, color as selected.
- F. Certificate: Certify that products of this section meet or exceed specified requirements.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA (GM) and GANA (SM) for glazing installation methods. Maintain one copy on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

**1.06 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

- B. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Float Glass Manufacturers:
1. Cardinal Glass Industries: [www.cardinalcorp.com](http://www.cardinalcorp.com).
  2. Guardian Industries Corp: [www.sunguardglass.com](http://www.sunguardglass.com).
  3. Pilkington North America Inc: [www.pilkington.com/na](http://www.pilkington.com/na).
  4. Vitro Architectural Glass: [www.vitroglazings.com](http://www.vitroglazings.com).
    - a. Basis of Design or approved substitution.
  5. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 GLASS MATERIALS**

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
  2. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
  3. Heat-Soak Testing (HST): Provide HST of fully tempered glass used on canopy, point-supported, spider wall, high-risk, sloping overhead, horizontal overhead, free-standing glass protective barrier, or other demanding applications of project, to reduce risks of spontaneous breakage due to nickel sulfide (NiS) induced fractures in accordance with industry established testing requirements.

### **2.03 GLAZING UNITS**

- A. Type G-2 -Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
    - a. Glazed lites in doors, except fire doors.
    - b. Glazed sidelights to doors, except in fire-rated walls and partitions.
    - c. Other locations required by applicable federal, state, and local codes and regulations.
    - d. Other locations indicated on drawings.
  2. Glass Type: Fully tempered safety glass as specified.
  3. Tint: Clear.

### **2.04 ACCESSORIES**

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option I. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I; color black.
- D. Glazing Clips: Manufacturer's standard type.

## **PART 3 EXECUTION**

### **3.01 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- C. Verify that sealing between joints of glass framing members has been completed effectively.
- D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

**3.02 PREPARATION**

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

**3.03 INSTALLATION, GENERAL**

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

**3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)**

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

**3.05 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Final Acceptance in accordance with glass manufacturer's written recommendations.

**3.06 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.
- B. Remove and replace glass that is damaged during construction period prior to Date of Final Acceptance.

**END OF SECTION**

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**SECTION 08 81 00**  
**INSULATING GLASS GLAZING WITH LAMINATED INBOARD****PART 1 GENERAL****1.01 SUMMARY**

- A. Section includes solar control insulating glass units with laminated inboard lite.

**1.02 REFERENCE S**

- A. ASTM C 1036 - Standard Specification for Flat Glass.
- B. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
- C. ASTM C 1172 - Standard Specification for Laminated Architectural Flat Glass.
- D. ASTM C 1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
- E. ASTM E 2188 - Standard Test Method for Insulating Glass Unit Performance.
- F. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- G. CPSC 16CFR-1201 - Safety Standard for Architectural Glazing Materials.
- H. ASTM E 1886 - Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
- I. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes.
- J. CPSC 16CFR-1201 - Safety Standard for Architectural Glazing Materials.
- K. GANA Glazing Manual.
- L. GANA Laminated Glazing Reference Manual

**1.03 DEFINITIONS**

- A. Sealed Insulating Glass Unit with Laminated Inboard Lite Surfaces:
  - 1. Surface No. 1: Exterior surface of outer lite.
  - 2. Surface No. 2: Interior surface of outer lite.
  - 3. Surface No. 3: Exterior surface of inner lite.
  - 4. Surface No. 4: Interior surface of inner lite.
  - 5. Surface No. 5: Exterior Surface of inboard lite.
  - 6. Surface No. 6: Interior Surface of inboard lite.
- B. Airspace: Space between lites of an insulating glass unit that contains dehydrated air or other inert specified gas.

**1.04 SUBMITTALS**

- A. Comply with Division 01 Section "Submittal Procedures."
- B. Product Data: Submit manufacturer's product data, including performance characteristics and installation instructions.
- C. Shop Drawings: Submit manufacturer's or fabricator's shop drawings, including plans, elevations, sections, and details, indicating glass dimensions, tolerances, types, thicknesses, and coatings.
- D. Samples: Submit manufacturer's samples of each type, thickness, and coating.
- E. Fabricator's Certification: Submit fabricator's certification by manufacturer.
- F. Cleaning Instructions: Submit manufacturer's cleaning instructions.
- G. Warranty: Submit manufacturer's standard warranty for sealed insulating glass units.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer's Qualifications: Minimum of 5 years experience manufacturing solar control coated glass.
- B. Fabricator's Qualifications:

1. Minimum of 5 years experience manufacturing sealed insulating glass units meeting ASTM E 2190.
  2. Minimum of 5 years experience manufacturing Laminated glass units meeting ASTM C 1172 and CPSC 16CFR-1201.
  3. Certified by manufacturer.
- C. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes enhanced-protection testing requirements in ASTM E 1996 for Wind Zone 2 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.
1. Large-Missile Test: For glazing located within 30 feet of grade.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery:
1. Deliver glass to site in accordance with manufacturer's instructions.
  2. Deliver glass in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage:
1. Store glass in accordance with manufacturer's instructions.
  2. Store glass in clean, dry area indoors.
  3. Protect from exposure to direct sunlight and freezing temperatures.
  4. Apply temporary coverings loosely to allow adequate ventilation.
  5. Protect from contact with corrosive chemicals.
  6. Avoid placement of glass edge on concrete, metal, and other hard objects.
  7. Rest glass on clean, cushioned pads at 1/4-points.
- C. Handling:
1. Handle glass in accordance with manufacturer's instructions.
  2. Protect glass from damage during handling and installation.
  3. Do not slide 1 lite of glass against another.
  4. Do not use sharp objects near unprotected glass.

#### **1.07 WARRANTY**

- A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
1. Warranty Period: Five (5) years from date of manufacture.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURER**

- A. Guardian Glass, LLC: [www.guardianglass.com](http://www.guardianglass.com).
1. Basis of Design or approved substitution.
- B. Viracon: [www.viracon.com](http://www.viracon.com).
- C. Interpane: [www.interpane.com](http://www.interpane.com)
- D. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 FABRICATORS**

- A. Sealed Insulating Glass Units, Laminated Glass Units, Heat-Strengthened Glass, Tempered Glass, and Spandrel Glass:
- B. Acceptable Fabricators: Certified by glass manufacturer.

**2.03 SOLAR CONTROL INSULATING LAMINATED COATED GLASS - LAMINATED INBOARD**

- A. Type IG- 1 - Double-Glazed Sputter-Coated Insulating Glass Units with Laminated Inboard Lite:
  - 1. Conformance: ASTM E 2190.
  - 2. Conformance: ASTM C 1172 and complying with testing requirements in CPSC 16CFR-1201 for Category II materials and with "Windborne-Debris-Impact Resistance" Paragraph in "Quality Assurance" Article.
  - 3. Outboard Lite: Sputter-coated clear] float glass.
    - a. Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
    - b. Vacuum Deposition Sputtered Coating: ASTM C 1376.
    - c. Coating on Surface No. 2: SunGuard SN 54.
    - d. Glass Thickness: 6 mm (1/4 inch)].
  - 4. Air Space: 12 mm (1/2 inch) wide, hermetically sealed, dehydrated air space.
  - 5. Inboard Laminated Glass Unit:
    - a. Conformance: ASTM C 1172, CPSC 16CFR-1201
    - b. Inner Lite:
      - 1) Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 6 mm (1/4 inch).
    - c. Interlayer: Polyvinyl butyral (PVB) plastic interlayer, clear, 0.090 inch thick.
    - d. Inboard Lite
      - 1) Clear Float Glass: ASTM C 1036, Type 1, Class 1, Quality q3.
      - 2) Glass Thickness: 6 mm (1/4 inch).
  - 6. Glass Unit Performance Characteristics:
    - a. Visible Light Transmittance: 53 percent.
    - b. Visible Light Reflectance Out: 14 percent.
    - c. Visible Light Reflectance In: 19 percent.
    - d. U-Value: 0.281.
    - e. Shading Coefficient: 0.32.
    - f. Solar Heat Gain Coefficient: 0.28.
  - 7. Sealing System: Dual seal, approved by glass manufacturer.
    - a. VOC Content: For sealants used inside of the weatherproofing system, not more than 250 g/L when calculated according to 40 CFR 59, Subpart D.
  - 8. Spacer: Manufacturer's standard spacer material and construction.
  - 9. Desiccant: Molecular sieve or silica gel, or blend of both.
  - 10. Corner Construction: Manufacturer's standard.
- B. Type IG-2 - Tempered Double-Glazed Sputter-Coated Insulating Glass Units with Laminated Inboard Lite:
  - 1. Same as IG-1 above and add the following:
    - a. Outboard Lite: Sputter-coated clear] float glass:
      - 1) Heat Treatment: Tempered; ASTM C 1048, Kind FT; CPSC 16CFR-1201
    - b. Inboard Laminated Glass Unit:
      - 1) Inner Lite:
        - (a) Heat Treatment: Tempered; ASTM C 1048, Kind FT; CPSC 16CFR-1201
      - 2) Inboard Lite:
        - (a) Heat-Treatment: Tempered; ASTM C 1048, Kind FT; CPSC 16CFR-1201

**2.04 FABRICATION OF GLAZING UNITS**

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
- B. Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Examine areas to receive glass. Notify Architect of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

**3.02 PREPARATION**

- A. Verify glazing openings are correct size and within tolerance.
- B. Verify glazing channels, recesses, and weeps are clean and free of obstructions.

**3.03 GLAZING**

- A. Install glass in accordance with manufacturer's instructions, except where local codes or GANA Glazing Manual indicate more stringent requirements.

**3.04 FIELD QUALITY CONTROL**

- A. Coated glass, when viewed from minimum of 10 feet, exhibiting slightly different hue or color not apparent in hand samples, will not be cause of rejection of glass units, as determined by Architect.
- B. Verify glass is free of chips, cracks, and other inclusions that could inhibit structural or aesthetic integrity.

**3.05 CLEANING**

- A. Clean glass promptly after installation in accordance with manufacturer's instructions.
- B. Remove labels from glass surface.
- C. Do not use harsh cleaning materials or methods that would damage glass.

**3.06 PROTECTION**

- A. Protect installed glass from damage during construction.
- B. Protect installed glass from contact with contaminating substances resulting from construction operations.
- C. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

**END OF SECTION**



**SECTION 08 88 13  
FIRE-RATED GLAZING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fire-rated glazing units.

**1.02 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- D. GANA (SM) - GANA Sealant Manual; 2008.
- E. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. ITS (DIR) - Directory of Listed Products; Current Edition.
- G. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- H. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies; 2022.
- I. UL (DIR) - Online Certifications Directory; Current Edition.
- J. UL 9 - Standard for Fire Tests of Window Assemblies; Current Edition, Including All Revisions.
- K. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- L. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene preinstallation meeting one week before starting work of this section; require attendance by each of affected installers.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data on Glazing Unit Glazing Types: Provide structural, physical, and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Two samples 12 by 12 inch (300 by 300 mm) in size of glass units.
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.
- H. Specimen warranty.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

**1.06 FIELD CONDITIONS**

- A. Ambient Conditions: Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).

- B. Maintain minimum ambient temperature before, during, and 24 hours after installation of glazing compounds.

### 1.07 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty for Insulating Glass Units: Provide 5-year manufacturer warranty coverage for seal failure, interpane dusting or misting, including providing products to replace failed units, and commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.

## PART 2 PRODUCTS

### 2.01 GLAZING UNITS

- A. Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire rating period of 45 minutes or less.
  - 1. Applications:
    - a. Glazing in fire-resistance-rated door assembly.
    - b. Glazing in fire-resistance-rated sidelites..
  - 2. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
  - 3. Safety Glazing Certification: 16 CFR 1201 Category II.
  - 4. Fire-Rating Period: As scheduled.
  - 5. Markings for Fire-Protection-Rated Glazing Assemblies: Provide permanent markings on fire-protection-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction
    - a. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
    - b. "OH" - meets fire window assembly criteria, including hose stream test of NFPA 257 or UL 9 fire test standards.
    - c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire tests standards.
    - d. "XXX" - placeholder that represents fire-rating period, in minutes.
  - 6. Products:
    - a. Type G-4 (20 min protective glazing) - Basis of design or approved substitution:
      - 1) SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite I: [www.safti.com/#sle](http://www.safti.com/#sle).
    - b. Type G-3 (45 min protective glazing) - Basis of design or approved substitution:
      - 1) SAFTIFIRST, a division of O'Keeffe's Inc; SuperClear 45-HS-LI: [www.safti.com/#sle](http://www.safti.com/#sle).
    - c. Technical Glass Products;: [www.fireglass.com/#sle](http://www.fireglass.com/#sle).
    - d. Vetrotech North America;: [www.vetrotechusa.com/#sle](http://www.vetrotechusa.com/#sle).

### 2.02 ACCESSORIES

- A. Setting Blocks: Calcium silicate, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

### 3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### **3.03 INSTALLATION - GENERAL**

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers unless more stringent requirements are indicated, including those in referenced glazing standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with contaminating substances that may result from construction operations including, but not limited to weld spatter, fire-safing, plastering, mortar droppings, etc.

### **3.04 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than four days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

### **3.05 PROTECTION**

- A. After installation, mark pane with 'X' by using removable plastic tape or paste; do not mark heat-absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**

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**SECTION 09 05 61  
COMMON WORK RESULTS FOR FLOORING PREPARATION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
  - 1. Resilient tile and sheet.
  - 2. Carpet tile.
  - 3. Thin-set ceramic tile and stone tile.
- B. Preparation of new concrete floor slabs for installation of floor coverings.
- C. Testing of concrete floor slabs for alkalinity (pH).
- D. Remediation of concrete floor slabs due to unsatisfactory alkalinity (pH) conditions.
  - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- E. Patching compound.
- F. Remedial floor coatings.

**1.02 REFERENCE STANDARDS**

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2023.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete; 2020.
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

**1.04 SUBMITTALS**

- A. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Alkalinity (pH) limits and test methods.
  - 2. Manufacturer's required bond/compatibility test procedure.
- B. Testing Agency's Report:
  - 1. Description of areas tested; include floor plans and photographs if helpful.
  - 2. Summary of conditions encountered.
  - 3. Copies of specified test methods.
  - 4. Recommendations for remediation of unsatisfactory surfaces.
  - 5. Submit report to Architect.
  - 6. Submit report not more than two business days after conclusion of testing.
- C. Adhesive Bond and Compatibility Test Report.

**1.05 QUALITY ASSURANCE**

- A. Alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.

- C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
  - 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- D. Contractor's Responsibility Relating to Independent Agency Testing:
  - 1. Provide access for and cooperate with testing agency.
  - 2. Confirm date of start of testing at least 10 days prior to actual start.
  - 3. Allow at least 4 business days on site for testing agency activities.
  - 4. Achieve and maintain specified ambient conditions.
  - 5. Notify Architect when specified ambient conditions have been achieved and when testing will start.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

### **1.07 FIELD CONDITIONS**

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F (18 degrees C) or more than 85 degrees F (30 degrees C).
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
  - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
  - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
  - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
  - 1. Thickness: As required for application and in accordance with manufacturer's installation instructions.

## **PART 3 EXECUTION**

### **3.01 CONCRETE SLAB PREPARATION**

- A. Follow recommendations of testing agency.
- B. Perform following operations in the order indicated:
  - 1. Preliminary cleaning.
  - 2. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 3. Specified remediation, if required.

4. Patching, smoothing, and leveling, as required.
5. Other preparation specified.
6. Adhesive bond and compatibility test.
7. Protection.

**3.02 PRELIMINARY CLEANING**

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

**3.03 ALKALINITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

**3.04 PREPARATION**

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with recommendations of testing agency.
- C. Comply with requirements and recommendations of floor covering manufacturer.
- D. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- E. Do not fill expansion joints, isolation joints, or other moving joints.

**3.05 ADHESIVE BOND AND COMPATIBILITY TESTING**

- A. Comply with requirements and recommendations of floor covering manufacturer.

**3.06 APPLICATION OF REMEDIAL FLOOR COATING**

- A. Comply with requirements and recommendations of coating manufacturer.

**3.07 PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

**END OF SECTION**

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**SECTION 09 21 16  
GYPSUM BOARD ASSEMBLIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Gypsum sheathing.
- C. Cementitious backing board.
- D. Gypsum wallboard.
- E. Joint treatment and accessories.

**1.02 REFERENCE STANDARDS**

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2023.
- B. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.
- C. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
- D. 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.
- E. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- F. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
- G. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- H. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, with Editorial Revision (2020).
- I. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- K. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
- L. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- M. GA-216 - Application and Finishing of Gypsum Panel Products; 2021.
- N. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on gypsum board, accessories, and joint finishing system.
  - 1. Provide data on metal framing, gypsum board, accessories, and joint finishing system.
  - 2. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- C. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

- B. Documents at Project Site: Maintain at the project site a copy of manufacturer's instructions, erection drawings, and shop drawings.

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

- A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.
- B. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

## **PART 2 PRODUCTS**

### **2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC as indicated calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
  - 1. Fire-Resistance-Rated Partitions: As indicated on the plans.
  - 2. Head of Fire-Resistance-Rated Partitions: As indicated on the plans.
  - 3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

### **2.02 BOARD MATERIALS**

- A. Manufacturers - Gypsum-Based Board:
  - 1. American Gypsum Company: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - 2. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 3. Georgia-Pacific Gypsum: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - 4. National Gypsum Company: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - 5. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  - 4. Thickness:
    - a. Vertical Surfaces: 5/8 inch (16 mm) Type X.
    - b. Ceilings: 5/8 inch (16 mm) Type X.
- C. Backing Board For Wet Areas:
  - 1. Application: Horizontal surfaces behind tile in wet areas including countertops.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
    - a. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch (16 mm).
- D. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
  - 1. Application: Vertical surfaces behind thinset tile, except in wet areas.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. Type X Thickness: 5/8 inch (16 mm).
  - 4. Edges: Tapered.

### **2.03 GYPSUM BOARD ACCESSORIES**

- A. Acoustic Insulation: As specified in Section 09 81 00.

- B. Sound Isolation Tape: Elastomeric foam tape for sound decoupling.
  - 1. Surface Burning Characteristics: Provide assemblies with flame spread index of 75 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
  - 2. Tape Thickness: 1/4 inch (6 mm).
- C. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- D. Water-Resistive Barrier: See Section 07 25 00.
- E. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, unless noted otherwise.
  - 1. Corner Beads: Low profile, for 90 degree outside corners.
  - 2. Expansion Joints:
    - a. Type: V-shaped PVC with tear away fins.
- F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

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

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

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Sound Isolation Tape: Apply to vertical studs and top and bottom tracks/runners in accordance with manufacturer's instructions.
- C. Acoustic Sealant: Install in accordance with manufacturer's instructions.
  - 1. Place two beads continuously on substrate before installation of perimeter framing (track) members.
  - 2. Place continuous bead at perimeter of each layer of gypsum board.
  - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.
    - a. Provide fire rated acoustical sealant in all rated walls in strict compliance with requirements of assembly listing.

#### **3.03 BOARD INSTALLATION**

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
  - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. 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.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- F. 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.

**3.04 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as directed.
  - 1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
- D. Decorative Trim: Install at locations shown on drawings and in accordance with manufacturer's instructions.

**3.05 JOINT TREATMENT**

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 4: Walls and ceilings to receive flat paint finish or wall coverings, unless otherwise indicated.
  - 2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
  - 3. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. 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 (0.8 mm).
- D. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

**3.06 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

**END OF SECTION**

**SECTION 09 22 16  
NON-STRUCTURAL METAL FRAMING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Metal partition framing.
- B. Framing accessories.

**1.02 REFERENCE STANDARDS**

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2020).
- B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- F. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.
- G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- H. 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.
- I. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
- J. ASTM E413 - Classification for Rating Sound Insulation; 2022.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate component details, stud layout, framed openings, anchorage to structure, type and location of fasteners, accessories, and items of other related work.
  - 2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
- C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

**1.05 DELIVERY, STORAGE AND HANDLING**

- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice".

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Metal Framing, Connectors, and Accessories:

1. ClarkDietrich Building Systems: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
2. MarinoWARE; \_\_\_\_: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
3. The Steel Network, Inc: [www.SteelNetwork.com/#sle](http://www.SteelNetwork.com/#sle).
4. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 FRAMING MATERIALS

- A. Fire Rated Assemblies: Comply with applicable code and as indicated on drawings.
- B. Non-Loadbearing Framing System Components: AISI S220; sheet steel, of size and properties necessary for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (L/240 at 240 Pa).
  1. Studs: C-shaped with flat faces.
  2. Runners: U-shaped, sized to match studs.
  3. Ceiling Channels: C-shaped.
- C. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws, and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
  1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code when evaluated in accordance with AISI S100.
  2. Material: ASTM A653/A653M steel sheet, SS Grade 50.
  3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
- D. Non-Loadbearing Framing Accessories:
  1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
  2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
    - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
    - b. Height: 23-3/4 inches (603 mm) and 35-3/4 inches (908 mm).
    - c. Products:
      - 1) ClarkDietrich; Pony Wall (PW): [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
      - 2) Substitutions: See Section 01 60 00 - Product Requirements.
  3. Framing Connectors: ASTM A653/A653M steel clips; secures cold rolled channel to wall studs for lateral bracing.
  4. Sheet Metal Backing: 0.0395 inch (1.01 mm) thick.
  5. Fasteners: ASTM C1002 self-piercing self-tapping screws.
  6. Anchorage Devices: Powder actuated.

## 2.03 FABRICATION

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

## PART 3 EXECUTION

### 3.01 EXAMINATION

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

### 3.02 INSTALLATION OF STUD FRAMING

- A. Comply with requirements of ASTM C1007.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

- E. Extend partition framing as indicated on drawings.
- F. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- G. Align and secure top and bottom runners at 24 inches (600 mm) on center.
- H. At partitions indicated with an acoustic rating:
  - 1. Provide components and install as required to produce STC ratings as indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
- I. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- J. Install studs vertically at 16 inches (400 mm) on center.
- K. Align stud web openings horizontally.
- L. Secure studs to tracks using fastener method. Do not weld.
- M. Stud splicing is not permissible.
- N. Fabricate corners using a minimum of three studs.
- O. Install double studs at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.
- P. Brace stud framing system rigid.
- Q. Coordinate erection of studs with requirements of door frames and window frames; install supports and attachments.
- R. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- S. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and opening frames.

### 3.03 CEILING AND SOFFIT FRAMING

- A. Comply with requirements of ASTM C754.
- B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- C. Install furring independent of walls, columns, and above-ceiling work.
- D. Securely anchor hangers to structural members or embed them in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.
- E. Space main carrying channels at maximum 72 inches (1 800 mm) on center, and not more than 6 inches (150 mm) from wall surfaces. Lap splice securely.
- F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- G. Place furring channels perpendicular to carrying channels, not more than 2 inches (50 mm) from perimeter walls, and rigidly secure. Lap splices securely.

### 3.04 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet (3 mm in 3 m).

### END OF SECTION

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**SECTION 09 30 00  
TILING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Non-ceramic trim.

**1.02 REFERENCE STANDARDS**

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2023.
- B. 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.
- C. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2023.
- D. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2019.
- E. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2023.
- F. ANSI A118.11 - American National Standard Specifications for EGP (Exterior Glue Plywood) Modified Dry-Set Mortar; 2017 (Reaffirmed 2022).
- G. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014 (Reaffirmed 2019).
- H. ANSI A136.1 - American National Standard Specifications for Organic Adhesives for Installation of Ceramic Tile; 2020.
- I. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.
- J. 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).
- K. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2024.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - 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.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, thresholds, ceramic accessories, and setting details.
- D. Selection Samples: Color charts illustrating full range of colors and patterns.
- E. Approval Samples: Samples of actual tiles for selection.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.

- B. Installer Qualifications:
  1. Company specializing in performing tile installation, with minimum of five years of documented experience.
- C. Single Source Responsibility: Obtain each type and color of tile from a single source. Obtain each type and color of mortar, adhesive and grout from the same source.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.
- B. Deliver and store products in manufacturer's unopened packaging until ready for installation.
- C. Store tile and setting materials on elevated platforms, under cover and in a dry location and protect from contamination, dampness, freezing or overheating.

#### 1.07 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature above 50 degrees F (10 degrees C) and below 100 degrees F (38 degrees C) during installation and curing of setting materials.

#### 1.08 MAINTENANCE MATERIALS

- 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. Tile and Trim Units: Furnish quantity of full-size units equal to three (3) percent for each type, composition, color, pattern, size and shape installed.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. American Olean Corporation: [www.americanolean.com/#sle](http://www.americanolean.com/#sle).
- B. Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).
- C. Emser Tile, LLC: [www.emser.com/#sle](http://www.emser.com/#sle).
- D. Summitville Tiles, Inc: [www.summitville.com](http://www.summitville.com).
- E. Ceramiche d'Arte, Distrubuted by B&F Ceramics Design Showroom: [www.bfceramics.com](http://www.bfceramics.com)
- F. Substitutions: See Section 01 60 00 - Product Requirements.
- G. Porcelain Mosaic Tile, Type WT-2: ANSI A137.1 standard grade.
  1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
  2. Size: 2 by 5 inch (51 by 127 mm), nominal.
  3. Shape: Chevron.
  4. Edges: Square.
  5. Surface Finish: polished.
  6. Color(s): To be selected by Architect from manufacturer's standard range.
  7. Product:
    - a. Dal-Tile Corporation: [www.daltile.com/#sle](http://www.daltile.com/#sle).
      - 1) Articulo, Basis of Design or approved substitution.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Glazed Wall Tile, Type WT-3: ANSI A137.1 standard grade.
  1. Moisture Absorption: 0 TO 0.5 percent as tested in accordance with ASTM C373.
  2. Size: 2.5 by 10 inch (63.5 by 254 inch), nominal.
  3. Edges: Cushioned.
  4. Surface Finish: Glossy.
  5. Color(s): To be selected by Architect from manufacturer's full range including accent colors.
  6. Products:
    - a. Ceramiche d'Arte, Distrubuted by B&F Ceramics Design Showroom: [www.bfceramics.com](http://www.bfceramics.com)
      - 1) Portofino, Basis of Design or approved substitution.

- b. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Porcelain Wall Tile, Type WT-1: ANSI A137.1 standard grade.
  - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
  - 2. Size: 12 by 24 inch (305 by 610 mm)
    - a. Pattern: Per Drawings
  - 3. Thickness: 5/16 inch (8 mm).
  - 4. Edges: Square.
  - 5. Surface Finish: Matte.
  - 6. Color(s): To be selected by Architect from manufacturer's full range.
  - 7. Products:
    - a. Dal-Tile: [www.daltile.com](http://www.daltile.com).
      - 1) Articulo, Basis of Design or approved substitution.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- J. Porcelain Floor Tile, Type FT-1: ANSI A137.1 standard grade.
  - 1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
  - 2. Size: 12 by 24 inch (305 by 610 mm), nominal.
  - 3. Thickness: 5/16 inch (8 mm).
  - 4. Edges: Square.
  - 5. Surface Finish: Matte glazed.
  - 6. Color(s): To be selected by Architect from manufacturer's full range.
  - 7. Products:
    - a. Dal-Tile Corporation: [www.daltile.com](http://www.daltile.com).
      - 1) Haut Monde, Basis of Design or approved substitution.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 TRIM AND ACCESSORIES

- A. Trim: Matching bullnose shapes in sizes coordinated with field tile.
  - 1. Applications:
    - a. Open Edges: Bullnose.
    - b. Inside Corners: Jointed.
  - 2. Manufacturers: Same as for tile.
- B. Non-Ceramic Trim - Walls: 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. Wall corners, outside.
    - c. Borders and other trim as indicated on drawings.
  - 2. Products:
    - a. Schluter-Systems; Schiene: [www.schluter.com/#sle](http://www.schluter.com/#sle).
      - 1) Product: Schluter Quadec Basis of Design or approved substitution.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Non-Ceramic Trim - Floors: Brushed stainless steel, style and dimensions to suit application.
  - 1. "L" shaped profile: 1/8 inch (3.2 mm) wide visible surface integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
    - a. Manufacturers:
      - 1) Schluter-Systems: [www.schluter.com/#sle](http://www.schluter.com/#sle).
        - (a) Product: Schluter SCHIENE Basis of Design or approved substitution.
      - 2) Genesis APS International: [www.genesis-aps.com/#sle](http://www.genesis-aps.com/#sle).
      - 3) Dural USA, Inc.: [www.dural.de](http://www.dural.de).
      - 4) Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Sloped profile: Sloped exposed surface, vertical leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
    - a. Manufacturers:

- 1) Schluter-Systems: [www.schluter.com/#sle](http://www.schluter.com/#sle).
  - (a) Product: Schluter RENO-U Basis of Design or approved substitution.
- 2) Genesis APS International: [www.genesis-aps.com/#sle](http://www.genesis-aps.com/#sle).
- 3) Substitutions: See Section 01 60 00 - Product Requirements.

### 2.03 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Manufacturers:
  1. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  2. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  3. Custom Building Products: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  4. LATICRETE International, Inc: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.

### 2.04 GROUTS

- A. Provide setting and grout materials from same manufacturer.
- B. Manufacturers:
  1. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
  2. Bostik Inc; \_\_\_\_\_: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  3. Custom Building Products: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
  4. LATICRETE International, Inc; \_\_\_\_\_: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Standard Grout: ANSI A118.6 standard cement grout.
  1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
  2. Use sanded grout for joints 1/8 inch (3.2 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3.2 mm) wide.
  3. Color(s): As selected by Architect from manufacturer's full line.
- D. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
  1. Applications: All floor & shower locations.
  2. Color(s): As selected by Architect from manufacturer's full line.
  3. Products:
    - a. ARDEX Engineered Cements; ARDEX WA: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; CEG-IG 100% Solids Industrial Grade Epoxy Grout: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - c. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - d. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.05 MAINTENANCE MATERIALS

- A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
  1. Applications: Between tile and plumbing fixtures.
  2. Color(s): As selected by Architect from manufacturer's full line.
  3. Products:
    - a. ARDEX Engineered Cements; ARDEX SX: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Custom Building Products; Commercial 100% Silicone Caulk: [www.custombuildingproducts.com/#sle](http://www.custombuildingproducts.com/#sle).
    - c. LATICRETE International, Inc; LATICRETE LATASIL: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - d. Merkrete, by Parex USA, Inc; Merkrete Colored Caulking: [www.merkrete.com/#sle](http://www.merkrete.com/#sle).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
  - 1. Composition: Water-based colorless silicone.

## **2.06 ACCESSORY MATERIALS**

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
  - 1. Crack Resistance: No failure at 1/8 inch (3.2 mm) gap, minimum.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- 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 tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

### **3.02 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
- E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

### **3.03 INSTALLATION - GENERAL**

- A. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- C. 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 non-ceramic trim in accordance with manufacturer's instructions.
- F. Install thresholds where indicated.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- K. 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.

### **3.04 INSTALLATION - FLOORS - THIN-SET METHODS**

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.

### **3.05 INSTALLATION - WALL TILE**

- A. Over coated glass mat backer board on studs, install in accordance with TCNA (HB) Method W245 typical locations or B419 at shower walls.

**3.06 CLEANING**

- A. Clean tile and grout surfaces.

**3.07 PROTECTION**

- A. Do not permit traffic over finished floor surface for 4 days after installation.

**END OF SECTION**

**SECTION 09 51 00  
ACOUSTICAL CEILINGS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

**1.02 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 C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.

**1.03 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.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning and junctions with other ceiling finishes.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Samples: Submit two full size samples illustrating material and finish of acoustical units.
- E. Samples: Submit two samples each, 12 inches (300 mm) long, of suspension system main runner, cross runner, and perimeter molding.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.05 QUALITY ASSURANCE**

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.06 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**1.07 MAINTENANCE MATERIALS**

- 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 five (5) percent of amount installed.
  - 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to two (2) percent of amount installed.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Acoustic Tiles/Panels:
  - 1. Armstrong World Industries, Inc: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
  - 2. CertainTeed Corporation: [www.certainteed.com/ceilings-and-walls/#sle](http://www.certainteed.com/ceilings-and-walls/#sle).
  - 3. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Suspension Systems:
  - 1. Same as for acoustical units.

**2.02 ACOUSTICAL UNITS**

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels, Type ACT-1: Painted mineral fiber, with the following characteristics:
  - 1. Classification: ASTM E1264 Type III.
  - 2. Size: 24 by 24 inches (610 by 610 mm).
  - 3. Thickness: 3/4 inch (19 mm).
  - 4. Tile Edge: Angled tegular.
  - 5. Color: White.
  - 6. Suspension System: Exposed grid.
  - 7. Product:
    - a. Armstrong World Industries, Inc: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
    - b. USG Corporation; Millenia Acoustical Panels: [www.usg.com/ceilings/#sle](http://www.usg.com/ceilings/#sle).
      - 1) Product: 76705 Basis of Design or approved substitution.
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Acoustical Panels, Type ACT-2: Mineral fiber with scrubbable finish, with the following characteristics:
  - 1. Classification: ASTM E1264 Type IX.
    - a. Form: 2, water felted.
    - b. Pattern: "E" - lightly textured.
  - 2. Size: 24 by 24 inches (610 by 610 mm).
  - 3. Thickness: 3/4 inch (19 mm).
  - 4. Panel Edge: Angled Tegular.
  - 5. Color: White.
  - 6. Suspension System: Exposed grid.
  - 7. Products:
    - a. USG Corporation: [www.usg.com/ceilings/#sle](http://www.usg.com/ceilings/#sle).
      - 1) Mars Helathcare Clean Room Panels, 86684CR, Basis of Design or approved substitution.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

**2.03 SUSPENSION SYSTEM(S)**

- 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. Exposed Suspension System: Hot-dipped galvanized steel grid with aluminum cap.
  - 1. Application(s): Seismic.
  - 2. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
  - 3. Profile: Tee; 15/16 inch (24 mm) face width.
  - 4. Finish: Baked enamel.
  - 5. Color: White.



**2.04 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 (2 mm) galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
  - 1. Size: As required for installation conditions and specified Seismic Design Category.
  - 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
- E. Acoustical Insulation: Specified in Section 09 81 00
- F. Touch-up Paint: Type and color to match acoustical and grid units.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

**3.02 PREPARATION**

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

**3.03 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C636/C636M and manufacturer's instructions 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 ceiling plan.
  - 1. Where no reflected ceiling plan is indicated; layout system to a balanced grid design with no edge units smaller than 4 inches (100 mm), unless directed otherwise by Architect.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
- E. Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to the perimeter molding on two adjacent walls; on opposite walls, maintain a 3/4 inch (19 mm) clearance between grid ends and wall.
- 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 (152 mm) 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 (25 mm) movement. Maintain visual closure.

**3.04 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- 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.
- 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 panels within 20 ft (6 m) of an exterior door.

**3.05 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**

**SECTION 09 65 00  
RESILIENT FLOORING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Resilient base.
- B. Installation accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2023.
- D. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
- E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - 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 two samples, 12x12 inch (300x300 mm) in size illustrating color and pattern for each resilient flooring product specified for Architect's approval.
- 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.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.
- C. Single-Source Responsibility: Obtain types of flooring and accessories and adhesive from a single manufacturer.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).
- D. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

**1.06 FIELD CONDITIONS**

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

- B. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65 degrees F (18 degrees C) and a maximum temperature of 100 degrees F (38 degrees C) for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55 degrees F (13 degrees C) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances.

### 1.07 WARRANTY

- A. Manufacturer's Materials Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
  - 1. 5 year limited warranty commencing on Date of Final Acceptance.

### 1.08 MAINTENANCE MATERIALS

- 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. Vinyl Composition Tile and Resilient Base: Furnish quantity of full-size units equal to five (5) percent for each type, composition, color, pattern, size and shape installed.

## PART 2 PRODUCTS

### 2.01 RESILIENT BASE

- A. Resilient Base- Type RB-1: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
  - 1. Manufacturers:
    - a. Johnsonite, a Tarkett Company: [www.johnsonite.com](http://www.johnsonite.com).
    - b. Mannington Commercial: [www.manningtoncommercial.com#sle](http://www.manningtoncommercial.com#sle).
    - c. Roppe Corporation: [www.roppe.com/#sle](http://www.roppe.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
  - 3. Height: 4 inches (100 mm).
  - 4. Thickness: 0.125 inch (3.2 mm).
  - 5. Finish: Matte.
  - 6. Length: Roll.
  - 7. Color: As selected by Architect from manufacturer's full range.
  - 8. Allow for two colors as selected by Architect from manufacturer's full range for RB-1.
- B. Resilient Base - Type RB-2: Same as RB-1, except:
  - 1. Height: 6 inches (150 mm).
  - 2. Allow for one color as selected by Architect from manufacturer's full range for RB-1.

### 2.02 ACCESSORIES

- A. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- B. Moldings, Transition and Edge Strips: as indicated on drawings.
  - 1. Provide transition/reducing strips tapered to meet abutting materials.
- C. Filler for Coved Base: Plastic.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

## PART 3 EXECUTION

### 3.01 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 alkalinity (pH).
  - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.
- E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

### **3.02 PREPARATION**

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- D. Clean substrate.
- E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.
- F. Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.
- G. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring. Make subfloor free from dust, dirt, grease, and all foreign materials.

### **3.03 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in strict accordance with manufacturer's instructions.
- C. Install multi-color accent tile in pattern as indicated on floor finish plan.
  - 1. Pattern: Quarter turn.

### **3.04 INSTALLATION - RESILIENT BASE**

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.
- B. Resilient Base - Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use manufacturer's premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.

### **3.05 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

### **3.06 MAINTENANCE - FLOORING**

- A. Machine scrub the floor with a properly diluted neutral detergent solution and a scrubbing pad or equivalent brushes.
  - 1. Do not use aggressive mop-on/mop-off, no-scrub and no-rinse strippers.
- B. Thoroughly rinse the entire floor with fresh, clean water. Remove rinse water and allow the floor to dry completely.
- C. Apply 5 coats of high-quality commercial floor polish.

**3.07 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.
- B. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

**END OF SECTION**

**SECTION 09 65 19  
RESILIENT TILE FLOORING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Resilient tile flooring.
- B. Installation accessories:
  - 1. Adhesives.
  - 2. Finishes and cleaners.

**1.02 REFERENCE STANDARDS**

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2023.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- C. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2021a, with Editorial Revision.
- D. ASTM F137 - Standard Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus; 2008 (Reapproved 2013).
- E. ASTM F386 - Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces; 2017 (Reapproved 2022).
- F. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- G. ASTM F925 - Standard Test Method for Resistance to Chemicals of Resilient Flooring; 2013 (Reapproved 2020).
- H. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2022.
- I. ASTM F1514 - Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color Change; 2003 (Reapproved 2013).
- J. ASTM F1515 - Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change; 2003 (Reapproved 2008).
- K. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.
- L. ASTM F1914 - Standard Test Method for Short-Term Indentation and Residual Indentation of Resilient Floor Covering; 2007 (Reapproved 2011).
- M. ASTM F2055 - Standard Test Method for Size and Squareness of Resilient Floor Tile by Dial Gauge Method; 2017 (Reapproved 2021).
- N. ASTM F2199 - Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat; 2009 (Reapproved 2014).
- O. ASTM F2421 - Standard Test Method for Measurement of Resilient Floor Plank by Dial Gage; 2005 (Reapproved 2011).
- P. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings.
- C. Manufacturer's documentation for flooring and accessories:
  - 1. Technical Data.
  - 2. Installation and Maintenance.
  - 3. Warranty.

- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit two samples, full size illustrating color and pattern for each resilient flooring product specified.

#### **1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and that the material is of the correct style, color, quantity and run number(s).
- B. Store all materials flat and off of the floor in an acclimatized, weather-tight space between 65 to 85 degrees F (18 to 29 degrees C).

#### **1.05 FIELD CONDITIONS**

- A. Acclimate material at jobsite between 65 to 85 degrees F (18 to 29 degrees C) and 35 percent to 85 percent relative humidity for 48 hours prior to installation. Temperature and relative humidity should also be maintained at the same levels during installation, and after installation.
- B. Spread unopened cartons no more than 6 cartons high and at least 4 inches (101 mm) apart.
- C. Keep away from heating and cooling ducts and direct sunlight.
- D. Close areas to traffic during installation of flooring and accessories.

#### **1.06 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: Installer experienced in performing work of this section with not less than three years of documented experience.

#### **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. 10-Year Commercial Material Warranty.

#### **1.08 MAINTENANCE MATERIALS**

- A. Extra Materials: Deliver extra materials to the Owner. Furnish extra materials from the same production run as products installed.
  - 1. Package with protective covering for storage and identified with appropriate labels.
  - 2. Furnish quantity of full-size units equal to five (5) percent for each type, composition, color, pattern, size and shape installed.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Mohawk Group: [www.mohawkgroup.com](http://www.mohawkgroup.com).
- B. Shaw Contract Group: [www.shawcontract.com](http://www.shawcontract.com).
- C. Armstrong Flooring Inc.: [www.armstrongflooring.com](http://www.armstrongflooring.com).
- D. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 RESILIENT TILE FLOORING**

- A. Luxury Vinyl Plank and Tile:
  - 1. Physical Properties:
    - a. Construction: Layered.
    - b. Wear Layer Thickness: 20 mil (0.5mm).
    - c. Total Thickness: 4.5mm.
    - d. Finish: M-Force Ultra.
  - 2. Manufacturing, Performance, and Safety Standards:
    - a. ASTM F1700, Classification: Class III, Type A - Smooth, Type B - Embossed.
    - b. ASTM F386, Thickness: Passes requirements.
    - c. ASTM F2055, Size and Squareness: Passes requirements.



- d. ASTM F1914, Residual Indentation: Surpasses requirements.
  - e. ASTM F137, Flexibility: Surpasses requirements.
  - f. ASTM F2199, Dimensional Stability: Surpasses requirements.
  - g. ASTM F925, Chemical Resistance: Surpasses requirements.
  - h. ASTM F1514, Resistance to Heat: Surpasses requirements.
  - i. ASTM F1515, Resistance to Light: Surpasses requirements.
  - j. ASTM E648/NFPA 253, Critical Radiant Flux: Class I.
  - k. ASTM E662, Smoke Density (Flaming and Non-Flaming): Passes requirements.
  - l. ASTM F970, Static Load Limit: Greater than or equal to 1,000 pounds (surpasses requirements).
- 3. Color: As selected by Architect from manufacturer's full range.
  - 4. Installation Pattern: As selected by Architect from manufacturer's full range.
  - 5. Product: Large and Local Collection: Rugged Foundation by Mohawk Group Basis of Design or approved substitution.

### 2.03 ACCESSORIES

- A. Moldings, Transition and Edge Strips: Same material as flooring.
- B. Adhesives: As recommended by manufacturer.
- C. Finishes and Cleaners: As recommended by manufacturer.

## PART 3 EXECUTION

### 3.01 EXAMINATION .

- A. Install flooring and accessories after other operations (including painting) have been completed.
- B. Acceptance of Conditions: Carefully examine all installation areas with installer/applicator present, for compliance with requirements affecting work performance.
  - 1. Verify that field measurements, product, adhesives, substrates, surfaces, structural support, tolerances, levelness, temperature, humidity, moisture content level, pH, cleanliness and other conditions are as required by the manufacturer, and ready to receive work.
- C. Verify that substrate is contaminant-free, including old adhesives and abatement chemicals.
- D. Test substrates as required by manufacturer to verify proper conditions exist.
  - 1. Concrete:
    - a. Check for concrete additives such as fly ash, curing compounds, hardeners, or other surface treatments that may prevent proper bonding of floor coverings.
    - b. Perform alkalinity testing per ASTM F710 to verify pH level is between 7 to 10.
    - c. Check substrate for absorbency per manufacturer's recommendations.
    - d. Perform bond testing per ASTM F710 to determine compatibility of adhesive to concrete substrate.
- E. Verify that required floor-mounted utilities are in correct location.

### 3.02 PREPARATION

- A. Flooring installation should not begin until all site conditions have been assessed, testing has been completed and subfloor conditions have been approved.
- B. Prepare per manufacturer's written instructions, Section 01 7000, and as follows:
  - 1. Prepare substrates to ensure proper adhesion of Luxury Vinyl Plank & Tile.
  - 2. Concrete Substrates: Prepare substrate per ASTM F710.
    - a. Verify that subfloor is clean, flat, smooth, free of dirt, rust, paint, oil, wax or any contaminant that will interfere with adhesive bonding.
    - b. Mechanically remove substrate coatings that are not compatible with adhesives, such as sealers, curing, hardening or parting compounds, soap, wax, oil, etc.
      - 1) Do not use solvents or adhesive removers.
    - c. Expansion joints, isolation joints, or other moving joints must be honored and must not be filled with underlayment products or other materials, and floor coverings must not be laid over them. Expansion joint covering systems should be detailed by the architect or engineer, and based upon intended usage and aesthetic considerations.

- d. Surface cracks, grooves, depressions, control joints or other non-moving joints, and other irregularities shall be filled or smoothed with high-quality Portland cement or calcium aluminate based patching or underlayment compound for filling or smoothing, or both.
  - 1) Do not skim-coat large areas with patching compound, especially slick power-troweled surfaces.
  - 2) Sand smooth per manufacturer's instructions.
- e. Slick surfaces such as power-troweled concrete shall be profiled as needed to allow for a mechanical bond between the adhesive and subfloor.
- f. Do not use gypsum-based underlayment products and do not skim coat concrete subfloors.
- g. Self-Leveling Underlayments: Provide a dry and smoothly-sanded underlayment substrate ready for installation of Luxury Vinyl Plank & Tile. Underlayment compound shall be moisture-resistant, mildew-resistant, and alkali-resistant and must have a minimum of 3,000 psi compressive strength per ASTM C109/C109M.
- h. Lightweight concrete shall have a compressive strength greater than 90 pounds per cubic foot with minimum compression strength of 2,500 psi or greater.

### 3.03 INSTALLATION

- A. Installation per manufacturer's written instructions, Section 01 7000, and as follows:
  1. Layout shall be specified by Architect.
  2. Follow layout and ensure installation reference lines are square.
  3. Field tiles shall be installed with directional arrows on back aligned in the same direction, or may be installed in quarter-turned fashion.
  4. Check cartons for and do not mix dye lots.
  5. Adhesives: Adhere flooring to substrate using the full spread method resulting in a completed installation without gaps, voids, raised edges, bubbles or any other surface imperfections.
    - a. Select appropriate adhesive, trowel and follow manufacturer's instructions.
    - b. Periodically spot-check transfer of adhesive to back of tile during installation.
    - c. Roll floor with a 100 pound roller to ensure proper transfer of adhesive and bonding.
    - d. Protect floor from traffic per manufacturer's instructions.
    - e. Do not wet mop floor until the adhesive has properly set per written instructions.

### 3.04 CLEANING

- A. Waste Management per Section 01 7000 and Section 01 7419, and as follows:
  1. Coordinate material reclamation program with manufacturer, if applicable.
    - a. Store and return cartons and pallets to manufacturer or recycler for reuse or recycling.
- B. Provide progress cleaning per manufacturer's written instructions, Section 01 7000, and as follows:
  1. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.
    - a. Clean and protect completed construction until Date of Substantial Completion.
    - b. During installation, remove wet adhesive from surface of flooring per manufacturer's instructions.
  2. Site: Maintain project site free of waste materials and debris.
- C. Provide final cleaning immediately prior to Date of Substantial Completion inspection per manufacturer's written instructions and Section 01 7000.
  1. Protection: Remove manufacturer's and other installed protection immediately prior to Date of Substantial Completion inspection, unless required otherwise.
  2. Clean floor with a neutral 6-8 pH cleaner.

### 3.05 MAINTENANCE

- A. Initial maintenance per flooring manufacturer's written instructions and as follows:
  1. Allow the adhesive to cure for at least 48 hours prior to wet cleaning the floor.
  2. Sweep, dust mop or vacuum the floor thoroughly to remove all loose dirt, dust, grit and debris. Do not use vacuums with a beater bar assembly.
  3. Remove any dried adhesive residue from the surface with mineral spirits applied to a clean, lint-free cloth.

4. Damp mop the floor using a cleaner recommended by the flooring manufacturer.
5. If necessary, scrub the floor using an auto scrubber or rotary machine (300 rpm or less) with a cleaner recommended by the flooring manufacturer. Maintain the proper dilution ratio and use the appropriate scrubbing brush or pad.
6. Thoroughly rinse the entire floor with fresh, clean water. Remove the dirty residue with a wet-vacuum or clean mop and allow the floor to dry completely.

### **3.06 PROTECTION**

- A. Protect materials from construction operations until Date of Substantial Completion or Owner occupancy, whichever occurs first.
  1. Protect finished floor from abuse and damage by using heavy non-staining kraft paper, drop cloths or equivalent. Use additional, non-damaging protective materials as needed.
  2. Light foot traffic on a newly installed floor can be permitted after 24 hours.
  3. Keep heavy traffic and rolling loads off the newly installed LVT flooring for 48 hours.
  4. Protect the floor from rolling loads by covering with protective boards.

**END OF SECTION**

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**SECTION 09 68 13  
TILE CARPETING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Carpet tile, fully adhered.

**1.02 REFERENCE STANDARDS**

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016 (Reapproved 2021).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- C. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- D. Submit two, 12 inch (300 mm) long samples of edge strip and base cap.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

**1.04 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.

**1.05 FIELD CONDITIONS**

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

**1.06 MAINTENANCE MATERIALS**

- 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. Carpet Tile: Furnish quantity of full-size units equal to five (5) percent for each type, color, pattern and size installed.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Shaw Contract Group: [www.shawcontractgroup.com](http://www.shawcontractgroup.com).
- B. Interface, Inc: [www.interface.com/#sle](http://www.interface.com/#sle).
- C. Milliken & Company: [www.milliken.com/#sle](http://www.milliken.com/#sle).
- D. Mohawk Group: [www.mohawkgroup.com/#sle](http://www.mohawkgroup.com/#sle).
  - 1. Basis of Design or approved substitution.
- E. Patcraft: [www.patcraft.com](http://www.patcraft.com).
- F. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 MATERIALS**

- A. Tile Carpeting, Type CPT-1: Tufted, manufactured in one color dye lot.
  - 1. Product: Sketch Effect Collection manufactured by Mohawk or approved substitution.
    - a. CPT-2: Framed Structure.
      - 1) Color: As selected by Architect from manufacturer's full range.
      - 2) Installation Pattern: Brick Ashlar.
      - 3) Allow for two colors as selected by Architect from manufacturer's full range for CPT-1.
  - 2. Tile Size: 24x24 inch (600x600 mm), nominal.
  - 3. Thickness (finished pile): 0.082 inch (2.08 mm).
  - 4. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  - 5. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
  - 6. Gage: 1/12 inch (47.0 rows per 10 cm).
  - 7. Stitches: 11 per inch (43.31 per 10 cm).
  - 8. Tufted Weight: 15.00 oz/sq yd (678 g / sq. m).
  - 9. Primary Backing Material: Synthetic.
  - 10. Secondary Backing Material: EcoFlex Air.
- B. Tile Carpeting, Type CPT-2: Walk-Off Tile, manufactured in one color dye lot.
  - 1. Product: Tuff Stuff II manufactured by Mohawk or approved substitution.
    - a. CPT-3: First Step II.
      - 1) Color: As selected by Architect from manufacturer's full range.
      - 2) Installation Pattern: Multi-Directional.
  - 2. Tile Size: 24x24 inch (600x600 mm), nominal.
  - 3. Thickness (finished pile): 0.413 inch (2.08 mm).
  - 4. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
  - 5. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
  - 6. Gage: 1/12 inch (47.2 per 10 cm).
  - 7. Stitches: 8.5 per inch (33.46 per 10 cm).
  - 8. Tufted Weight: 38.0 oz/sq yd (1288 g / sq. m).
  - 9. Primary Backing Material: Synthetic.
  - 10. Secondary Backing Material: EcoFlex NXT.

**2.03 ACCESSORIES**

- A. Edge Strips: Rubber, color as selected.
- B. Carpet Tile Adhesive: Recommended by carpet tile manufacturer.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.
- C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for alkalinity (pH).
  - 1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

**3.02 PREPARATION**

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

**3.03 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. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Fully adhere carpet tile to substrate.
- G. Trim carpet tile neatly at walls and around interruptions.
- H. Complete installation of edge strips, concealing exposed edges.

**3.04 CLEANING**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION**

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**SECTION 09 81 00  
ACOUSTIC INSULATION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Batt Acoustical Insulation.

**1.02 REFERENCE STANDARDS**

- A. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- B. ASTM C 553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
- C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- F. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C.
- G. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- H. National Fire Protection Association (NFPA) Life Safety Code.

**1.03 SUBMITTALS**

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Manufacturer with a minimum of ten years of documented experience manufacturing products in this section shall provide all products listed.
- B. Installer Qualifications: Products listed in this section shall be installed by a single organization with at least five years of documented experience successfully installing insulation on projects of similar type and scope as specified in this section.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Store materials in dry locations with adequate ventilation, free from water, and in such a manner to permit easy access for inspection and handling.
- C. Handle materials to avoid damage.
- D. Ensure that products of this section are supplied in time to prevent interruption of construction progress.

**1.06 PROJECT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).

1. Basis of Design or approved substitution.
- B. Johns Manville: [www.jm.com](http://www.jm.com).
- C. Owens-Corning Fiberglass Corporation: [www.owenscorning.com](http://www.owenscorning.com).
- D. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 APPLICATIONS

- A. Interior Partitions: Batt type.
- B. Above Interior Ceilings: Batt type.

## 2.03 MATERIALS

- A. Acoustical/Thermal Insulation: Certaineed Sound Attenuation NoiseReducer Batts preformed glass fiber batt insulation (Basis of Design or approved substitution).
  1. Location: Between studs - friction fit, coordinate thickness with wall type.
  2. Facing: ASTM C 665, Type 1, Unfaced.
    - a. Fire Hazard Classification ASTM E84.
    - b. Maximum Flame Spread Index of 25.
    - c. Maximum Smoke Developed Index of 50.
    - d. Noncombustible ASTM E 136, passes.
  3. Thermal Resistance: R of 11 (RSI 1.9) and R of 19 (RSI 3.3).
  4. Thickness: 3 1/2 inches (89 mm) and 6 1/4" (159 mm).
  5. Width: As required by project conditions.
- B. Acoustical/Thermal Insulation: Certaineed Acoustical Ceiling NoiseReducer Batts preformed glass fiber batt insulation. (Basis of Design or approved substitution).
  1. Location: Ceiling.
  2. Facing: ASTM C 665, Type 1, Unfaced.
    - a. Fire Hazard Classification ASTM E84.
    - b. Maximum Flame Spread Index of 25.
    - c. Maximum Smoke Developed Index of 50.
    - d. Noncombustible ASTM E 136, passes.
  3. Thermal Resistance: R of 19 (RSI 3.3).
  4. Thickness: 6 1/4 inches (159 mm).
  5. Width: As required by project conditions.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that all interior walls, partitions, and ceiling assembly construction has been completed to the point where the insulation may correctly be installed.
- C. Verify that mechanical and electrical services in ceilings, walls and floors have been installed and tested and, if appropriate, verify that adjacent materials are dry and ready to receive insulation.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.02 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.

### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

- D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.

**3.04 PROTECTION**

- A. Protect installed products until completion of project.

**END OF SECTION**

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**SECTION 09 91 13  
EXTERIOR PAINTING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
  - 1. Exposed surfaces of steel lintels and ledge angles.
  - 2. Mechanical and Electrical:
    - a. On the roof and outdoors, paint equipment exposed to weather or to view, including factory-finished materials.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise 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. Roof mechanical equipment screen.
  - 6. Floors, unless specifically indicated.
  - 7. Ceramic and other types of tiles.
  - 8. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
  - 9. Glass.
  - 10. Concealed pipes, ducts, and conduits.

**1.02 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. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- D. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
  - 4. Manufacturer's installation instructions.
- C. Samples: Submit two paper chip samples, 2 x 2 inch (50 x 50 mm) in size illustrating range of colors and textures available for each surface finishing product scheduled.
- D. Samples: Submit two painted samples, illustrating selected colors for each color and system selected with specified coats cascaded. Submit on tempered hardboard, 8 1/2 x 11 inch (216 x 279 mm) in size.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning

instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

#### **1.04 MAINTENANCE MATERIALS**

- A. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.

#### **1.05 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 three years documented experience.

#### **1.06 MOCK-UPS**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Locate where directed by Architect.
- C. Mock-up may remain as part of the work.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

#### **1.08 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- 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 paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  - 2. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
  - 3. Benjamin Moore & Co.: [www.benjaminmoore.com](http://www.benjaminmoore.com).
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 60 00 - Product Requirements.

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

- A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.

1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  2. 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 paint material in quantity required to complete entire project's work from a single production run.
  5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
1. Provide paints and finishes 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.
  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.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: As indicated in Color Schedule.
1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
  2. Extend colors to surface edges; colors may change at any edge as directed by Architect.

### 2.03 PAINT SYSTEMS - EXTERIOR

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including roof mounted equipment.
1. Two top coats and one coat primer.
  2. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint CE-OP-3A - Concrete/Masonry, Opaque, Acrylic, 3 Coat:
1. One coat of block filler.
  2. Satin: Two coats of elastomeric.
- C. Paint ME-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
1. One coat of latex primer.
  2. Semi-gloss: Two coats of latex enamel.
- D. Paint ME-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
  2. Semi-gloss: Two coats of latex enamel.
- E. Paint MgE-OP-3L - Galvanized Metals, Latex, 3 Coat:
1. One coat galvanize primer.
  2. Semi-gloss: Two coats of latex enamel.

### 2.04 ACCESSORY MATERIALS

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

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.

**3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Exterior Gypsum Board: Fill minor defects with exterior filler compound. Spot prime defects after repair.
- G. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
  - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.
- H. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

**3.03 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 written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.
- F. Sand metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**3.04 CLEANING**

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



**3.05 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Final Acceptance.

**END OF SECTION**

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**SECTION 09 91 23  
INTERIOR PAINTING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
  - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise 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, bar code labels, and operating parts of equipment.
  - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
  - 6. Floors, unless specifically indicated.
  - 7. Ceramic and other tiles.
  - 8. Glass.
  - 9. Concealed pipes, ducts, and conduits.

**1.02 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 D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- D. SSPC-SP 2 - Hand Tool Cleaning; 2018.
- E. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
  - 2. MPI product number (e.g., MPI #47).
  - 3. Cross-reference to specified paint system products to be used in project; include description of each system.
  - 4. Manufacturer's installation instructions.
- C. Samples: Submit two paper chip samples, 2 x 2 inch (50 x 50 mm) in size illustrating range of colors and textures available for each surface finishing product scheduled.
- D. Samples: Submit two painted samples, illustrating selected colors for each color and system selected with specified coats cascaded. Submit on tempered hardboard, 8 1/2 x 11 inch (216 x 279 mm) in size.
- E. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- F. Manufacturer's Instructions: Indicate special surface preparation procedures.
- G. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning

instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

#### **1.04 MAINTENANCE MATERIALS**

- A. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gal (4 L) of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.

#### **1.05 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 of three years of documented experience.

#### **1.06 MOCK-UP**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Locate where directed by Architect.
- C. Mock-up may remain as part of the work.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

#### **1.08 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F (3 degrees C) above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 fc (860 lux) measured mid-height at substrate surface.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  - 2. Benjamin Moore & Co.: [www.benjaminmoore.com](http://www.benjaminmoore.com).
  - 3. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 60 00 - Product Requirements.

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

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.

1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  2. 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. Supply each paint material in quantity required to complete entire project's work from a single production run.
  4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
1. Provide paints and finishes 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.
  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.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors:
1. Selection to be made by Architect after award of contract.
  2. Allow for minimum of ten colors for each system, unless otherwise indicated, without additional cost to Owner.
  3. Extend colors to surface edges; colors may change at any edge as directed by Architect.
  4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

### 2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, uncoated steel, and shop primed steel.
1. Two top coats and one coat primer.
  2. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
1. Medium duty applications include doors and door frames.
  2. Two top coats and one coat primer.
  3. Top Coat(s): High Performance Architectural Interior Latex.
  4. Top Coat Sheen:
    - a. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
  5. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Paint I-OP-MD-WC - Medium Duty Overhead: Including gypsum board, uncoated steel, shop primed steel, and galvanized steel.
1. Two top coats and one coat primer.
  2. Top Coat(s): High Performance Architectural Interior Latex.
  3. Top Coat Sheen:
    - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces and for all painted finishes in the Welding Shop.
  4. Primer: As recommended by top coat manufacturer for specific substrate.
- D. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
1. One coat of latex primer.
  2. Semi-gloss: Two coats of latex enamel.

- E. Paint Mgl-OP-3L - Galvanized Metals, Latex, 3 Coat:
  - 1. One coat galvanize primer.
  - 2. Semi-gloss: Two coats of latex enamel.
- F. Paint CI-OP-3E - Concrete/Masonry, Epoxy Enamel, 3 Coat:
  - 1. One coat of catalyzed epoxy primer.
  - 2. Semi-Gloss: Two coats of catalyzed epoxy enamel.
- G. Paint GI-OP-3A - Gypsum Board/Plaster, Alkyd, 3 Coat:
  - 1. One coat of alkyd primer sealer.
  - 2. Semi-gloss: Two coats of industrial alkyd urethane.
  - 3. Locations: All toilet room gypsum board walls.
- H. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
  - 1. One coat of alkyd primer sealer.
  - 2. Flat: Two coats of latex enamel.

#### **2.04 ACCESSORY MATERIALS**

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

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin application of paints and finishes until substrates have been adequately prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
  - 1. Gypsum Wallboard: 12 percent.
  - 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
  - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Masonry:
  - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
  - 2. Prepare surface as recommended by top coat manufacturer.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

- H. Galvanized Surfaces:
  - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  - 2. Prepare surface according to SSPC-SP 2.
- I. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
  - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.
- J. 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.

### 3.03 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 written instructions.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### 3.04 CLEANING

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

### 3.05 PROTECTION

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

**END OF SECTION**

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**SECTION 10 11 00  
VISUAL DISPLAY UNITS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Porcelain enamel steel markerboards.

**1.02 REFERENCE STANDARDS**

- A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).
- B. ANSI A208.1 - American National Standard for Particleboard; 2022.
- C. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on markerboard, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.
- D. Samples: Submit color charts for selection of color and texture of markerboard and trim.
- E. Samples: Submit two two samples 6 by 6 inch (150 by 150 mm) in size illustrating materials and finish, color and texture of markerboard, markerboard, tackboard, and tackboard.
- F. Test Reports: Show compliance to specified surface burning characteristics requirements.
- G. Manufacturer's printed installation instructions.
- H. Maintenance Data: Include data on regular cleaning, stain removal .

**1.04 QUALITY ASSURANCE**

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

**1.05 WARRANTY**

- A. See Section 01 78 00 - 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****2.01 VISUAL DISPLAY UNITS**

- A. Porcelain Enamel Steel Markerboards:
  - 1. Manufacturers:
    - a. AJW Architectural Products: [www.ajw.com/#sle](http://www.ajw.com/#sle).
    - b. ASI Visual Display Products: [www.asi-visualdisplayproducts.com/#sle](http://www.asi-visualdisplayproducts.com/#sle).
    - c. Claridge Products and Equipment, Inc: [www.claridgeproducts.com/#sle](http://www.claridgeproducts.com/#sle).
    - d. Nelson Adams NACO: [www.nelsonadamsnaco.com/#sle](http://www.nelsonadamsnaco.com/#sle).
  - 2. Color: As selected from manufacturer's full range.
  - 3. Steel Face Sheet Thickness: 24 gauge, 0.0239 inch (0.61 mm).
  - 4. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
  - 5. Backing: Galvanized steel sheet, laminated to core.
  - 6. Size: As indicated on drawings.
  - 7. Frame: Extruded aluminum , with concealed fasteners.
  - 8. Frame Profile: Box style.
  - 9. Frame Finish: Anodized, natural.
  - 10. Accessories: Provide marker tray and marker tray.

**2.02 MATERIALS**

- A. Porcelain Enamelled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.

- B. Hardboard for Cores: ANSI A135.4, Class 1 - Tempered, S2S (smooth two sides).
- C. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
- D. Steel Sheet Backing: 28 gauge, 0.0149 inch (0.38 mm), galvanized.

### **2.03 ACCESSORIES**

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall (; 25 mm wide overall) , full width of frame.
- B. Temporary Protective Cover: Sheet polyethylene, 8 mil (0.2 mm) thick.
- 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**

### **3.01 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.

### **3.02 PREPARATION**

- A. Acclimatize tackable wall panels by removing from packaging in installation area not less than 24 hours before application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.03 INSTALLATION**

- A. Install boards in accordance with manufacturer's instructions.
- B. Install with top of marker tray at 30 inches (760 mm) above finished floor.
- C. Secure units level and plumb.
- D. Butt Joints: Install with tight hairline joints.

### **3.04 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 Date of Substantial Completion.

**END OF SECTION**

**SECTION 10 14 19  
DIMENSIONAL LETTER SIGNAGE****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Dimensional letter signage.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.
- C. Samples: Submit one sample of each type of dimensional letter sign of size similar to that required for project, indicating sign style, font, and method of attachment.
- D. Selection Samples: Where materials, colors, and finishes are not specified, submit two sets of selection charts or chips.
- E. Verification Samples: Submit samples showing colors and finishes specified.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Package dimensional letter signs as required to prevent damage before installation.
- B. Store under cover and elevated above grade.

**PART 2 PRODUCTS****2.01 DIMENSIONAL LETTERS**

- A. Applications: Building identification.
  - 1. Use individual metal letters.
  - 2. Mounting Location: Exterior as indicated on drawings.
  - 3. Content: As indicated on drawings.
- B. Metal Letters:
  - 1. Material: Aluminum casting.
  - 2. Thickness: Manufacturer's standard for letter size.
  - 3. Letter Height: As indicated on drawings.
  - 4. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
    - b. Character Case: Upper case only.
  - 5. Finish: Baked enamel.
  - 6. Color: As selected by Architect from manufacturers full range.
  - 7. Mounting: Projected stud.
  - 8. Content: As indicated on plans.

**2.02 ACCESSORIES****PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.

C. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

**END OF SECTION**

**SECTION 10 14 23  
PANEL SIGNAGE****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Panel signage.
- B. Building street number.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
  - 1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
  - 2. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
    - a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
    - b. 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.
    - c. 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, indicating sign style, font, and method of attachment.
- E. Selection Samples: Where colors, materials, and finishes are not specified, submit two sets of color selection charts or chips.
- F. Verification Samples: Submit samples showing colors, materials, and finishes specified.
- G. Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- H. Manufacturer's qualification statement.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.05 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.

**1.06 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain minimum ambient temperature during and after installation.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Panel Signage:

1. ASI Sign Systems, Inc: [www.asisignage.com](http://www.asisignage.com)
2. Avalis Wayfinding Solutions: [www.avalisway.com](http://www.avalisway.com)
3. Best Sign Systems, Inc: [www.bestsigns.com/#sle](http://www.bestsigns.com/#sle).
4. FASTSIGNS International, Inc: [www.fastsigns.com/#sle](http://www.fastsigns.com/#sle).
5. Gemini, Inc.: [www.geminisigns.com](http://www.geminisigns.com)
6. Inpro Corporation: [www.inprocorp.com/#sle](http://www.inprocorp.com/#sle).
7. Mohawk Sign Systems, Inc: [www.mohawksign.com/#sle](http://www.mohawksign.com/#sle).
8. Seton Identification Products: [www.seton.com/aec/#sle](http://www.seton.com/aec/#sle).
9. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 REGULATORY REQUIREMENTS

- A. Accessibility Requirements: 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 restrictive requirements.

## 2.03 PANEL SIGNAGE

- A. Panel Signage:
  1. Application: Room and door signs.
  2. Description: Flat signs with applied character panel media, tactile characters.
  3. Sign Size: As indicated on drawings and as necessary for compliance with ANSI/ICC A117.1 Chapter 7.
  4. Total Thickness: 1/8 inch (3 mm).
  5. Color and Font, unless otherwise indicated:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
    - b. Character Case: Upper and lower case (title case).
    - c. Background Color: As selected by Architect from manufacturers full range.
    - d. Character Color: Contrasting color as selected by Architect from manufacturers full range.
  6. Material: Acrylic plastic base with applied plastic letters and braille.
  7. Profile: Flat panel without frame.
  8. Tactile Letters: Raised 1/32 inch minimum.
  9. Braille: Grade II, ADA-compliant.
  10. One-Sided Wall Mounting: Tape adhesive.

## 2.04 BUILDING STREET NUMBER

- A. Die Cut Vinyl: Use individual numbers.
  1. Size: 10 inches unless directed otherwise by authority having jurisdiction.
  2. Color: As selected by Architect from manufacturers full range.
- B. Content: As directed by Owner.
- C. Location: As directed by authority having jurisdiction.

## 2.05 SIGNAGE APPLICATIONS

- A. Room and Door Signs:
  1. Office Doors: Identify with room names and numbers to be determined later, not those indicated on drawings; provide "window" section for replaceable occupant name.
  2. Conference and Meeting Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
  3. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
  4. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", and braille.

## 2.06 ACCESSORIES

- A. Tape Adhesive: Double-sided tape, permanent adhesive.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

- B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.
- C. Locate panel 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 28 00  
TOILET, BATH, AND LAUNDRY ACCESSORIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Commercial shower and bath accessories.
- C. Under-lavatory pipe supply covers.
- D. Utility room accessories.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2022.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2024.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Commercial Toilet, Shower, and Bath Accessories:
  - 1. ASI - American Specialties, Inc: [www.americanspecialties.com](http://www.americanspecialties.com).
    - a. Basis of Design or approved substitution.
  - 2. Bradley Corporation: [www.bradleycorp.com](http://www.bradleycorp.com).
  - 3. Bobrick: [www.bobrick.com](http://www.bobrick.com).
  - 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Provide products of each category type by single manufacturer.

**2.02 MATERIALS**

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Keys: Provide two keys for each key operated accessory to Architect .
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- G. Adhesive: Two component epoxy type, waterproof.
- H. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

### 2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Back paint components where contact is made with building finishes to prevent electrolysis.

### 2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser - TD: Double roll, surface mounted bracket type, stainless steel.
  - 1. Products:
    - a. Product: 7305-2S manufactured by ASI or approved substitution.
- B. Paper Towel Dispenser - PT: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.
  - 1. Capacity: 400 minimum.
  - 2. Product: 0210 manufactured by ASI or approved substitution.
- C. Soap Dispenser - SD: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and vertical stainless steel tank and working parts; automatic battery operated dispensing, and window gage refill indicator, tumbler lock.
  - 1. Minimum Capacity: 35 ounces (1.2 liters).
  - 2. Product: 0360 manufactured by ASI or approved substitution.
- D. Mirrors - MR: Stainless steel framed, 1/4 inch (6 mm) thick annealed float glass; ASTM C1036.
  - 1. Size: As indicated on drawings.
  - 2. Product: 0600 manufactured by ASI or approved substitution.
- E. Grab Bars - GB: Stainless steel, peened surface.
  - 1. Standard Duty Grab Bars:
    - a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
    - b. Dimensions: 1-1/2 inch (38 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
    - c. Finish: Satin.
    - d. Length and Configuration: As indicated on drawings.
    - e. Product: 3800-P manufactured by ASI or approved substitution.

### 2.05 COMMERCIAL SHOWER AND BATH ACCESSORIES

- A. Shower Curtain Assembly - CR:
  - 1. Shower Curtain Rod: Stainless steel tube, 1 inch (25 mm) outside diameter, 0.04 inch (1.0 mm) wall thickness, satin-finished, with 3 inch (75 mm) outside diameter, minimum 0.04 inch (1.0 mm) thick satin-finished stainless steel flanges, for concealed mounting.
    - a. Products: 1214 manufactured by ASI or approved substitution.
  - 2. Shower Curtain:
    - a. Material: Opaque vinyl, 0.008 inch (0.2 mm) thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
    - b. Products: 1200-V manufactured by ASI or approved substitution
  - 3. Shower curtain hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
    - a. Product: 1200-SHU manufactured by ASI or approved substitution.
- B. Folding Shower Seat - SS: Wall-mounted surface; welded tubular seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, rectangular seat - hand as

indicated on plans or as required.

1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of color as selected.
  2. Size: ADA Standards compliant.
  3. Products: 8203-33 as manufactured by ASI or approved substitution.
- C. Wall-Mounted Soap Basket - SB: Heavy duty, stainless steel with wires for drainage, surface mouted, satin finish; with concealed mechanical fastening suitable for substrate .
1. Products: 7322 as manufactured by ASI or approved substitution.
- D. Towel Pin - TH: Stainless steel, 3 1/2 inch (75 mm) extension from wall; rectangular-shaped bracket and backplate for concealed attachment, satin finish.
1. Product: 7301-S manufactured by ASI or approved substitution.

## **2.06 UTILITY ROOM ACCESSORIES**

- A. Combination Utility Shelf/Mop and Broom Holder - MS: 0.05 inch (1.3 mm) thick stainless steel, Type 304, with 3/4 inch (19 mm) returned edges, 0.06 inch (1.6 mm) steel wall brackets.
1. Hooks: Two, 0.06 inch (1.6 mm) stainless steel rag hooks at shelf front.
  2. Mop/broom holders: Three spring-loaded rubber cam holders at shelf front.
  3. Length: 30 inches (762 mm).
  4. Product: 1315-3 as manufactured by ASI or approved substitution.
  5. Installation: One in each janitors room.
    - a. Coordinate location with owner.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.

### **3.02 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

### **3.03 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

### **3.04 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION**

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**SECTION 10 44 00  
FIRE PROTECTION SPECIALTIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.
- D. Fire Department Key Lock Box.

**1.02 REFERENCE STANDARDS**

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- B. FM (AG) - FM Approval Guide; Current Edition.
- C. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- D. UL (DIR) - Online Certifications Directory; Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, anchorage details, and installation instructions.
- C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

**1.04 FIELD CONDITIONS**

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Fire Extinguishers:
  - 1. Activar Construction Products Group, Inc. - JL Industries: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - 2. Ansul, a Tyco Business: [www.ansul.com/#sle](http://www.ansul.com/#sle).
  - 3. Kidde, a unit of United Technologies Corp: [www.kidde.com](http://www.kidde.com).
  - 4. Nystrom, Inc: [www.nystrom.com](http://www.nystrom.com).
  - 5. Potter-Roemer: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).
  - 6. Pyro-Chem, a Tyco Business: [www.pyrochem.com/#sle](http://www.pyrochem.com/#sle).
  - 7. JL Industries, Inc. : [www.jlindustries.com](http://www.jlindustries.com).
  - 8. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Fire Extinguisher Cabinets and Accessories:
  - 1. Activar Construction Products Group - JL Industries: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - 2. Kidde, a unit of United Technologies Corp: [www.kidde.com](http://www.kidde.com).
  - 3. Larsen's Manufacturing Co: [www.larsensmfg.com/#sle](http://www.larsensmfg.com/#sle).
  - 4. Nystrom, Inc: [www.nystrom.com/#sle](http://www.nystrom.com/#sle).
  - 5. Potter-Roemer: [www.potterroemer.com/#sle](http://www.potterroemer.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 FIRE EXTINGUISHERS**

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
  1. Stored Pressure Operated: Deep Drawn.
  2. Class: A:B:C type.
  3. Size: 10 pound (4.54 kg).
  4. Finish: Baked polyester powder coat, color as selected.
  5. Temperature range: Minus 40 degrees F (Minus 40 degrees C) to 120 degrees F (49 degrees C).

### 2.03 FIRE EXTINGUISHER CABINETS

- A. Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- B. Cabinet Construction: Non-fire rated.
  1. Formed primed steel sheet; 0.036 inch (0.9 mm) thick base metal.
- C. Fire Rated Cabinet Construction: One-hour fire rated.
  1. Steel; double wall or outer and inner boxes with 5/8 inch (15.9 mm) thick fire barrier material.
- D. Configuration: Semi-recessed rolled edge.
  1. Projection: 3 1/2 inches.
  2. Sized to accommodate extinguisher and accessories.
- E. Door: 0.036 inch (0.9 mm) metal thickness, reinforced for flatness and rigidity with roller type catch. Hinge doors for 180 degree opening with continuous piano hinge.
  1. Style: Full panel.
  2. Opening: 180 degree.
  3. Handle: Polished chrome.
  4. Catch: Roller.
  5. Lock: None.
  6. Lettering: Red vertical, "Fire Extinguisher".
- F. Door Glazing: Float glass, clear, 1/8 inch (3 mm) thick, and set in resilient channel glazing gasket.
- G. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- H. Fabrication: Weld, fill, and grind components smooth.
- I. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.
- J. Finish of Cabinet Interior: White colored enamel.
- K. Product - FEC: Larsen's Manufacturing Company "Architectural Series" or approved substitution.

### 2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.
- B. Lettering: "FIRE EXTINGUISHER" decal, or vinyl self-adhering, pre-spaced black lettering in accordance with authorities having jurisdiction (AHJ).

### 2.05 FIRE DEPARTMENT LOCK BOX

- A. Fire Department Lock Box - Basis of Design: 3200 series Knox-Box by Know Company or approved substitution.
- B. Fire Department Lock Box: Heavy-duty, recessed, solid stainless-steel box with hinged door and interior gasket seal; single drill resistant lock with dust covers and tamper alarm.
  1. Capacity: Holds 2 keys.
  2. Finish: Manufacturer's standard dark bronze.
  3. Door: Weather resistant gasket.
  4. Options:
    - a. Tamper alarm switch, UL Listed.
    - b. Recessed mounting kit.
    - c. Inside switch.

- C. Manufacturers - Fire Department Lock Box:
  - 1. Knox Company; Knox-Box Rapid Entry System: [www.knoxbox.com](http://www.knoxbox.com).
  - 2. Kidde: [www.kidde.com](http://www.kidde.com).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Location: Coordinate with Owner and Fire Marshal.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify rough openings are correctly sized and located.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install plumb and level in wall openings, inside bottom of cabinet.
- C. Secure rigidly in place.
- D. Place extinguishers in cabinets.

**END OF SECTION**

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**SECTION 10 51 13  
METAL LOCKERS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Metal lockers.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - 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, numbering plan and combination lock code.
- D. Manufacturer's Installation Instructions: Indicate component installation assembly.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Protect locker finish and adjacent surfaces from damage.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Metal Lockers:
  - 1. ASI Storage Solutions, Traditional Collection: [asi-storage.com](http://asi-storage.com).
    - a. Basis of Design or approved substitutions.
  - 2. Lincora: [www.lincora.com](http://www.lincora.com)
  - 3. Spacesaver: [www.spacesaver.com](http://www.spacesaver.com)
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 LOCKER APPLICATIONS**

- A. 911 Dispatch Lockers: Metal lockers, wall mounted for base indicated on drawings.
  - 1. Width: 15 inches (381 mm).
  - 2. Depth: 18 inches (457 mm).
  - 3. Height: 72 inches (1830 mm).
  - 4. Configuration: Z-tier (2 lockers each with a short and long compartment).
  - 5. Fittings:
    - a. Hooks: One double prong.
    - b. Number Plate: Polished Aluminum Plate, Door Riveted
  - 6. Ventilation: Louvers at top and bottom of door panel.
  - 7. Locking: Padlock hasps, for padlocks provided by Owner.
  - 8. Continuous "Zee" base.

**2.03 METAL LOCKERS**

- A. Accessibility: Comply with ICC A117.1 and ADA Standards.
- B. Lockers: Factory assembled, made of formed sheet steel, mild cold rolled steel, 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. Color: To be selected by Architect.
- C. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
  - 1. Body and Shelves: 24 gauge, 0.0239 inch (0.61 mm).
  - 2. Base: 20 gauge, 0.036 inch (0.9 mm).
  - 3. Metal Base Height: 4 inch (100 mm).
- D. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.

1. Door Frame: 16 gauge, 0.0598 inch (1.52 mm), minimum.
- E. Doors: Channel edge; welded construction, manufacturer's standard stiffeners, grind and finish edges smooth.
  1. Door Thickness: 16 gauge, 0.0598 inch (1.52 mm), minimum.
  2. Form recess for operating handle and locking device.
- F. Hinges: Continuous piano hinge with powder coat finish to match locker color.
- G. Coat Hooks: Stainless steel or zinc-plated steel.
- H. Number Plates: Provide rectangular shaped aluminum plates. Form numbers 3/8 inch (9.525 mm) high of block font style, in contrasting color.
- I. Locks: Locker manufacturer's standard type indicated above.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that prepared bases are in correct position and configuration.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install lockers plumb and square.
- C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds (445 N).
- D. Install fittings if not factory installed.
- E. Replace components that do not operate smoothly.

**3.03 CLEANING**

- A. Clean locker interiors and exterior surfaces.

**END OF SECTION**

**SECTION 10 73 16.19  
EXTRUDED ALUMINUM CANOPY****PART I GENERAL****1.01 SECTION INCLUDES**

- A. Furnishing and installation of extruded aluminum canopy system.
  - 1. The extents of aluminum canopies are shown on the drawings.

**1.02 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation meeting: Convene one week before starting work of this section.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Submit detailed drawings indicating layout of canopy system, dimensions, anchorages, all mechanical joint locations with complete details, connections, jointing and accessories.
- C. Product Data: Submit manufacturer's product data, specifications, component performance data and installation instructions
- D. Calculations: Provide signed and sealed structural calculations for the proposed canopy, by a professional engineer registered in the state which the project is located.

**1.04 QUALITY ASSURANCE**

- A. Design system and components under the direct supervision of a Professional Structural Engineer, registered in the State which the project is located.
  - 1. Comply with provisions of applicable code.
  - 2. Comply with AWS (American Welding Society) standards for structural aluminum welding.
- B. Obtain aluminum canopy system, including all components, from a single manufacturer.
- C. Manufacturer Qualifications: Company specializing in manufacturing systems as defined by this section with a minimum of five years of documented experience.
- D. Installer Qualification: Company with not less than three (3) years documented experience in installation of aluminum canopies of type, quantity and installation methods similar to work of this section.
- E. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work.
  - 1. Allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- F. General contractor shall field confirm dimensions and elevations shown on shop drawings prior to fabrication.

**1.05 DELIVERY, STORAGE AND HANDLING:**

- A. Deliver, store and handle canopy system components as recommended by manufacturer.
- B. Handle and store in a manner to avoid deforming members and to avoid excessive stresses.

**1.06 WARRANTY**

- A. Manufacturer shall warrant the entire system against defects in labor and materials for a period of one (1) year commencing on the date of Final Acceptance as established in Division One of these specifications.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Mapes Canopies: [www.mapes.com](http://www.mapes.com).
  - 1. Product: Super Lumideck Basis of Design or approved substitution.
- B. Mitchell metals: [www.mitchellmetals.com](http://www.mitchellmetals.com).

- C. Dittmer Architectural: [www.diideck.com](http://www.diideck.com).
- D. Peachtree Protective Covers, Inc.: [www.peachtreecovers.com](http://www.peachtreecovers.com).
- E. Mason Corporation: [www.masoncorp.com](http://www.masoncorp.com).
- F. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 PERFORMANCE

- A. Provide aluminum canopy system that has been designed, produced, fabricated and installed to withstand normal temperature changes as well as live loading, dead loading and wind loading in compliance with applicable codes in the State which the project is located and as follows:
  - 1. Structural loads as indicated on the plans.
- B. Water shall drain from deck into designated beams and terminate per plans.

## 2.03 MATERIALS

- A. Extruded Aluminum Canopy shall consist entirely of extruded aluminum sections (roll-formed not acceptable). System shall consist of heli-arc welded, one-piece rigid structural bents (column and beam assemblies), decking, fascia, accessory items and hardware to provide a complete system.
- B. Roof Deck: Extruded Aluminum, interlocking self-flashing. Shop fabricate to lengths and panel widths required for field assembly. Depth of sections to comply with structural requirements.
  - 1. Decking: 3" extruded flat soffit .078 decking.
  - 2. Provide shop induced camber in deck units with spans greater than 16'- 0" to offset dead load deflections.
  - 3. Welded dams are to be used at non-draining ends of deck.
- C. Fascia: Standard 8" extruded aluminum "J" style.
- D. Fasteners:
  - 1. Deck Screws (rivets not permitted): Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8" outside dimension, conical washer.
  - 2. Fascia Rivets: Size 3/16" by 1/2" grip range aluminum rivets with aluminum mandrel.
  - 3. Bolts: All bolts, nuts and washers to be 18-8 non-magnetic stainless steel.
  - 4. Tek Screws: Not permitted
- E. All aluminum extrusions shall be alloy 6063 heat treated to a T-6 temper.
- F. Finish: 2-coat kynar.
  - 1. Color: As selected by Architect from manufacturer's full range.

## 2.04 FABRICATION

- A. Shop Assembly: Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Comply with indicated profiles, dimensioned requirements and structural requirements.
- C. Use sections true to details with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture, free from defects impairing strength and durability.
- D. All welding do be done by heli-arc process.
- E. Mechanical joints shall consist of stainless steel bolts with a minimum of two (2) bolts per fastening. Bolts and nuts shall be installed in a concealed manner utilizing 1/2" thick by 1 1/2" aluminum bolt bars welded to structural members. All such mechanical joints must be detailed on shop drawings showing all locations.
- F. Expansion joints, design structure for thermal expansion and contraction. Provide expansion joints as required.
- G. Concealed drainage. Water shall drain from covered surfaces into intermediate trough and be directed to downspout from rear gutter.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that support work and that surrounding area is ready to receive work of this section.
  - 1. Notify Architect of any conditions that would prevent installation of system.
  - 2. Do not proceed until defects are corrected.
- B. Installer shall confirm dimensions and elevations to be as shown on shop drawings.
- C. Erection shall be performed by an approved installer and scheduled after all concrete, masonry and roofing in the area is completed.

**3.02 INSTALLATION**

- A. Installation shall be in strict accordance with manufacturer's shop drawings. Particular attention should be given to protecting the finish during handling and erection.
- B. Replace roof deck panels and other components of the work which have been damaged or have deteriorated beyond successful minor repair.

**3.03 CLEANING AND PROTECTION**

- A. Remove protective coverings at time in project construction sequence which will afford greatest protection of work. Clean finished surfaces as recommended by manufacturer. Maintain in a clean condition during construction.
- B. Protect installed products from damage during subsequent construction.

**END OF SECTION**

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**SECTION 12 21 13  
HORIZONTAL LOUVER BLINDS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Horizontal slat louver blinds.
- B. Operating hardware.

**1.02 REFERENCE STANDARDS****1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the placement of concealed blocking to support blinds. See Section 06 10 00.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating physical and dimensional characteristics.
- C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- D. Samples: Submit two samples, 6 inch long illustrating slat materials and finish, color, cord type and color.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

**1.05 QUALITY ASSURANCE**

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

**1.06 PROJECT CONDITIONS**

- A. Coordinate the work with window installation and placement of concealed blocking to support blinds.
- B. Take field measurements to determine sizes required.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Horizontal Louver Blinds Without Side Guides:
  - 1. Hunter Douglas Architectural: [www.hunterdouglasarchitectural.com/#sle](http://www.hunterdouglasarchitectural.com/#sle).
  - 2. Levolor Contract: [www.levolorcontract.com](http://www.levolorcontract.com).
  - 3. SWFcontract, a division of Spring Window Fashions, LLC.: [www.swfcontract.com](http://www.swfcontract.com).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 BLINDS WITHOUT SIDE GUIDES**

- A. Description: Horizontal slat louvers hung from full-width headrail with full-width bottom rail.
- B. Manual Operation: Control of raising and lowering by cordless lift with full range locking; blade angle adjustable by control wand.
- C. Metal Slats: Spring tempered pre-finished aluminum; radiused slat corners, with manufacturing burrs removed.
  - 1. Width: 1 inch (25 mm).
  - 2. Thickness: 0.006 inch (0.15 mm).
  - 3. Color: As selected from manufacturer's full range.
- D. Slat Support: Woven polypropylene cord, ladder configuration.
- E. Head Rail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.
- F. Bottom Rail: Pre-finished, formed steel; with end caps.
  - 1. Color: Same as headrail.

- G. Control Wand: Extruded hollow plastic; hexagonal shape.
  - 1. Removable type.
  - 2. Length of window opening height less 3 inch (76 mm).
  - 3. Color: As selected by Architect from manufacturer's full range.
- H. Headrail Attachment: Wall brackets.
- I. Accessory Hardware: Type recommended by blind manufacturer.

**2.03 FABRICATION**

- A. Determine sizes by field measurement.
- B. Fabricate blinds to fit within openings with uniform edge clearance of 1/4 inch (6.25 mm).
- C. At openings requiring multiple blind units, provide separate blind assemblies with space of 1/4 inch (6.25 mm) between blinds, located at window mullion centers.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that openings are ready to receive the work.
- B. Ensure structural blocking and supports are correctly placed. See Section 06 10 00.

**3.02 INSTALLATION**

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with concealed fasteners.
- C. Install at all exterior windows/storefronts unless specifically noted otherwise.

**3.03 TOLERANCES**

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch (6 mm).
- B. Maximum Offset From Level: 1/8 inch (3 mm).

**3.04 ADJUSTING**

- A. Adjust blinds for smooth operation.

**3.05 CLEANING**

- A. Clean blind surfaces just prior to occupancy.

**END OF SECTION**



**SECTION 12 36 61  
QUARTZ SURFACING FABRICATIONS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Quartz Surfacing as indicated in documents and for countertops.

**1.02 REFERENCE STANDARDS**

- A. ASTM C97 - Absorption and Bulk Specific Gravity of Dimension Stone.
- B. ASTM C99 - Modulus of Rupture of Dimension Stone.
- C. ASTM C170 - Compressive Strength of Dimension Stone.
- D. ASTM C482 - Bond Strength of Ceramic Tile to Portland Cement.
- E. ASTM C484 - Thermal Shock Resistance of Glazed Ceramic Tile.
- F. ASTM C501 - Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.
- G. ASTM C531 - Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
- H. ASTM C1026 - Resistance of Ceramic Tile to Freeze-Thaw Cycling.
- I. ASTM C1028 - Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
- J. ASTM E84 - Surface Burning Characteristics of Building Materials.
- K. NEMA LD-3 - High Pressure Decorative Laminates
- L. ISO 9001 - Quality Management Systems.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Submit manufacturer's product data for each specified product, sample warranty form, and manufacturer's fabrication and installation instructions.
- C. Submit Safety Data Sheets (SDS) for adhesives and sealants.
- D. Accessories: Submit manufacturer's product data and installation instructions.
- E. Shop Drawings: Identify colors and finishes, and show the following:
  - 1. Field-verified dimensions.
  - 2. Quartz surfacing dimensions.
  - 3. Locations and dimensions of cutouts.
  - 4. Required locations of support and blocking members.
  - 5. Edge profiles.
  - 6. Installation details and methods.
- F. Samples:
  - 1. Cut sample and seam together for representation of seaming techniques.
  - 2. Indicate full range of color and pattern variation.
  - 3. Samples for Color Selection: Submit two sets of manufacturer's standard colors and finishes.
  - 4. Samples for Color Approval: Submit two samples, 10 x 10 inches, (250 x 250 mm) of each color and finish selected.
  - 5. Stone Adhesive: Submit two samples of an adhesive joint for each color quartz surfacing selected. Show color match of adhesive.
- G. Fabricator Qualifications: Submit evidence of fabricator's qualifications.
- H. Closeout Submittals: Submit completed warranty form.
- I. Product Certificates: For each type of product, provide product certificates signed by product manufacturer.
- J. Maintenance Data:

1. Submit manufacturer's care and maintenance data.

#### 1.04 QUALITY ASSURANCE

- A. Applicable Standards.
  1. Standards of the following, as referenced herein:
    - a. American Society for Testing and Materials (ASTM).
    - b. National Electrical Manufacturers Association (NEMA).
    - c. International Organization for Standardization (ISO).
  2. Fire Test response characteristics.
    - a. Provide with the following Class A (Class 1) surface burning characteristics as evidenced by testing identical products against ASTM E84 (UL 723) or another testing and inspecting agency acceptable to authorities having jurisdiction.
    - b. Flame Spread Index: 25 or less.
    - c. Smoke Developed Index: 450 or less.
- B. Allowable Tolerances:
  1. Variation in component size  $\pm 1/8"$  (3mm) over a ten (10) foot length.
  2. Location of openings:  $\pm 1/8"$  (3mm) from indicated location.
  3. Maximum  $1/8"$  (3mm) clearance between quartz surfaces and each wall.
- C. Manufacturing Facility Qualifications: Quartz surfacing materials produced in an ISO 9001 certified facility.
- D. Fabricator Qualifications: Minimum of five years documented experience in fabricating quartz surfacing countertops similar in scope and complexity to this Project, using water-cooled cutting tools. Currently certified by the manufacturer as an acceptable fabricator.
- E. Installer Qualifications: Minimum of five years documented installation experience for projects similar in scope and complexity to this Project and currently certified by the manufacturer as an acceptable installer.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Handling: Comply with manufacturer's recommendations for shipping and handling quartz surfacing materials to preclude breakage or damage. Brace quartz surfacing units as necessary during shipment, transporting in near-vertical position with finished face towards finished face. Do not allow finished surfaces to rub during shipping and handling.
- B. Storage and Protection: Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer. Store quartz surfacing sheet materials on racks in near-vertical position to preclude damage. Store with finished face turned towards finished face. Prevent warpage and breakage.

#### 1.06 WARRANTY

- A. Provide manufacturer's Limited Commercial 10-Year Warranty against product defects.

### PART 2 PRODUCT

#### 2.01 MANUFACTURERS

- A. Wilsonart: [www.wilsonart.com](http://www.wilsonart.com).
- B. Hanstone Quartz: [www.hanstonequartz.com](http://www.hanstonequartz.com).
- C. Silestone: [www.silestoneusa.com](http://www.silestoneusa.com).
- D. WD Purestone: [web-don.com/purestone](http://web-don.com/purestone)
- E. Substitutions: See Section 01 60 00-Product Requirements.

#### 2.02 QUARTZ SURFACING

- A. Composition: 93 percent crushed quartz aggregate combined with resins and pigments and fabricated into slabs using a vacuum vibro-compaction process.
- B. Dimensions:
  1. Thickness: Nominal  $3/4$  inch (20 mm).

2. Size: Slabs shall be not less than 56.5 x 120 inches (1.44 x 3.05 m) to minimize the number of joints used in installation.
- C. Identification: Material shall be labeled with a batch number and imprinted with a manufacturer's identifying mark on the back.
- D. Color and Finish:
  1. Color: Crystal Onyx by WD Purestone or approved substitution.
  2. Finish: Polished.
- E. Exposed Edges and Corners:
  1. Countertops:
    - a. Edges: Chamfered/Eased profile unless indicated otherwise on drawings.
    - b. Outside Corners: Square 3/4 inch (20 mm).

### 2.03 ACCESSORIES

- A. Joint Adhesive: Methacrylate-based adhesive for chemically bonding quartz surfacing seams. Color complementary to quartz surfacing sheet material.
- B. Elastomeric Sealant: Mildew-resistant silicone sealant for filling gaps between countertops and terminating substrates in wet environment applications.
- C. Siliconized Acrylic Sealant: Siliconized acrylic latex sealant. For general applications to fill gaps between countertops and at terminating substrates.
- D. Construction Adhesive: Countertop manufacturer's recommended silicone-based construction adhesive for backsplashes, endsplashes, and other applications according to manufacturer's published fabrication instructions.

### 2.04 FABRICATION

- A. Shop Assembly: Observe proper safety procedures and comply with manufacturer's instructions.
- B. Layout: Layout joints to minimize joints and to avoid L-shaped pieces of quartz surfacing.
- C. Inspect Material
  1. Inspect material for defects prior to fabrication.
  2. Color Match
    - a. Materials used throughout the project shall be from the same batch and bear labels with the same batch numbers.
    - b. Visually inspect materials to be used for adjacent pieces to ensure acceptable color match.
    - c. Inspect in lighting conditions similar to those existing at the jobsite.
  3. Variation in distribution of aggregates in quartz surfacing that is within manufacturer's tolerances is not a defect.
- D. Tools: Cut and polish with water-cooled power tools.
- E. Cutouts:
  1. Cutouts shall have 3/8 inches (10 mm) minimum inside corner radius. Inside corners shall be reinforced in an acceptable manner to prevent cracking.
  2. Polish edges where they will be exposed in finished work.
  3. If the remaining material outside a cutout is less than three inches (76 mm) wide, reinforce area by laminating it with a strip of quartz surfacing.
  4. Provide holes and cutouts for plumbing fixtures and accessories indicated on approved shop drawings.
- F. Laminations: Laminate layers of quartz surfacing as required to create built-up edges, trim, and other areas requiring additional thickness.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify dimensions by field measurements prior to fabrication.
- B. Examine substrates and conditions that could adversely affect the work of this Section.

- C. Verify that substrates supporting quartz surfaces are plumb, level, and flat to within 1/16 inch in ten feet (1.6 mm in 3000 mm), and that necessary supports and blocking are in place.
- D. Base Cabinets: Cabinet units shall be securely fixed to adjoining units and back wall.
- E. Substrates must be sound, flat, smooth, and free from dust or other surface contaminants.
- F. Commencement of work will constitute acceptance of substrates and conditions to receive the work.
- G. Inspect finished surfaces for damage. Do not install until damaged materials have been repaired or replaced in an acceptable manner.

### **3.02 INSTALLATION**

- A. Install quartz surfacing components plumb, level, and true according to approved shop drawings and manufacturer' s published installation instructions. Use woodworking and specialized fabrication tools acceptable to manufacturer.
- B. Form joint seams with specified seam adhesive. Seams to be inconspicuous in completed work. Seams in locations shown on approved shop drawings and acceptable to manufacturer. Promptly remove excess adhesive.
  - 1. Clamp or brace quartz surfaces in position until adhesive sets.
- C. Fill gaps between countertop and terminating substrates with specified silicone sealant.
- D. Install backsplashes and endsplashes where indicated on Drawings. Adhere to countertops with specified construction adhesive.
- E. Joints between adjacent pieces of quartz surfacing
  - 1. Joints shall be flush, tight fitting, level, and neat.
  - 2. Securely join with stone adhesive.
  - 3. Fill joints level with quartz surfacing.
  - 4. Clamp or brace quartz surfacing in position until adhesive sets.
  - 5. Joints between backsplashes and countertops: Seal joints with silicone sealant.

### **3.03 REPAIR**

- A. Repair or replace damaged materials in a satisfactory manner.
- B. Remove and replace quartz surfacing components that are damaged and cannot be satisfactorily repaired.

### **3.04 CLEANING**

- A. Remove masking and excess adhesives and sealants. Clean exposed surfaces.
- B. Clean quartz surfacing components according to manufacturer' s published maintenance instructions.

### **3.05 PROTECTION**

- A. Protect surfacing from damage by other Sections.

**END OF SECTION**

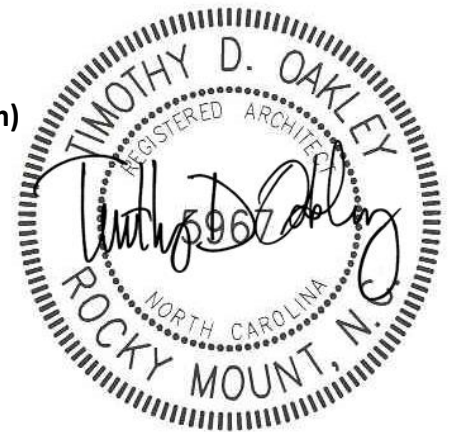
Project Manual

New Building For  
EOC / 911 Dispatch  
**Pamlico County**  
103 N. Third Street  
Bayboro, North Carolina 28515



**PRE-BID DATE:** October 7, 2024  
**PRE-BID TIME:** 2:00 pm  
**PRE-BID LOCATION:** Patsy H. Sadler Room (Commissioner's Room)  
Pamlico County Courthouse  
202 Main Street, Bayboro, NC

**BID DATE:** October 17, 2024  
**BID TIME:** 2:00 pm  
**BID LOCATION:** Patsy H. Sadler Room (Commissioner's Room)  
Pamlico County Courthouse  
202 Main Street, Bayboro, NC



## **BID SET**

### **Specification Book 2 of 2**

September 2024

Architect's Project Number: 24017

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Oakley Collier Architects, PA  
109 Candlewood Road  
Rocky Mount, North Carolina 27804  
205 West Martin Street  
Raleigh, North Carolina 27601





Division (22 00 00)

New Facility for  
Pamlico County EOC / 911 Dispatch**SECTION 220000 – SINGLE SECTION PLUMBING****A. GENERAL****1. GENERAL CONDITIONS**

- a. Drawings, all Contract Documents, and Division-1 Specifications sections, apply to work of this Section.
- b. Where the term "Contractor" is used it shall mean the Plumbing Contractor.
- c. Contractors bidding on this section are notified that they shall hold a license for Plumbing as issued by the North Carolina State Board of Examiners of Plumbing and Heating Contractors.
- d. Reference shall be made to the Architectural, Structural, Heating and Air-conditioning, and Electrical drawings and specifications for details of building construction and for coordination with other parts of construction.
- e. Contractor shall visit the job site before the submission of a bid and familiarize himself with existing conditions. Submission of a bid will be considered as evidence that the Contractor has visited the site and is familiar with existing conditions.

**2. BIDDING**

- a. See General conditions.

**3. SCOPE OF THE WORK**

- a. The work to be done under this contract consists of furnishing all labor, materials, equipment, devices, appliances, tools, transportation, and services as required, and in performing all functions to completion and leave ready for operation the installation of the plumbing work in strict accordance with these specifications and applicable drawings and subject to the terms and conditions of the contract.
- b. Obtain all permits and make all test.

**4. INTENT**

- a. It is the intention of the specifications and drawings to call for finished work, tested, and ready for operation. Work shall be installed in accordance with the drawings and specifications using skilled workmen.
- b. It shall be the responsibility of this Contractor upon discovering any discrepancies in the drawings or specifications or points of conflict therein, to immediately notify the Owner who will clarify such discrepancies or conflicts in writing before the

work progresses beyond said point. No extras will be allowed because of failure to properly notify the Owner.

#### 5. CODE, PERMITS AND INSPECTIONS

- a. All work under this specification shall comply with all local and state codes, laws, ordinances and regulations. Wherever the drawings and specifications are in excess of such laws, ordinances and regulations, the drawings and specifications shall hold.
- b. Contractor shall obtain permits and arrange all inspections necessary for the installation of this work, paying all fees in connection therewith, and furnishing the Owner with certificates of inspection from all authorities having jurisdiction.
- c. No piping or other construction shall be covered up or concealed until it has been inspected, tested and approved. The Contractor shall furnish all labor, materials, water, fuel, equipment, and apparatus and bear all expenses of such tests as are hereinafter specified for the work under this section of the specifications.

#### 6. DRAWINGS AND SPECIFICATIONS

- a. The plumbing drawings show the general arrangement of all piping, equipment and appurtenances and shall be followed as closely as actual building construction will permit.
- b. Plumbing work shall conform to the requirements shown on all the drawings. Architectural and Structural drawings shall take precedence over Plumbing drawings. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall investigate the structural and finish conditions affecting the work and shall arrange his work accordingly, providing such fittings, valves and accessories as may be required to meet such conditions.
- c. The drawings and specifications are complementary each to the other and what is called for by one shall be as binding as if called for by both.
- d. Omission of particular reference to any item necessary for a complete installation and proper operation thereof, shall not relieve the Contractor of the responsibility of furnishing same.

#### 7. COORDINATION OF WORK

- a. The Contractor shall coordinate the work with other contractors on the project. All work shall be so arranged that there will be no delay in the proper installation and completion of any part or parts of all piping systems and equipment. Work shall be installed in proper sequence with other trades, and without unnecessary delays.



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New Facility for  
Pamlico County EOC / 911 Dispatch

- b. The layout shown shall be followed as closely as circumstances will permit but the Contractor must lay out his work so as not to conflict with other trades and to avoid any unnecessary cutting of or damage to walls, floors or other parts of his equipment.
- c. Whenever interferences might occur, before installing any of the work in question, the Contractor shall consult with other contractors and shall come to an agreement with them as to the exact location and level of his piping and other parts of his equipment.
- d. Locations of pipes, equipment, and appurtenances shall be adjusted to accommodate the work to interferences anticipated and encountered. The Contractor shall determine the exact route and location of each pipe prior to fabrication. Lines, which pitch, shall have right of way over those which do not pitch. Lines whose elevations cannot be changed shall have right of way over lines whose elevations can be changed.
- e. Offsets and changes in direction in pipes shall be made as required to maintain proper head room and pitch of sloping lines whether or not indicated on the drawings. The Contractor shall furnish and install all accessories as required to effect these offsets and changes in direction.

## 8. EQUIPMENT AND MATERIALS

- a. Catalog numbers and trade names in these specifications and noted on the drawings are intended to describe the material, devices or apparatus wanted. Similar materials, devices or apparatus of other manufacturers, if of equal quality, capacity and character, may be substituted on the written approval of the Owner. If the Contractor fails to comply with the provisions of this paragraph, he shall be required to furnish all materials and equipment as specified.
- b. All materials shall be new and bear the manufacturer's name, trade name and the UL Label in every case where a standard has been established for the particular material. The equipment to be furnished shall be essentially the standard product of a manufacturer regularly engaged in the production of the required type of equipment, and shall be the manufacturer's latest approved design.
- c. Equipment and materials shall be delivered to the site and stored in original containers, suitably sheltered from the elements, but readily accessible for inspection until installed.
- d. Equipment and materials of the same general type shall be of the same make throughout the work to provide uniform appearance, operation and maintenance.

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- e. Equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury and theft. Damage or defects developing before acceptance of the work shall be made good at the Contractor's expense.
- f. Dimensions: It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. He shall make necessary field measurements to ascertain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the drawings and specifications.

#### 9. EQUIPMENT ACCESSORIES

- a. The Contractor shall furnish and install all equipment, accessories, connections and incidental items necessary to fully complete the work, ready for use, occupancy and operation by the Owner.
- b. Supports: The Contractor shall support plumb, rigid and true to line all work and equipment furnished under this section. The Contractor shall study thoroughly all general, structural, mechanical and electrical drawings, shop drawings, and catalog data to determine how equipment, fixtures, piping, etc., are to be supported, mounted or suspended and shall provide extra steel bolts, inserts, pipe stands, brackets and accessories for proper support whether or not shown on the drawings.

#### 10. CUTTING, PATCHING, AND REPAIRING

- a. In new construction, the General Contractor will provide all openings in wall, floor, and roof construction required by the Plumbing Contractor for installation of his work, provided complete information is furnished to the General Contractor at the time required. Failure to provide necessary information will necessitate provisions of additional required openings, chases, recesses, etc., by Plumbing Contractor at his own expense, and he shall be fully responsible for the proper cutting and patching of such construction as approved and directed by the Owner.
- b. Where pipes or conduit pass through walls, floors, or roofs, sleeves shall be furnished by this Contractor and installed, except as noted otherwise, by the trade furnishing and installing the material in which they are located. Location of sleeves, inserts, and supports shall be as directed by this Contractor who will also insure that they are properly installed. Sleeves shall be neatly sawed, sheared, or cut with wheeled cutters. No flame cutting will be permitted.
- c. Each trade shall bear the expense of all cutting, patching, repairing or replacing of the work of other trades required because of his fault, error or tardiness or because of any damage done by him.
- d. Under no circumstances shall the Contractor cut any structural beam or support without prior approval and instructions from the Owner.

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New Facility for  
Pamlico County EOC / 911 Dispatch

- e. If Plumbing Contractor installs Plumbing work through exposed finish walls, ceiling or floor after they are in place, the Plumbing Contractor shall close excess openings around his work to match finish surface.

#### 11. SHOP DRAWINGS AND SUBMITTAL DATA

- a. The Contractor shall submit to the Owner after the award of the contract, a folder containing catalog cuts and descriptions giving name of manufacturer, trade name, type, catalog number and location in work, of all equipment which he proposes to use in the execution of the contract.
- b. Approval is solely for the purpose of determining suitability and will in no way absolve the Contractor of his responsibility for the correctness of measurements, quantities, or performance. Approval of shop drawings shall not constitute a change in the contract requirements.
- c. Shop drawings must comply with the requirements of all regulatory bodies having jurisdiction.
- d. Contractor shall furnish at least five (5) copies of submittal data. Three (3) copies will be returned to the Contractor. If the Contractor desires the return of more than three (3) copies, additional copies shall be furnished at the time of original submission.

#### 12. WORKMANSHIP

- a. The work throughout shall be executed in the best and most thorough manner, under the periodic observation of and to the satisfaction of the Owner and Engineer who will jointly interpret the meaning of the drawings and specification, and shall have the power to reject any work or materials which, in their judgment, are not in full accordance therewith.

#### 13. SINGULAR

- a. In all cases where a device or piece of equipment is referred to herein or on the drawings in the singular number, it is intended that such reference shall apply to as many such devices as are required to complete the installation.

#### 14. USE OF THE WORD "PROVIDE"

- a. Herein, where the word "Provide" is written in these specifications, provide shall be understood to mean provide complete in place, that is, "Furnish and Install".

#### 15. SUPERVISION AND SUPERINTENDENCE

- a. The Contractor shall, during the progress of the work, maintain a competent superintendent, who shall not be change d except if he proves unsatisfactory to the

Division (22 00 00)

New Facility for  
Pamlico County EOC / 911 Dispatch

Contractor or the Owner. Efficient supervision shall be given to all work under this contract.

**B. PRODUCTS****1. EXCAVATION, TRENCHING, AND BACKFILL**

- a. Unless noted otherwise on the drawings, the Plumbing Contractor shall do all excavation and backfill required for his work. Unless otherwise shown, provide separate trenches for each sanitary sewer, storm sewer, and water line. Lay all pipe in open trenches except when the Owner gives written permission for tunneling.
- b. **Sheeting, Bracing, and Water Removal:** Sheet and brace trenches, and remove water as necessary to fully protect workmen and adjacent structures and permit proper installation of the work. Comply with all local regulations or, in the absence thereof, with the provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc. Under no circumstances lay pipe or install appurtenances in water. The trench shall be kept free from water until pipe joint material has hardened. The presence of ground water in the soil or the necessity of sheeting or bracing trenches shall not constitute a condition for which any increase may be made in the contract price. Sheeting shall not be removed until the trench is substantially backfilled.
- c. **Rock Excavation:** The material to be excavated is assumed to be earth and debris encountered in the project area. If rock should be encountered, an agreed extra compensation will be allowed. Earth shall include all material that can be removed by a 3/4-yard power shovel. Rock is defined as rock, stone, hard shale in original ledge, boulders, masonry and rock fragments over nine (9) cubic feet in volume, and cannot be removed by power shovel or without the use of explosives or drills.
- d. **Blasting:** The written consent and approval of method from the Owner must be obtained before explosives are used, and if used, all local regulations, laws, and ordinances shall be observed. Cover blasts with heavy timbers or mats and set off no blast within twenty-five (25) feet of pipe already laid in the trench. Protect pipe already laid with earth backfill.
- e. **Grading Trench Bottoms:** Grade the bottom of trenches evenly to insure uniform bearing for the full length of all pipes. Cut holes as necessary for joints and joint making. Excavate all rock, cemented gravel, or other hard materials to at least four (4) inches below the pipe at all points. Refill to grade with sand or fine gravel firmly compacted.
- f. **Backfill trenches only after piping has been inspected, tested and locations of pipe and appurtenances have been recorded. Backfill by hand around pipe and for a**

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depth of one (1) foot above the pipe using earth without rock fragments or large stones, and tamp firmly in layers not exceeding six (6) inches in thickness, taking care not to disturb the pipe or injure the pipe coating. Compact the remainder of the backfill thoroughly with a rammer of suitable weight or with an approved mechanical tamper, in layers not exceeding six (6) inches in thickness. All cinders and rubbish shall be prohibited from all trenches.

All fill within the building shall be compacted to 95 per cent of the maximum standard Proctor density.

## 2. SANITARY, WASTE, AND VENT LINES

- a. The following lines and fittings shall be Schedule 40 PVC OR Service Weight Cast Iron:

Underfloor and underground waste lines

- b. The following lines and fittings shall be Schedule 40 PVC OR Service Weight Cast Iron:

Above floor sanitary waste lines

Above floor vent lines

- c. Installation:

- i. Piping of sizes shown shall be run as indicated on the drawings. All extensions above the roof shall be made according to code and as detailed on the drawings. Soil waste and vent stacks shall be run in partitions and suspended above ceilings where indicated. Vertical vent pipes shall be connected together into one main vent stack or riser above the fixtures and vented as indicated on riser diagrams. Vents and branch vent lines shall be free from drops or sags and be graded and connected so as to drip back into the soil or waste pipe by gravity. Where vent pipes connect to the horizontal soil or waste pipe, the vent branch shall be taken off above the center line of the pipe and the vent pipe extended vertically or at an angle of forty-five (45) degrees to the vertical before off-setting or connecting to branch, main waste or soil vent.
- ii. Vents from any fixture or line of fixtures, when connected to a vent line serving other fixtures, shall be extended at least six (6) inches above the flood level rim of the highest of such fixtures to prevent use of the vent line as a waste. Extensions of vent pipes through a roof shall be terminated not less than twelve (12) inches above the roof.
- iii. Horizontal drainage piping shall be installed in practical alignment at the grade shown on the drawings, but in no case less than a uniform grade of 1/8

inch per foot for sizes 3" and larger. For sizes 2" and smaller grade shall be not less than 1/4 inch per foot.

- iv. Changes in direction in drainage piping shall be made by the appropriate use of forty-five (45) degrees wyes, half-wyes, or long sweep quarter, sixth, eighth, or sixteenth bends. Sanitary tees or short quarter bends may be used when two (2) fixtures are installed back to back and have a common drain. Straight tees, elbows, and crosses may be used on vent lines. No change in direction of flow greater than ninety (90) degrees shall be made. Where different sizes of drainage pipes or pipes and fittings are to be connected, standard increasers and reducers of proper size shall be used. Reduction of the size of drainage piping in the direction of flow is prohibited.
- v. Drilling and tapping of house drains, soil, waste or vent pipes, and the use of saddle hubs and bands are prohibited.
- vi. Cross-connections or any fixtures, devices, or construction which will permit backflow connections between a water distribution system and any part of the drainage system shall not be installed.
- vii. All piping shall be made permanently gas and water tight. Any fitting or connection which has an enlargement, chamber, or recess with a ledge or shoulder or reduction of the pipe area that offers an obstruction to flow through the pipe shall not be installed. Threaded joints shall be made with a lubricant on the male thread only. All burrs or cutting shall be removed and pipe shall be reamed or filed out to not less than the original diameter.
- viii. Floor connections for water closets and other fixtures shall be made by means of an approved brass, or iron flange, caulked, into the drainage pipe. The connection shall be bolted, with an approved gasket or approved setting compound between the fixture base and the connections.

### 3. WATER PIPING, COLD AND HOT

- a. Copper tubing, water, ASTM Specification B-88-55, Type K and Type L.
- b. Soldered joint fittings, wrought type, American Standard Specification B-16 22-1951. Fittings to be of same manufacturer as copper tubing.
- c. Silver Solder: 15% silver, 80% copper, 5% phosphorous conforming to ASTM B 260-52T.
- d. 95/5 Solder: 95% tin, 5% antimony.
- e. Above-ground Piping: Seamless, type L, hard drawn copper with wrought copper fittings.

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- f. Underground Piping: Piping shall be seamless, type K, soft copper with wrought copper fittings.
- g. Valves: Valves shall have the name and trademark of the manufacturer and the guaranteed working pressure cast on the body of the valve. All valves shall be of one manufacturer and identified by manufacturer's catalog number stamped on a metal disk located under the valve handle nut. Valves shall be bronze NIBCO S-111 or approved equal.
- h. Installation:
  - i. All piping shall be provided with identification in accordance with ANDI A13.1-1981 standards. Markers shall be located at each wall, floor, and ceiling penetration, and at every 20ft. Markers shall be fully legible from floor level showing medium contained in pipe, and direction of flow.
  - ii. Contractor shall provide hot and cold water mains with branches and risers complete from point indicated on plans running to all fixtures and other outlets indicated. Mains and branches shall be run generally as shown on the drawings. Contractor shall provide all interior water piping, branches, and risers as shown on the drawing and shall make connections to all plumbing fixtures, hose bibbs, wall hydrants, and other points requiring water under this and other divisions of the specifications.
  - iii. All water mains and branches shall be pitched at least one (1) inch in twenty-five (25) feet toward fixtures. The piping installation shall be arranged so that the entire system can be drained through fixture supply connections. Unions shall be installed at the connections to each piece of equipment to allow removal of equipment without dismantling connecting piping.
  - iv. Size of all water piping shall be as shown on the drawings. Sizes for connections to fixtures and equipment shall be not less than shown in the schedules on the drawings.
  - v. Plumbing Contractor shall be held responsible for any damage to any work installed by others caused by leaks or improper installation of the piping system. The Contractor shall coordinate his work with that of the Heating Contractor and where interference occurs, shall procure approval from the Owner before installation of the work.
  - vi. Provide eighteen (18) inch high air chambers at fixtures with flush valves. At other fixtures air chambers shall be eighteen (18) inches high. Pipe size for air chambers shall be same as supply to fixture.
  - vii. Soldered or Bronzed Joints: Joints 1-1/4 inches and larger shall be made with silver solder. For joints less than 1-1/4 inches and all valves (regardless

of size) use 95/5 solder. Also use a non-corrosive paste flux in accordance with manufacturer's instructions. All joints shall be thoroughly cleaned with emory cloth and reamed cut before assembly. Acid core solder will not be permitted.

- viii. Pipe penetrations through floor slabs and fire rated walls shall be restored to the slab or fire rated wall's original rating and shall be sealed with impervious non-combustible materials sufficiently tight to prevent transfer of smoke or combustion gases from one side of the wall or slab to the other in accordance with UL methods.
- ix. As appropriate to the penetration size and location, provide firestopping using one of the following:
  - x. High-temperature non-shrink grout shall be installed in accordance with recommendations of ACI, CSI and the manufacturer's specifications.
  - xi. Fill openings with Thermafiber Safing insulation.
  - xii. Caulk full depth of wall or floor with 3M fire barrier; material - No. 25 caulk or 303 putty.
  - xiii. Penetrations through existing construction shall be neatly drilled or cut, and the opening completely filled around the penetrating pipe with the approved firestopping material. Solid masonry and concrete walls as well as concrete slabs shall be core drilled. Diameter of core drilled holes shall be from 3/4 inch to 1-1/2 inch bigger than the outside diameter of pipe. Pipe shall be secured within 18 inches of the penetration, both sides, from other than the fire wall or slab itself.

#### 4. OPEN ENDS

- a. This Contractor shall keep all ends of piping including those extending above the roof, drains, and fixture branches closed with caps or plugs so as to prevent dirt from building materials from getting into pipes and traps during construction.

#### 5. HANGERS, ANCHORS, AND GUIDES

- a. All piping in building shall be rigidly supported from the building structure by means of approved hangers and supports. Piping shall be supported to maintain required grading and pitching of lines, to prevent vibration, and to secure piping in place and shall be so arranged as to provide for expansion and contraction.
- b. Generally, pipe hangers shall be attached to 1-1/2" x 1- 1/2" x 1/4" angles supported between joists or supported from clamps attached to bar joists. Use trapeze hangers, 1-1/2" x 1-1/2" x 1/4" angles, where possible and lines can be grouped. Trapeze hanger to be supported from joists by beam clamps.



- c. Spacing of hangers shall not be greater than the following:
  - i. Horizontal soil pipe, 5'-0" on centers.
  - ii. Copper tubing, 2" size, 10'-0" on centers,  
1-1/2" and smaller 6'-0" on centers.
  - iii. In addition, provide two (2) hangers at each turn in horizontal line approximately two (2) feet from fitting.
- d. Hangers shall be adjustable steel clevis, MSS Type 1. Select size of hangers to exactly fit pipe size for bare piping and to exactly fit around piping insulation with saddle of shield for insulated piping. Provide copper plated hangers and supports for copper piping that do not receive insulation.

- e. Hanger rods shall not be less than the following sizes and machine threads:

2" and smaller	3/8" diameter
2-1/2" and 3"	1/2" diameter
3-1/2", 4" and 5"	5/8" diameter

- f. Provide fastening devices, turnbuckles or other leveling devices, locknuts, rods and inserts as required to properly support the piping systems.

6. PIPE INSULATION

- a. All hot and cold water piping in building shall be insulated.
- b. Piping shall be insulated with premoulded glass fiber. Jacket shall be factory applied white kraft bonded to aluminum foil, reinforced with fiberglass yarn. Insulation shall be Johns-Manville Flame-Safe with VB jacket or equal by Owens Corning or Certainteed - 1" thick for all piping and all pipe sizes.
- c. Provide 4" sealing strips of jacket for butt joints. Securely fasten jacket at longitudinal laps and sealing strips with adhesive and flare-door type staples 3 to 4 inches on centers. Each staple shall be sealed after installation with adhesive. Adhesive shall be Foster Spark-FAS 85-20. Apply according to manufacturer's recommendations.
- d. At hanger locations, the Contractor shall furnish and install insulation protection saddle between insulation and hanger. Insulation shall pass through hanger unbroken.
- e. All fittings, valve bodies, etc., to be insulated with machined fiberglass fitting covers and PVC ZIP jackets as manufactured by Speed Line Manufacturing Company. Install according to manufacturer's recommendations.

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- f. Insulation shall pass through all sleeves and walls unbroken.
- g. All insulation material shall have 25/50 smoke and flame rating.

**7. PLUMBING FIXTURES**

- a. The best quality of plumbing fixtures and trimmings shall be provided, fabricated by a manufacturer of established reputation, and all plumbing fixtures shall be of same manufacturer through entire job.
- b. All fixtures shall have the manufacturer's guarantee label or trademark indicating first quality. All enameled ware shall bear the manufacturer's symbol signifying acid resisting enamel.
- c. Quantities: The Contractor is referred to the Architectural and Plumbing drawings for the quantities of fixtures to be furnished under this division of the specifications which shall be deemed to include all plumbing fixtures shown of the type described hereinafter, complete with all necessary trimmings.
- d. All supply fittings to lavatories, urinals, and water closets through wall to valve and to fixture shall be chrome plated brass, complete with chrome plated escutcheon.
- e. The fixtures herein, specifying catalog numbers, show the type and quality of plumbing fixture desired in each instance. Owner approved equal fixtures of the following manufacturers will be acceptable.

Fixtures	American-Standard, Kohler, Eljer, Elkay, Just
Trim	As for fixtures plus Chicago Faucet, Sloan, Delta, Symmons, McGuire
Seats	Church, Beneke, Olsonite
Carriers	Josam, Wade, Zurn
Floor Drains	Josam, Wade, Zurn
Cleanouts	As for floor drains
Water Cooler	Halsey Taylor, Elkay, Sunroc
Water Heater	Rudd, State, A.O. Smith

- f. All fixtures shall be white
- g. Refer to drawings for fixture schedule.

**C. EXECUTION**

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### 1. ELECTRICAL CONNECTIONS OF EQUIPMENT

- a. Wiring from disconnect switches, junction boxes, panel board circuit breakers, etc. up to mechanical equipment shall be by the electrical contractor. Final electrical connections to plumbing equipment shall be by this contractor.
- b. Control wiring and control connections for plumbing systems is by this Contractor.

### 2. PROTECTION DURING CONSTRUCTION

- a. Plumbing fixtures and trim shall be protected against damage or injury due to building materials, acid, tools, equipment, or any causes incidental to construction.
- b. The finished surface of each fixture shall be covered with building paper or similar protection. All fixtures damaged by any cause, and any trim with marred or scratched finish shall be replaced at nocost to the Owner. The fixture and fixture trim protection shall be removed at the completion of construction.

### 3. TESTS

- a. Concealed work shall remain uncovered until required tests have been completed, but if necessary, tests on portions of the work may be made and those portions of the work may be concealed after being proved satisfactory. Repairs of defects that are discovered as a result of inspections or tests shall be made with new materials. Caulking of screwed joints, cracks, or holes will not be accepted. Test shall be repeated after defects have been eliminated.
- b. Drainage System Tests:
  - i. A water test shall be applied to all parts of the drainage systems before the pipes are concealed or fixtures set in place. The test may be applied in sections. All openings of each system to be tested shall be tightly closed except the highest opening above roof, and the entire system shall be filled with water up to the overflow point of this highest opening.
  - ii. All parts of the system shall be subject to not less than ten (10) feet of hydrostatic head except the uppermost ten (10) feet of the piping directly below the opening. The water shall remain in the system for not less than fifteen (15) minutes after which time no leaks at any joint or lowering of the water level at the overflow shall be visible.
- c. Water Supply System:
  - i. A water pressure test shall be applied to all parts of the water supply system before the piping is concealed or before the fixtures are connected. A hydrostatic pressure of not less than one hundred twenty-five (125) pounds per square inch shall be applied to the system, and there shall be no leaks at any point in the system at this pressure. An air or gas test is not acceptable.

#### 4. STERILIZATION

- a. All the new water piping and affected existing water piping, including all valves, fixtures, fittings, and other devices connected hereto, shall be sterilized with a solution containing not less than fifty (50) parts per million of available chlorine. The chlorinating material shall be liquid chlorine gas-water mixture, calcium hypochlorite, sodium hypochlorite, or chlorinated lime and water mixture conforming to the standards of the American Water Works Association and shall be introduced into the system in an approved manner.
- b. The sterilization solution shall be allowed to remain in the system for a minimum period of twenty-four (24) hours, but until pronounced safe and fit for human consumption by the Owner based on samples drawn from the system and tested. During the sterilizing period all valves and outlets shall be opened and closed several times. After sterilization, the solution shall be flushed from the system with clean water until residual chlorine content is not greater than 0.2 parts per million unless otherwise directed. After the system has been flushed, additional samples will be taken and tests made; if the water is found unsafe for human consumption, the sterilization procedure specified herein before shall be repeated.

#### 5. CLEANING AND ADJUSTING

- a. Upon completion of work, all surplus material and rubbish shall be removed from premises. Fixtures shall be cleaned; all valves adjusted; all escutcheons and plates installed; all floor drains cleaned, and all mortar and foreign matter removed from all exposed plumbing work.
- b. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishing, due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor without cost to the Owner.

#### 6. EMERGENCY REPAIRS

- a. The Owner reserves the right to make, or have made, repairs to the plumbing system within the guarantee period as required to keep the equipment in operation when the Plumbing Contractor is not available to make the necessary repairs. These necessary repairs shall in no way void the Contractor's guarantee bond nor relieve the Contractor of his responsibilities during the bonding period.

#### 7. PAINTING

- a. All factory finished metal surfaces of plumbing equipment installed that are damaged during construction shall be restored to the original condition.

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- b. Contractor shall paint all iron and steel, including pipe hangers, that do not have a factory finish or galvanized finish used for support of equipment. Prime with one coat of oil base primer followed by one coat of oil base finish coat.

#### 8. MAINTENANCE AND OPERATING MANUALS

- a. At the completion of this project the contractor shall furnish the Owner three (3) operating and maintenance manuals containing a brief description of each system and its various components. Instructions must give full details of the operation of all equipment installed, and shall include manufacturer's printed operating and maintenance instructions, detailed data and bulletins covering all material furnished under the contract giving all necessary illustrations and diagrams and a composite schedule of periodic servicing and lubrication requirements and replacement parts.

#### 9. AS BUILT DRAWINGS

- a. Contractor shall keep and maintain in good order a record of any waste, vent, or water piping that deviates from drawings for any reason. This record shall be made available to the Owner on the date of substantial completion and shall be legible and accurate so as to be directly transferable to an as-built reproducible drawing.
- b. Contractor shall provide to the Owner actual dimensions of all waste and water lines installed on exterior of building, giving dimensions to new and/or existing buildings.

#### 10. GUARANTEE

The Contractor shall deliver the system to the Owner complete in first-class operating condition in every respect and shall guarantee the material and workmanship for a period of one (1) year from the date of acceptance. If, during that time, any defect should show up due to defective material, negligence, or want of proper care on the part of the Contractor, he shall furnish such new materials as are necessary to repair such defects and place same in working order at his own expense on receipt of notice of such from the Owner or Owners.

END OF SECTION 220000



**SECTION 23 05 00 – GENERAL MECHANICAL REQUIREMENTS****A. GENERAL**

1. Scope of Work
  - a. The Contractor shall provide all materials, equipment and labor necessary to install and set into operation a complete mechanical systems as shown on the engineering drawings and as specified herein.
2. Quality Assurance
  - a. See the General and Supplementary General Conditions.
  - b. All work shall be in accordance with State Code and Underwriter's Regulations. Minimum requirements shall be the State Plumbing, Mechanical, Gas, and Energy Code.
  - c. Wherever the words "Approved", "Approval", or "Approved Equal" appear, it is intended that items other than the model numbers specified shall be subject to the approval of the Engineer.
  - d. "Provide" as used herein shall mean that the Contractor responsible shall furnish and install said item or equipment. "Furnish" as used herein shall mean that the Contractor responsible shall acquire and make available said item or equipment and that installation shall be by others. "Install" as used herein shall mean that the Contractor responsible shall make installation of items or equipment furnished by others.
  - e. All material and equipment that the Contractor proposes to substitute in lieu of those specified, shall be submitted to the Engineer ten (10) days before the bid date for evaluation. The submittal shall include a full description of the material or equipment and all pertinent engineering data required to substantiate the equality of the proposed item to that specified. Items that are submitted for approval after this date will not be accepted. The General Conditions will be followed for substitutions after award of the contract.
3. Submittals
  - a. See General and Supplementary General Conditions.
  - b. Within twenty days after notification of the award of the Contract and written notice to begin work, the Contractor shall submit to the Architect/Engineer for approval a detailed list of equipment and material which he proposes to use. Items requiring submittal data for approval will be noted at this time. Six (6) sets of submittal data shall be provided for approval
  - c. Each submittal shall bear the approval of the Contractor indicating that he has reviewed the data and found it to meet the requirements of the specifications as well as space limitations and other project conditions. The submittals shall be clearly identified showing project name, manufacturer's catalog number, and all necessary performance and fabrication data. Detailed submittal data shall be provided when items are to be considered as substitutions for specified items. Acceptance for approval shall be in writing from the Engineer.
  - d. The Contractor shall submit to the Engineer a set of accurately marked-up plans indicating all changes encountered during the construction. Final payment will be contingent upon receipt of these as-built plans.

- e. The Contractor shall furnish four (4) bound sets of maintenance and operating instructions as outlined in Paragraph C, (Execution), Item #6, of this specification section.
  - f. The Contractor shall submit to the Owner all certificates required for operating the system in compliance with the plans and specifications.
4. Product Delivery, Storage and Handling
- a. All material and equipment shall be delivered and unloaded by the Contractor within the project site as noted herein or as directed by the Owner.
  - b. The Contractor shall protect all material and equipment from breakage, theft, or weather damage. No material or equipment shall be stored on the ground.
  - c. The material and equipment shall remain the property of the Contractor until the project has been completed and turned over to the Owner.
5. Work Conditions and Coordination
- a. The Contractor shall review the electrical plans to establish points of connection and the extent of electrical work to be provided in his Contract. All electrical work shall be performed by a licensed electrician.
  - b. Electrical work shall be in accordance with State codes, and as specified in Division 16 contained herein.
  - c. Pipe chases required for installation of work shall be provided by the General Contractor unless otherwise noted. This Contractor shall be responsible for coordinating the location of all required chases.
  - d. All work shall be coordinated with other trades. Cutting of new work and subsequent patching shall be at the Contractor's expense at no extra cost to the Owner.
6. Guarantee
- a. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The contractor shall replace such defective equipment or materials, without cost to the owner, within the manufacturer's warranty period.
  - b. The contractor shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the final acceptance of the work and shall replace such defective materials or workmanship without cost to the owner.
  - c. The contractor shall provide a five year compressor warranty for all refrigeration compressors from date of system acceptance.
  - d. Additionally, the contractor shall guarantee materials and workmanship against latent defects arising from faulty materials, faulty workmanship or negligence which is hidden or not readily apparent to the owner at the time of final acceptance and which is discovered by the owner within six (6) years following final acceptance of the work. The contractor shall replace such defective materials or workmanship without cost to the owner.

**B. PRODUCT**



1. Materials and equipment shall be new, unless noted otherwise, of the highest grade and quality and free from defects or other imperfections. Material and equipment found defective shall be removed and replaced at the Contractor's expense.
2. The Contractor shall provide nameplates for identification of all equipment, switches, panels, etc. The nameplates shall be laminated phenolic plastic, black front and back with white core, white engraved letters (1/4" minimum) etched into the white core. Nameplates shall be fastened with pan head tapping screws.

**C. EXECUTION**

1. Inspection
  - a. This Contractor shall examine the areas of completed work and shall insure that no defects or errors are present which would result in the poor application or installation of subsequent work.
2. Installation
  - a. All work shall be performed in a manner indicating proficiency in the trade.
  - b. All pipes shall be either parallel to building walls or plumb where installed in a vertical position and shall be concealed when located in architecturally finished areas.
  - c. Any cutting or patching required for installation of this Contractor's work shall be kept to a minimum. Written approval shall be required by the Architect/Engineer if cutting of primary structure is involved.
  - d. All finishing shall be by the General Contractor.
  - e. The Contractor shall lay out and install his work in advance of pouring concrete floors or walls. He shall furnish all sleeves to the General Contractor for openings through poured masonry floors or walls, above grade, required for passage of all pipes required to support his equipment.
  - e. All fixtures shall be accurately roughed in according to the manufacturer's installation dimensions so that no offset adaptors, flexible connections or other improvising are necessary. All incorrect work shall be torn out and corrected and walls and floors patched.
3. Performance
  - a. The Contractor shall perform all excavation and backfill operations necessary for installation of his work.
  - b. Rock excavation shall be defined in the Supplementary General Conditions. Unless specifically stated, neither rock excavation nor a unit price for rock excavation shall be required in the bid.
4. Erection
  - a. All support steel, angles, channels, pipes or structural steel stands and anchoring devices that may be required to rigidly support or anchor material and equipment shall be provided by this Contractor.
5. Adjust and Clean

- a. All equipment and installed materials shall be thoroughly clean and free of all dirt, oil, grit, grease, etc.
  - b. Factory painted equipment shall not be repainted unless damaged areas exist. These areas shall be touched up with a material suitable for intended service. In no event shall nameplates be painted.
  - c. At a scheduled meeting, the Contractor shall instruct the Owner or the Owner's representative in the operation and maintenance of all equipment installed under his Contract.
6. Maintenance and Operating Manual
- a. The Contractor shall prepare four (4) copies of a manual describing the proper maintenance and system operation. This manual shall not consist of standard factory printed data intended for dimension or design purposes (although these may be included), but shall be prepared to describe this particular job. This manual shall include the following:
    - 1) Index and page numbers.
    - 2) Certificate of substantial completion.
    - 3) A summary sheet of warranties with the dates noted and a copy of all warranties.
    - 4) List of all subcontractors and suppliers with names, addresses and phone numbers.
    - 5) Certified testing and balancing report.
    - 6) All submittal data and shop drawings.
  - b. The O & M manuals shall be installed in 3 ring heavy back note books with the name of the building and the words, "Operations and Maintenance Manuals" permanently affixed to the cover and spine.
  - c. The operating and maintenance manuals shall be submitted to the Engineer (2) weeks before the pre-final inspection, for approval. When the manuals are considered complete by the Engineer, they will be turned over to the Owner for their permanent use.

**END OF SECTION 230500**

**SECTION 23 05 13 – ELECTRICAL WORK (MECHANICAL)**

**A. GENERAL**

1. This Contractor shall be responsible for the entire control system and control connections to all equipment installed as part of his contract.
2. Wiring from disconnect switches, junction boxes, etc. up to mechanical equipment shall be by this contractor. Final electrical connections to mechanical equipment shall be by this contractor.
3. All power and control wiring shall be in conduits.
4. All electrical work shall be performed by a licensed electrician.
5. All electrical work shall be in accordance with the State Building Code and all its supplements and the latest edition of the National Electrical Code.

**B. PRODUCT**

1. All motor starters, disconnects, switches, relays, conduits, conductors, etc. that are required for a complete electrical power and/or control system shall conform to the requirements set forth by NEC.
2. Refer to the plans for the type, size and electrical characteristics of the starters, disconnects, switches, relays, conductor and conduits.
3. All conductors and conduits shall be sized as noted on the plans or as required per NEC.

**C. EXECUTION**

1. All motor starters, disconnects, and switches shall be installed on or as close to the equipment they are serving as possible, or where shown on the plans.
2. Electrical connection to equipment subject to vibration which develops objectionable noises shall be made from the conduit system with short lengths of flexible "Liquid-Tite" conduit. Connection to other equipment shall be made with rigid conduit.
3. Conduits shall be run in a concealed space such as wall cavities, ceiling cavities, etc. except in the mechanical rooms where conduit may be run exposed.

**END OF SECTION 230513**



**SECTION 23 05 29 – PIPE HANGERS AND SUPPORTS**

**A. GENERAL**

1. This Section includes all hangers and supports, etc. as may be required to provide a complete piping system.
2. The actual arrangement of the piping shall follow the general locations shown on the Drawings, such that clearances, line drainage, etc. shall be maintained.
3. Refer to specification Section 232113 for piping.

**B. PRODUCT**

1. Piping shall be as stated in Piping Section(s).
2. Hangers and supports shall be as manufactured by B-Line Systems, Inc., PHD Manufacturing, Empire, or Modern Support Devices.

**C. EXECUTION**

1. In no case shall this Contractor be allowed to cut or reduce the specified covering to allow the application of a smaller hanger than required.
2. Hangers shall be spaced as dictated by North Carolina Plumbing Code.
3. Hangers shall be provided at each change in direction.
4. Vertical risers shall be supported at each floor, 5 feet on center, and/or at changes in direction of pipe.
5. Do not support piping from bar joist bridging and/or roof deck.

END OF SECTION 230529



**SECTION 23 05 48 – VIBRATION ISOLATION**

**A. GENERAL**

1. All equipment having rotating or moving parts shall have vibration isolators to eliminate transmission of objectionable noise to other material or equipment.
2. Isolators shall be selected for the use intended and shall be approved by the Engineer.

**B. PRODUCT**

1. Flexible connections shall be provided between metal ductwork and motorized housings.
2. Flexible fabric duct connectors shall be twenty-ounce, fire retardant, UL labeled, 10" maximum length, Ventfab or approved equal.
3. Neoprene pads, springs, hangers, isolation pads, etc., where required, shown or indicated, shall be by Consolidated Kinetics Company' Vibration Mountings, Inc.; Vibration Eliminator Company; or approved equal.

**C. EXECUTION**

1. Flexible connections shall be made according to the manufacturer's recommendations utilizing angles, bolts, clips or other fastenings necessary for securing the material to the duct pipe and the equipment.
2. Install neoprene pad between motor and air handling unit casing.
3. All vibration isolation equipment shall be coordinated with equipment specified and installed according to manufacturer's recommendations.
4. Flexible pipe connections shall be braided stainless steel with enlarged connections by Mctraflex or approved equal.

**END OF SECTION 230548**





**SECTION 23 05 53 – IDENTIFICATION OF HVAC COMPONENTS**

**A. GENERAL**

1. This section includes insulation for piping, ductwork, and equipment, as shown on the plans.
2. All coverings, and adhesives shall have a flame spread classification of 25 or less and a smoke developed rating of not more than 50.

**B. PRODUCT**

**C. EXECUTION**

1. EQUIPMENT

- a. All HVAC equipment, including air handlers, fans and pumps shall be properly identified with equipment identification, equipment controlled, electrical ratings and date of installation.
- b. Equipment shall be clearly identified with engraved phenolic plates securely fastened to the equipment with sheet metal screws. Phenolic plates shall be white background and black lettering.
- c. All serviceable equipment (fans, reheat coils, VAV boxes, etc.) located above ceilings or other concealed spaces shall clearly identified on an adjacent finished surface below service space. Label shall be engraved phenolic plate with white background and white letters. Label shall list name of equipment.
- d. Equipment labeling shall be coordinated with owner to match identification used by Building Automaton System.

2. DUCTWORK

- a. Paint all exposed ductwork insulation in mechanical rooms white. Ductwork exposed in finished spaces shall be painted as shown on architectural plans.

Duct System	Color Stencil Identification	Label Color	Lettering Color
Supply Ductwork	SUPPLY AIR	Green	White
Return Ductwork	RETURN AIR	Blue	White
OA Ductwork	OUTSIDE AIR	Blue	White
Exhaust Ductwork	EXHAUST	Yellow	Black

PIPING AND VALVES

b. Valve Identification

- i. All valves shall be tagged brass valve tags with chains for isolation and control valves.
- ii. Provide valve tag chart in the O&M manual.

- iii. Provide fumed valve tag chart with lexan cover mounted in each mechanical room. Chart shall include all valves in that room.
- iv. Include the tag numbers in the as-built drawings.
- c. All piping shall be provided with identification in accordance with ANSI A13.1-1981 standards. Markers shall be located at each wall, floor or ceiling penetration, and at every 20 ft. Markers shall be fully legible from floor level showing medium contained pipe, and direction flow. Stenciling as indicated below will be acceptable in lieu of markers.
- d. All exposed piping in mechanical rooms shall be painted and marked as listed below:

Piping System	Color	Stencil Identification	Label Color	Lettering Color
Natural Gas	Yellow	GAS	Yellow	Black

- e. Pipe identification shall contrast in color to the pipe colors and be easily readable. The width of color bands should be equal to the size of the stencil indicated below.
- f. For insulated pipe systems, stencil sizes are as follows:
  - i. For pipes up to 1 inch, use 1/2 inch letters.
  - ii. For pipes 1 inch to 2 inches, use 3/4 inch letters.
  - iii. For pipes 2 inches to 4 inches, use 1 1/4 inch letters
  - iv. For pipes 4 inches to 6 inches, use 1 1/4 inch letters.
  - v. For pipes above 6 inches, use 4 inch letters.
- g. f. For un-insulated systems, stencil sizes are as follows:
  - i. For pipe diameters up to 1 inch, use 1/2 inch letters.
  - ii. For pipe diameters from 1 inch to 2 inches, use 1 inch letters.
  - iii. For pipe diameters from 2 inches to 6 inches, use 2 inch letters.
  - iv. For pipe diameters over 6 inches, use 3 inch letters.

**END OF SECTION 230553**

**SECTION 23 05 93 – TESTING AND BALANCING**

**A. GENERAL**

1. SECTION INCLUDES

a. Testing, Adjusting, and Balancing:

- i. Air condition equipment, including air distribution devices, supply ducts, air handling units, condensing units, fans, coils, and related equipment.
- ii. Hydronic systems, including pumps, water distribution systems, chillers, boilers, heat exchangers, coils, and related equipment.

2. REFERENCES

- a. American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE)
  - i. Standard 111-2008 – Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-conditioning and Refrigeration Systems.
  - ii. Applications Handbook 2019, Chapter 39 – Testing, Adjusting, and Balancing
- b. Testing, Adjusting and Balancing Bureau (TABB) – International Standards for Environmental Systems Balance.
- c. Sheet Metal and Air Conditioning Contractors’ National Standards for Total System Balance.
- d. Associated Air Balance Council (AABC) – National Standards for Total System Balance.
- e. National Environmental Balancing Bureau (NEBB) – Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.

3. DEFINITIONS

- a. Adjusting: Varying of system flow by modifying settings of dampers and valves, in combination with varying fan speeds to obtain optimum operating conditions for the entire system.
- b. Balancing: Proportioning of air and hydronic flows through system mains, branches and terminal devices using standardized procedures to obtain specified air or hydronic flow while imposing the least amount of restriction on the HVAC system.
- c. Testing: Use of specialized and calibrated instruments to measure temperatures, pressures, rotational speeds, electrical characteristic, air and hydronic flow in velocities or quantities used in evaluating the performance of an HVAC system.

4. COORDINATION

- a. The testing, adjusting and balancing Contractor shall coordinate his work with the mechanical system and temperature control system installing Contractors to accomplish coordination and verification of system operation and readiness for testing, adjusting and balancing.
- b. Coordinate and assist CxP with all verification activities including providing all required sampling data necessary for the commissioning process.

5. SUBMITTALS

- a. Qualification Statements:
  - i. Submit company’s certification documents, including:
  - ii. Contractor Certification:
  - iii. Supervisor Certification

- iv. Technician Certification
- v. Submit name of testing agency to Owner within thirty (30) days on Notice to Proceed.
- vi. Submit list of projects completed by testing agency of similar size, scope and equipment. Include name of Contractor and building Owner contacts.
- vii. Submit a certification letter stating that the TAB agency is an independent entity not owned in part or in whole by any subcontractor employed on the current project.

b. Reports:

- i. Deficiency Report: Following examination of installed system, prior to balancing, submit report indicating system deficiencies that would prevent proper testing, adjusting and balancing of systems and equipment to meet specified performance.
- ii. TAB Report: Submit a copy of the complete testing, adjusting and balancing report to FMC Project Manager and RECS Atlanta Staff Engineer via email when it becomes available. Report shall include any drawings indicating air outlets, thermostats and equipment identified to correspond with data sheets.
- iii. Reports shall be on TABB/SMACNA (NEBB or AABC), forms that indicate information addressing each of the testing methods, readings and adjustments.

c. Closeout Submittals:

- i. Provide complete copy of testing, adjusting and balancing report. Include report in operation and maintenance manual.

6. QUALITY ASSURANCE

a. Qualifications:

- i. Testing and balancing shall be performed by a testing agency who specializes in testing, adjusting and balancing of heating, ventilating, air-moving equipment, air-conditioning systems and hydronic systems, and has a minimum of one (1) year experience.
- ii. Testing agency shall have successfully completed a minimum of five (5) projects, similar in size and scope.
- iii. Testing agency shall be a certified member of TABB (AABC and/or NEBB).
- iv. Maintain a copy of applicable standards at the project site.

b. Certifications:

- i. TAB Technician shall be certified by a nationally recognized certifying agency (AABC and/or NEBB).
- ii. Perform total system balance in accordance with Testing, Adjusting and Balancing Bureau (TABB) – Quality Assurance Program for Environmental Systems Balance, and (AABC National Standards for Field Measurement and Instrumentation and/or NEBB Quality Assurance Program – Conformance Certification).

c. PROJECT CONDITIONS

- i. Testing, adjusting and balancing shall commence after the HVAC systems installation is complete and in working order. Associated areas of general

construction shall be in place including interior and exterior doors, windows, walls, ceilings and existing conditions.

d. SPECIAL WARRANTY

- i. Provide warranty for period of ninety (90) days following physical occupancy of building, during which time the Owner may request a re-check of up to 10% of total number of terminals, or resetting of any outlet, coil or device listed in the test report. This period of time shall be no longer than 180 days after submission of the completed report.
- ii. Warranty shall meet the requirements of the following program(s):
  1. TABB – Quality Assurance Program
  2. AABC – National Performance Guarantee
  3. NEBB – Conformance Certification

**B. PRODUCTS – NOT USED**

**C. EXECUTION**

1. Prior to commencing testing, adjusting and balancing of environmental system(s), verify the following conditions; if deficiencies are evident, submit Deficiency Report to Engineer. Do not begin testing, adjusting and balancing of environmental system until deficiencies have been remedied.
  - a. Systems are started and operating in a safe and normal condition.
  - b. Temperature control systems are installed, complete, and operable.
  - c. Automatic and manual dampers are operable and fully open.
  - d. Thermal overload protection is in place for fans, pumps, chillers and other equipment.
  - e. Start up air filters are removed.
  - f. Final filters are clean and properly installed.
  - g. Duct and fan systems are clean.
  - h. Fans are rotating correctly.
  - i. Fire and volume dampers are in place and open.
  - j. Air coils fins are cleaned and combed.
  - k. Access doors are closed and duct end caps are in place.
  - l. Air outlets are installed and connected.
  - m. Hydronic systems are pressure tested, flushed, filled and properly vented.
  - n. Leak testing on duct system has been performed in accordance with SMACNA Standards, or as specified.
  - o. Pumps are rotating correctly.
  - p. (Start-up/construction) strainers have been removed and all permanent strainers are clean and in place.
  - q. Gauges and/or test parts are properly located for balancing.
  - r. Service and balance valves are fully open.
2. SITE TOLERANCES
  - a. Air Handling Systems: Adjust to within plus 10 percent of outlet total plus allowable leakage rate.

- b. Air Outlets and Inlets: Adjust to within plus or minus 10 percent of design for the space.
  - c. Hydronic Systems: Adjust to within plus or minus 10 percent of design flow.
  - d. Hydronic Terminal Devices: Adjust to within plus or minus 10 percent of design flow.
3. AIR SYSTEMS PROCEDURE
- a. Adhere to the following procedure:
    - i. TABB – HVAC Testing, Adjusting and Balancing International Standards; with particular focus on the following chapters:
    - ii. Preliminary TABB procedures
    - iii. General air systems TABB procedures
  - b. TABB procedures for specific (VAV, CAV, Multizone, Dual duct, etc.) air systems
  - c. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) HVAC Systems – Testing, Adjusting and Balancing.
  - d. NEBB – Procedural standards for TAB of environmental systems.
  - e. AABC – National standards for total systems balance.
  - f. Minimum air procedures should include the following:
    - i. Test and adjust fan RPM to design requirements.
    - ii. Test and record motor full load nameplate rating and actual ampere draw.
    - iii. Test and record system static pressures, fan suction and discharge.
    - iv. Adjust all main supply and return air duct to within tolerances listed in this section of work
    - v. Test and adjust each diffuser, grille and register. Reading and tests of diffusers, grilles and registers shall include design velocity (FPM) and adjusted velocity, design CFM and adjusted CFM.
    - vi. Test and record outside, mixed air, and discharge temperatures (D.B. for heating cycle, D.B. and W.B. for cooling cycle).
    - vii. In coordination with the ATC contractor, set adjustments of automatically operated dampers to operate as specified, indicated and/or noted.
    - viii. Test and adjust air handling and distribution systems to provide required or design supply, return, outside and exhaust air quantities within design tolerance
    - ix. In air systems employing filters, blank off filter area to simulate a pressure drop that is midway between that of a clean filter and that of a dirty filter.
    - x. Make air velocity measurements in ducts by Pitot tube traverse entire cross-sectional area of duct in accordance with SMACNA equal area method or Log Linear method.
    - xi. Measure air quantities at all air inlets and outlets.
    - xii. Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels.
    - xiii. Vary total system air quantities by adjustments of fan speeds. Provide drive changes recommendations. Vary branch air quantities by damper regulation.
    - xiv. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for loading of filters and coils.

- xv. Adjust outside air automatic dampers. Outside air, return air and exhaust dampers for design conditions within specified tolerances.
- xvi. Where modulating dampers or economizers are provided, take and record measurement at full return air, minimum outside air and 100 percent outside are mode of operation.
- xvii. Verify and record, in the T&B Report, "K" factors for all VAV air terminal devices and air flow stations.

#### 4. HYDRONIC SYSTEM PRESSURE

##### a. Adhere to the following procedure:

- i. Testing, Adjusting and Balancing Bureau (TABB) – International Standards for Environmental Systems Balance
- ii. SMACNA – HVAC Testing, Adjusting and Balancing International Standards; with particular focus on the following chapter:
  - 1. Hydronic TAB procedures
  - 2. NEBB – Procedural standards for TAB of environmental systems.
  - 3. AABC – National standards for total systems balance.

##### b. Hydronic balancing shall include the following minimum data:

- i. Prepare itemized equipment schedules, listing all heating and/or cooling elements and equipment in the systems to be balanced. List, in order on equipment schedules, by pump or zone according to the design, all heating and/or cooling elements, all zone balancing valves, and circuit pumps, ending with the last items of equipment or transfer element in the respective zone or circuit. Include on schedule sheet column titles listing the location, type of element or apparatus, design conditions and measured conditions. Prepare individual pump report sheets for each zone or circuit.
- ii. Use calibrated Venturi tubes, orifices, metered fittings, pressure gages and direct reading instrumentation to determine flow rates for system balance. Where flow-metering devices are not installed, flow balance in temperature difference across various heat transfer elements in the system is acceptable.
- iii. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- iv. Adjust hydronic distribution systems by means of balancing cocks, valves and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
- v. Test pumps and adjust flow. Record the following on pump report sheets:
  - 1. Suction and discharge pressure;
  - 2. Running amps and brake horsepower of pump motor under full flow and no flow conditions;
  - 3. Pressure drop across pump in feet of water and total GMP pump is handling under full flow conditions.
- vi. Where available pump capacity is less than total flow requirements or individual system parts, proportional balancing must be performed.

#### 5. ADJUSTING

- a. Recorded data shall represent actual measured or observed conditions.

- b. Permanently mark setting of valves, dampers and other adjustment devices allowing for settings to be restored. Set and lock memory stops.
- c. Leave systems in proper working, replacing belt guards, closing access doors, closing doors to electrical switch boxes and restoring thermostats to specified settings.
- d. Areas or rooms designed to maintain positive, negative or balanced air pressures with respect to adjacent spaces, as indicated by the design air quantities, require special attention. Adjust fan drives, distribution dampers, terminals and controls to maintain indicated pressure relationship.

**END OF SECTION 230593**



**SECTION 23 07 00 - INSULATION****A. GENERAL**

1. This section includes insulation for piping, ductwork, and equipment, as shown on the plans.
2. All insulation, linings, coverings, and adhesives shall have a flame spread classification of 25 or less and a smoke developed rating of not more than 50.
3. Insulation shall be Certainteed, Owens Corning, or Johns-Manville.

**B. PRODUCT**

1. Duct
  - a) Unless otherwise noted in the drawings all rectangular and round air conditioning supply, return, exhaust, and outside air duct shall be externally insulated with 3" thick, 3/4 lb. density foil scrim Kraft jacketed insulation. Joints shall be wrapped with a minimum of 3" wide FSK band of insulation to prevent any possible leakage and condensation. Ducts with widths over 30" shall be further secured on the underside with mechanical fasteners on 18" maximum centers.
  - b) In addition to the duct wrap specified in B1.a of this specification, all low pressure rectangular supply and return ductwork shall be lined for 15 feet downstream from air handling unit (or up to and including the first 90 degree elbow). Duct liner shall be 1" thick, 2lb. dense, Shuller Permorate Linacoustic HP, or approved equivalent. Coat all exposed leading edges and transverse joints with a fire retardant adhesive.
  - c) Duct sizes shown are actual duct dimension. Where ductwork is lined, as noted above, the duct insulation thickness shall be added to the listed ductwork dimensions for final duct size.
  - d) Duct routed outside the building shall be insulated with minimum R-8 fiberglass. All joints shall be sealed with mastic prior to insulating. Apply final skin of sheet metal and seal weather tight.
  - e) Ductwork located in mechanical rooms shall be wrapped with duct board insulation 2" thickness rigid Fiberglas Owens/Corning or equal, ASTM C 612, 3 pounds per cubic foot density, with Foil reinforced jacket. The board shall be attached with field applied perforated base pins or weld pins applied on 12" centers. Finish shall be 8oz canvas jacket, totally sized with Foster 81-42W or equal lagging adhesive. Corner board shall be used on all edges.
  - f) Ductwork located outside the building shall be wrapped with duct board insulation 2" thickness rigid Fiberglas Owens/Corning or equal, ASTM C 612, 3 pounds per cubic foot density, with Foil reinforced jacket. The board shall be attached with field applied perforated base pins or weld pins applied on 12" centers. Board shall be wrapped with self-adhesive weather barrier equal to Alumaguard.
2. Piping
  - a) All condensate drain piping, make-up water piping, all refrigerant suction piping, and all refrigerant piping exposed on the exterior of the building shall be insulated with 1.5" wall tubular closed cell elastomeric insulation with all joints butted and cemented tight. Insulation shall be Rubatex R-180-FS or equal. Cover exterior insulation with aluminum jacket.

Division 23 00 00

**C. EXECUTION**

1. Insulation shall be installed in accordance with manufacturer's recommendations.
2. All exterior piping insulation above grade shall be provided with a protective aluminum jacket with a factory-applied asphalt and kraft paper moisture barrier. Aluminum jackets shall be cross-crimped (longitudinally corrugated) for strength. Aluminum jackets shall be not less than 0.106" thick and shall be secured with aluminum or stainless steel screw; not more that 8" apart.
3. Any pipe covered prior to leak testing shall be exposed at contractor expense.
4. All piping shall be provided with identification in accordance with ANSI A13.1-1981 standards. Markers shall be located at each wall, floor or ceiling penetration, and at every 20 ft. Markets shall be fully legible from floor level showing medium contained pipe, and direction flow.

**END OF SECTION 230700**

**SECTION 23 21 13 – PIPE AND PIPE FITTINGS****A. GENERAL**

1. This section includes all pipe, pipe fittings, hangers, and supports, etc. as may be required to provide a complete piping system.
2. Testing of all piping shall be made in the presence of the Engineer or a designated representative of the Owner. No piping shall be covered or put into operation before such testing has been approved. Covered pipe shall be exposed at contractor's expense. Engineer shall be given 48 hours written notification of test.
3. The actual arrangement of the piping shall follow the general locations shown on the Drawings, such that clearances, line drainage, etc. shall be maintained.
4. Refer to specification Section 230523 for Valving.
5. Refer to specification Section 232116 for Piping Specialties.
6. Refer to specification Section 230529 for Hangers and Supports.
7. Refer to specification Section 230700 for Pipe Insulation.
8. All piping shall be provided with end caps or have ends covered prior to installation.

**B. PRODUCT**

1. Refrigerant Piping
  - a) Refrigerant piping shall be Type "L" hard drawn copper.
  - b) Refrigerant piping fittings shall be sweat type wrought copper.
  - c) Use silver solder on all refrigerant piping.
  - d) Copper tubing, which is out of round, will not be acceptable.
  - e) Not notching or mitering of copper tubing will be permitted.
  - f) Do not allow piping to rub against masonry when expanding and contracting.
  - g) Close and protect open ends of piping until final connections are made. Such closing shall be made with fittings, which cannot be easily removed. Caps or plugs shall be made with fittings, which cannot be easily removed. Caps or plugs shall be required at all times during construction so that no pipes are left open at the end of any day's work, even though continuation is expected the next day.
  - h) Copper pipe ends shall be reamed, sanded and deburred before soldering. Non-corrosive flux shall be used.
  - i) Test refrigerant piping in accordance with the NC Building Code.
2. Condensate Drain Pipe
  - a) Drain pan condensate piping shall be Type "L" copper with all joints soldered with 95-5 solder.
  - b) Terminate condensate drain lines as shown on drawings. Condensate drains from rooftop units are to be routed to nearest roof drain.
3. Gas Piping

- a) Piping below grade shall be polyethylene having a cell classification of ASTM D-3350-PE234343E. Pipe and pipefittings shall meet the requirements of ASTM D-2513. All fittings and access shall be as manufactured and furnished by the pipe supplier.
- b) Piping above grade shall be standard weight, schedule 40, black steel pipe conforming to ANSI B36.10, ASTM A53, or ASTM 106. Screwed fitting shall be malleable iron, 150 lb. S.W.P, will banded pattern conforming to ANSI B16.3.
- c) Connections between plastic and metallic piping shall be in accordance with the State Code.
- d) All pipes shall be buried in accordance with manufacturer's recommendations.
- e) All plastic pipe shall have a 3" wide detector tape installed 18" above finished grade.
- f) All metal pipe run below grade shall be coated with coal tar enamel coating.
- g) All exposed gas piping surfaces, supports, etc., shall be painted one prime and one finish coat of rust resistant paint. Finish coat shall be yellow according to OSHA Standards unless otherwise noted on the plans.
- h) All gas piping systems shall be tested in strict accordance with the National Fire Protection Association's National Fuel Gas Code NFPA54, and the State Building Code.
- i) All gas piping system shall be air tested at 50 psi for a period of not less than one (1) hour without loss of pressure. Any leaks that occur shall be repaired and another test started. All joints shall be checked for leaks with a water-soap solution. Where leaks are found, the joint shall be re-made.

**C. EXECUTION**

- 1. Piping 2" and smaller shall be welded or have screwed fittings with extra heavy nipples, unless otherwise noted.
- 2. Piping 2 ½" and larger shall have welded fittings of the same material and weight as the piping in which they are installed.
- 3. Welding tees or weldolets shall be used.
- 4. No "Stub-In" shall be permitted.
- 5. All insulated piping shall be protected by saddles at horizontal support points or by insulation protectors if the insulation has a vapor barrier. Saddles where used shall be welded to the pipe.
- 6. Sleeves shall be provided wherever pipes pass through walls, floors and ceilings. Sleeves shall be Schedule 40, black steel, 1/2" in diameter larger than the pipe and insulation on the pipe. Sleeves through walls and ceilings shall be flush. Sleeve through floors shall extend two inches above finished floor. Sleeves in exterior walls shall be caulked and made watertight.
- 7. All pipe welding shall be uniform and thorough, and shall comply with AWS standards for pipe weldings. All pipe welding must be done by AWS certified welders experienced in this type of work. Provide copy of certification with other credentials to Engineer with piping submittal package.

**END OF SECTION 232113**

**SECTION 23 31 00 – DUCTWORK****A. GENERAL**

1. This Section includes ductwork, splitter dampers, balancing dampers, air deflection devices, etc. required for a complete system.
2. The Drawings are intended to indicate, with reasonable accuracy, the location of components and the general arrangement of the system. All offsets, bends fittings and other devices, not shown but required for the full operation of the system, shall be provided.
3. Refer to specification Section 230700 for duct insulation.

**B. PRODUCT**

1. Low and Medium Pressure Ductwork.
  - a) Round and rectangular ductwork shall be of gauges and construction methods as indicated in the latest ASHRAE Guide and SMACNA Standard.
  - b) Splitter dampers, balancing dampers, turning vanes and air deflection devices shall be installed as shown on the plans and/or where required for the proper control of airflow.
  - c) All take-offs to diffusers shall be tapered type taps with factory damper and locking quadrant.
  - d) All take-offs to VAV Units shall be made with conical taps.
2. Flexible Ductwork
  - a) Ducts shall be insulated type with foil wrapper complying with NFPA Standard No. 90A and UL181.
  - b) All flexible ducts shall have a factory installed 1" thick 1.5 lb./cu. ft. fiberglass insulation with a seamless vinyl vapor barrier.
  - c) Length of flexible duct shall not exceed 10 feet.
  - d) Flexible duct shall be secured and sealed in place with mastic to hard duct collars at each end, with nylon tie-wraps on the wire enforced inner mylar skin, followed by the insulation layer and then the exterior vapor layer secured with another tie-wrap.
3. Exposed Ductwork
  - a) Exposed shall be round, 18 gauge spiral lock seam with paintable finish, double wall and internally insulated at the factory. Inner wall shall be perforated.
  - b) Duct shall be fastened using sheet metal screws only and no duct tape.
4. Dryer Ductwork.
  - a) Dryer ductwork shall be round 30 gauge-galvanized steel with substantially airtight joints and shall connect to box outlet.
  - b) Sheet metal screws shall not be used at joint connections.
  - c) Joints shall run in direction of airflow.

**C. EXECUTION**

1. Turning vanes shall be installed in square elbows for all ductwork.
2. Duct transitions, splitter dampers, and balancing dampers shall be constructed of gauges and materials as indicated in ASHRAE Guide and SMACNA Standards.
3. Hangers and supports for ductwork shall be of metal bands, angles and rods as indicated in ASHRAE Guide and SMACNA Standards. The minimum bandwidth shall be 1", 16 gauge, galvanized steel.
4. Where ductwork passes through floors and walls, the space around the ducts shall be sealed in an approved manner with mineral wool insulation, and/or proper fire seal material approved by the State or Local Inspector.
5. In exposed areas and mechanical rooms, ductwork openings shall be finished with a metal collar.
6. Ductwork shall be cross-braced and reinforced properly with galvanized steel angles as recommended by SMACNA Standards.
7. Where ductwork behind grilles or diffusers is visible, it shall be painted with two coats of flat black base fire retardant paint.
8. Duct connections to outside air louvers shall be pitched to drain outside and shall be soldered watertight.
9. Tape all low-pressure joints with Hardcast or approved equal for completely airtight system.
10. All medium pressure joints are to be sealed in accordance with SMACNA standards for ductwork 2" W.C. and greater. All ducts shall be air tight, rigid and free from vibration and noise.
11. Duct dimensions shown on the drawings are net inside dimensions.
12. Where ductwork is lined, as noted in Section 230700, the duct insulation thickness shall be added to the listed ductwork dimensions for final duct size.

**END OF SECTION 233100**

**SECTION 23 33 13 – FIRE DAMPERS**

**A. GENERAL**

1. Fire dampers shall be installed where shown on the plans and as required by the latest edition of NFPA 90A.
2. All fire dampers shall be UL labeled.
3. Fire dampers shall be in compliance with UL 555 and UL 555S for dynamic dampers.

**B. PRODUCT**

1. Fire dampers shall be of the type and rating as noted on the drawings or as required.
2. Fire dampers shall be Air Balance, Inc.; Ruskin; Metal Industries; or approved equivalent.

**C. EXECUTION**

1. Fire dampers shall be installed in wall and floor openings utilizing steel sleeves, angles, other materials, and practices required to provide installation equivalent to the manufacturers UL tested assembly.
2. Fire dampers shall be installed in accordance with the manufacturer's instructions.
3. Access doors shall be provided for access to each damper assembly.
4. Doors shall be constructed with a minimum of 24 gauge double wall galvanized steel, insulated with 1" of insulation. Doors shall be UL listed.
5. Door size shall be 12" x 10" minimum, but as large as possible for access to fusible link.
6. Two fire dampers shall be installed in fire wall rated for 3 hours or more. Each fire damper shall have a rating equal to the fire wall.
7. Fire dampers shall be tested by the test and balance sub-contractor and mechanical contractor with witness by engineer of record.

**END OF SECTION 233313**





**SECTION 233400 – FANS**

**A. GENERAL**

1. Provide all fans, roof caps, etc., of the type and capacities indicated on the Drawings.
2. Fans, roof caps, curbs, etc., shall be by the same manufacturer.
3. Fans shall be by Greenheck, Loren Cook, Carnes, Penn, American Air Cool, or equal.

**B. PRODUCT**

1. All fans, roof caps, etc., shall be as scheduled on the Drawings.
2. All fans shall be equipped with 1/2" mesh birdscreen, gravity damper.
3. All fan motors shall have vibration isolators, motor housing shall be grounded, and motor overload protection shall be provided.
4. All curbs shall be of the pre-fab insulated type.
5. Provide NEMA 3R rated disconnect switch.

**C. EXECUTION**

1. Fans and roof caps shall be installed as shown on the plans.
2. Roof openings and locations are to be coordinated with the other trades.
3. Fan motors and all other electric components shall bear the UL or other acceptable third party testing agency label.

**END OF SECTION 233400**



**SECTION 23 37 00 – AIR DISTRIBUTION****A. GENERAL**

1. Furnish and install air distribution devices of the type, size and configuration indicated on the drawings.
2. Refer to Architectural Reflected Ceiling Plan and Schedule for types of ceiling specified, and provide compatible frames on air distributions devices.

**B. PRODUCT**

1. Diffusers, Grilles, and Registers
  - a) Surface mounted devices shall have sponge gaskets.
  - b) Devices shall be of steel construction with baked on enamel finish, unless otherwise noted.
  - c) All devices shall be by Krueger, Carnes, Titus, Metalaire, Tuttle & Bailey, Price or approved equivalent.
  - d) Ceiling mounted diffusers shall have insulation applied to metal top and neck to prevent sweating. Insulation shall match duct insulation.
  - e) Soffit grilles shall be extruded anodized aluminum with ¼" x ¼" insect screen.
  - f) Return and exhaust grilles in lay-in ceilings shall have full louvered face (24" x 24").
  - g) Devices in moist and humid spaces shall be of aluminum construction.
  - h) Provide heavy-duty steel return grilles (in gymnasiums, multi-purpose rooms, etc) or in all locations where the grille is within 8' off the floor.
  - i) Lay-in diffusers installed 12 feet above finished floor shall have adjustable vanes for vertical throw.
  - j) Where grilles are installed above hard ceilings with no access to balancing dampers, opposed blade dampers shall be installed.
2. Louvers
  - a) Louvers shall be 12 gauge extruded aluminum with drainable blades, unless otherwise noted.
  - b) Louvers shall be provided with ½" x ½" insect screen.
  - c) Louvers shall be Arrow, Ruskin, Air Balance or approved equivalent.
  - d) Provide louvers with required mounting sleeves/support. Coordinate opening with general contractor.
  - d) Combination louver/dampers indicated on drawings to have motorized damper shall be interconnected with fans indicated, and shall open when the fan is energized. This Contractor shall provide and make all interconnecting control wiring from the fan to the damper.

**C. EXECUTION**

1. Air distribution devices shall be mounted level, straight, and flush with walls or ceilings.
2. Color shall be as indicated on drawings, or as selected by the Architect/Engineer.
3. Locations of all air distribution devices shall be coordinated with ceiling and lighting work.
4. Provide submittals data to include, cfm, pressure drop, dimensional, velocity and noise criteria data.

**END OF SECTION 233700**



**SECTION 23 55 33 – GAS FIRED UNIT HEATER****A. GENERAL**

1. Contractor shall furnish and install Modine Separated Combustion high efficiency gas-fired unit heater(s).
2. Performance shall be as indicated on the equipment schedule in the plans.
3. Units heaters shall have C.S.A. (Canadian Standards Association) design certification.
4. The unit capacity shall be as listed on the plans. The output capacity shall be a minimum of 81% or 82% of the input based on steady-state thermal efficiency as certified by the Canadian Standards Association (C.S.A.).
5. Units shall be manufactured by Modine, Reznor or approved equivalent.

**B. PRODUCT**

1. Casing shall be 22 gauge cold rolled steel draw-formed with aesthetically designed rounded corners, and fitted to eliminate exposed fasteners. Entire casing shall be powder painted with an attractive, tough, corrosion resistant baked-on polyester gray-green paint. Casing shall also include a hinged bottom panel for easy access to the burner compartment. Horizontal air deflector louvers shall be provided to aid in controlling the discharge air pattern.
2. Burner material shall be 409 stainless steel, with non-clogging, slotted ports with 409 stainless steel separator strip designed for good lighting characteristics without noise of extinction.
3. Heat exchanger shall be designed with direct-fired primary heat exchanger tubes constructed of stainless steel. The unit shall also have secondary heat exchanger tubes designed to extract heat from the combustion gases after the gases have passed through the primary heat exchanger tubes. The secondary heat exchanger tubes shall be made of Type 409 Stainless Steel. The header plates of the heat exchanger shall be constructed of Type 409 Stainless Steel and the entire heat exchanger assembly shall be completely heliarc machine-welded and shall have contoured stress-free, air-foil designed tubes.
4. The units shall have a factory mounted and wired integral power exhauster directly connected to the unit collector box assembly. The unit shall also include a factory mounted and wired safety pressure switch designed to prevent pilot and main burner ignition until positive venting has been proved. Units shall be designed for single vent connection and shall include factory supplied concentric vent kit.
5. The units shall be provided with a combustion air inlet collar for connection of combustion air pipe directly to the outside atmosphere. Unit shall include factory supplied combustion air inlet terminal.
6. Units shall be provided with intermittent-duty pilot ignition and shall be with 100% shut-ff and continuous retry. All units shall include a redundant type main gas valve, pilot valve, low voltage control transformer, safety high limit control (overheat control), safety pressure switch, gas valve regulator, manual shut-off valve and terminal board for low voltage wiring. All gas controls shall be rated for a maximum inlet pressure of ½ psi.
7. Each unit heater shall have a single motor and propeller totally enclosed with thermal overload protection. Propeller shall be statically balanced and shall be equipped with a 360° safety fan guard.

8. Each unit shall have a single motor and centrifugal blower completely factory assembled and mounted. Motor shall be totally enclosed. Single phase motors shall be equipped with thermal overload protection. Blowers shall be statically and dynamically balanced for quiet operation.

**C. EXECUTION**

1. Unit(s) shall be installed as shown on the drawings.
2. Unit(s) shall be provided with accessories noted on the drawings.

**SECTION 23 62 13 – AIR COOLED CONDENSING UNIT**

**A. GENERAL**

1. Furnish and install an air-cooled condensing unit(s) of the capacity shown on the drawing.
2. Unit(s) shall be completely factory assembled and pretested.
3. Unit(s) shall be Carrier, Trane, Lennox, or approved equivalent.

**B. PRODUCT**

1. Unit casing shall be galvanized steel, zinc phosphatized, baked enamel finish and fully weatherproof.
2. Condenser coil shall be of non-ferrous construction, aluminum plate fins, mechanically bonded to seamless copper tube, sub-cooling circuitry.
3. Condenser fans and motors shall be direct drive, propeller type fins, Class B motor insulation, inherent protection, permanently lubricated, resiliently mounted; fans shall have safety guard.
4. Controls shall be factory wired and include high and low pressure stats, compressor overload devices, short cycling timer (5 min.), discharge line thermostats, oil pressure switches, pressure relief valve and circuit breakers.
5. A wire guard shall be provided over the condenser coils for protection from physical damage. The wire guard shall be either factory mounted or field erected.
6. The refrigerant for the condensing unit shall be R-410a, or other refrigerant not containing CFC's.

**C. EXECUTION**

1. Unit shall be mounted on concrete pad as shown on the plans.
2. Controls shall be as indicated on the plans, or as specified herein.
3. Provide 5-year compressor warranty.





**SECTION 23 81 43 – SPLIT SYSTEM HEAT PUMP****A. GENERAL**

1. Furnish and install a direct expansion heat pump indoor unit with capacity as indicated on the plans.
2. Unit shall be completely factory assembled and pretested.
3. Unit shall be Trane, Lennox, Mitsubishi, or approved equivalent.

**B. PRODUCT**

1. Air Handling Unit/Fan Coil
  - a. Casing shall be Galvanneal steel, bonderized with baked enamel finish.
  - b. Fan section shall have forward curved blades, centrifugal type, belt or direct drive. Fan shall be statically and dynamically balanced and shall run on permanently lubricated bearings.
  - c. Cooling coils shall be of non-ferrous construction with mechanically bonded aluminum plate fins on copper tube.
  - d. Casing shall be insulated with fire retardant insulation in accordance with NFPA 90A. Insulation shall be secured to casing panels with waterproof cement and permanent fasteners.
  - e. A condensate drain pan shall be furnished with threaded pipe connections and shall extend completely under the coil section. Condensate drain lines shall be insulated copper.
  - f. Electric heater assembly shall include circuit breakers, automatic re-setting limit switches and heat limiter for primary and secondary over-current and thermal protection.
  - g. Accessories shall be as indicated on the drawings.
2. Outdoor Unit
  - a. Cabinet shall be single, enclosed, and weatherproof casing or galvanized steel bonderized and finished with baked enamel. A base pan drain connection shall be provided. Panels shall be easily removable for service access.
  - b. Compressor system shall consist of serviceable hermetic compressor. Compressor shall have service shut-off valves; suction pressure operated capacity control unloader, suitable vibration isolators and crankcase heater.
  - c. Condenser and evaporator coils shall have aluminum plate fins mechanically bonded to copper tubes.
  - d. Outdoor fans shall be propeller type, direct driven. All motors shall have overload protection and suitable vibration isolators.
  - e. Cooling system shall be protected by fusible plug, high and low pressurestat, compressor motor overloads, anti-cycling timer device (5 minutes). Controls shall include low voltage control circuit transformer, compressor and fan motor safety controls with automatic reset, high and low pressure cutout switches and terminals for accessory electrical connections.

**3. EXUCTUTION**

1. Unit shall be installed as shown on the plans, in strict accordance with manufacturer's recommendations.
2. Controls shall be as indicated on the plans.
3. Provide 5-year compressor warranty.
4. Provide with spare belts for any belt driven fans.
5. Provide with (2) sets of filters. Contractor to install one set at system start-up and a second set at completion of project.

**SECTION 26 00 00 - GENERAL PROVISIONS ELECTRICAL****PART 1 - GENERAL**

## 1.1 Scope of Work

- A. This Contractor shall provide all materials, equipment and labor necessary to install and set into operation the electrical equipment as shown on the Engineering Drawings and as contained herein.

## 1.2 Quality Assurance

- A. See the General and Supplementary General Conditions.
- B. All work shall be in accordance with the North Carolina State Building Code, which includes the 2020 edition of the National Electrical Code.
- C. Wherever the words "Approved", "Approval", and "Approved Equal" appear, it is intended that items other than the model numbers specified shall be subject to the approval of the Engineer.
- D. "Provide" as used herein shall mean that the Contractor responsible shall furnish and install said item or equipment. "Furnish" as used herein shall mean that the Contractor responsible shall acquire and make available said item or equipment and that installation shall be by others. "Install" as used herein shall mean that the Contractor responsible shall make installation of items or equipment furnished by others.
- E. All material and equipment that the Contractor proposes to substitute in lieu of those specified shall be submitted to the Engineer ten (10) days prior to the bid date for evaluation. The submittal shall include a full description of the material or equipment and all pertinent engineering data required to substantiate the equality of the proposed item to that specified.

## 1.3 Submittals

- A. See General and Supplementary General Conditions and Division 1.
- B. Within ten (10) days after notification of the award of the Contract and written notice to begin work, the Contractor shall submit for approval to the Architect/Engineer a detailed list of equipment and material which he proposes to use. Items requiring submittal data for approval will be noted at this time. Six (6) sets of submittal data shall be provided for approval.
- C. Each submittal shall bear the approval of the Contractor indicating that he has reviewed the data and found it to meet the requirements of the specifications as well as space limitations and other project conditions. The submittals shall be clearly identified showing project name, manufacturer's catalog number and all necessary performance and fabrication data. Detailed submittal data shall be provided when items are to be considered as substitution for specified items. Acceptance for approval shall be in writing from the Engineer.

- D. The Contractor shall submit to the Engineer a set of accurately marked-up plans indicating all changes encountered during the construction. Final payment will be contingent on receipt of these as-built plans.
- E. The Contractor shall furnish an electronic set of maintenance and operating instructions, parts lists, electrical circuit wiring diagrams, all submittal data, and sufficient manufacturer's literature to operate and maintain all equipment.
- F. The Contractor shall submit to the Engineer a duplicate set of final electrical inspection certificates prior to final payment.

#### 1.4 Product Delivery, Storage and Handling

- A. All material and equipment shall be delivered and unloaded by the Contractor within the project site as noted herein or as directed by the Owner.
- B. The Contractor shall protect all material and equipment from breakage, theft or weather damage. No material or equipment shall be stored on the ground.
- C. The material and equipment shall remain the property of the Contractor until the project has been completed and turned over to the Owner.

#### 1.5 Work conditions and Coordination

- A. The Contractor shall review the mechanical plans to establish points of connection and the extent of electrical work to be provided in his Contract.
- B. This Contractor shall be responsible for all electrical work and make final connections to equipment installed in his Contract. Unless otherwise noted, this Contractor shall wire to disconnect switches, junction boxes, or circuit breakers as provided in his Contract.
- C. All work shall be coordinated with other trades. Cutting of new work and subsequent patching shall be approved by Architect/Engineer and shall be at the Contractor's expense with no extra cost to the owner.

#### 1.6 Guarantee

- A. See the General and Supplementary General Conditions.
- B. Where extended warranties or guarantees are available from the manufacturer, the Contractor shall prepare the necessary Contract Documents to validate these warranties as required by the manufacturer and present them to the Owner.

**PART 2 - PRODUCT**

- 2.1 Materials and equipment shall be new, unless noted otherwise, of the highest grade and quality and free from defects or other imperfections. Materials and equipment found defective shall be removed and replaced at the Contractor's expense.
- 2.2 The Contractor shall provide nameplates for identification of all equipment, switches, panels, transformers, etc. The nameplates for 120/208-volt panels shall be laminated phenolic plastic, blue front and back with white core, white engraved letters (1/2" minimum) etched into the white core. The nameplates for 277/480-volt panels shall be laminated phenolic plastic, black front and back with white core, white engraved letters (1/2" minimum) etched into the white core. Name tags to be mounted with self-tapping sheet metal, stainless steel screws.
- 2.3 All materials and equipment be approved third party labeled or bear re-examination listing where such approval has been established for the type of device in question.

**PART 3 - EXECUTION**

- 3.1 Inspection
  - A. If any part of this Contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance on the character or conditions of contiguous work not executed by him, the Contractor shall examine and measure such contiguous work and report to the Architect or Engineer in writing any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should the Contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions and he shall be responsible for any defects in this work consequent thereon and will not be relieved of the obligation of any guarantee because of any such imperfection or condition.
  - B. It is the responsibility of the electrical contractor to notify the authority having jurisdiction to schedule required inspections including rough-in, above ceiling and final inspections.
- 3.2 Installation
  - A. All work shall be performed in a manner indicating proficiency in the trade.
  - B. All conduit, pipes, ducts, etc., shall be either parallel to building walls or plumb where installed in a vertical position and shall be concealed when located in architecturally finished areas.
  - C. Any cutting or patching required for installation of this Contractor's work shall be kept to a minimum. Written approval shall be required by the Architect/Engineer if cutting of primary structure is involved.
  - D. All patching shall be done in such a manner as to restore the areas or surfaces as to match existing finishes.
  - E. The Contractor shall lay out and install his work in advance of pouring concrete floors or walls. He shall furnish and install all sleeves or openings through poured masonry floors or walls above grade required for passage of all conduits, pipes or duct installed by him. The Contractor shall furnish and install all inserts and hangers required to support his equipment.

## F. Grounding

1. All grounding shall be in accordance with the requirements of the NEC.
2. Install a separate green grounding conductor with the circuit conductors in each conduit. Use of the conduit only shall not be an acceptable means of equipment grounding.
3. All grounding conductors shall be sized per Article 250.122 of the NEC.
4. The ground system shall be tested with an "Earth Megger" and the test report submitted to the Engineer. If resistance exceeds 25 ohms provide an additional driven ground rods separated by a minimum of 6' interconnected with #3/0 copper. A copy of the test report shall be submitted to the electrical engineer.
5. All ground points shall be accessible for inspection.
6. Boxes with concentric, eccentric or over-sized knockouts shall be provided with bonding bushings and jumpers. The jumper shall be sized per NEC Table 250.122 and lugged to the box.

## G. Electrical Identification

1. Furnish and install engraved laminated phenolic nameplates for all safety switches, panel boards, transformers, switchboards, motor control centers and other electrical equipment supplied for the project for identification. Nameplates shall be securely attached to equipment with self-tapping stainless-steel screws; if the screw sharp end is protected; otherwise Rivets shall be used. Letters shall be approximately 1/2-inch-high minimum. Embossed, self-adhesive plastic tape is not acceptable for marking equipment. Nameplate material colors shall be:
  - a. Blue surface with white core for 120/208-volt equipment.
  - b. Black surface with white core for 277/480-volt equipment.
  - c. Bright red surface with white core for all equipment related to fire alarm system.
  - d. Dark red (burgundy) surface with white core for all equipment related to security.
  - e. Green surface with white core for all equipment related to "emergency" systems.
  - f. Orange surface with white core for all equipment related to telephone systems.
  - g. Brown surface with white core for all equipment related to data systems.
  - h. White surface with black core for all equipment related to paging systems.
  - i. Purple surface with white core for all equipment related to TV systems.
2. Furnish and install self-adhesive plastic tape for all receptacle and wall switch cover plates indicating circuit numbers.

3. Furnish and install self-adhesive embossed plastic labels on outside of all junction box cover plates indicating circuit numbers.
  4. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by tags with string or wire attached to conduit or outlet.
- 3.3 Performance
- A. The Contractor shall perform all excavation, backfilling, and patching operations as indicated on the drawings.
- 3.4 Erection
- A. All support steel, angles, channels, pipes or structural steel stands and anchoring devices that may be required to rigidly support or anchor material and equipment shall be provided by this Contractor.
- 3.5 Field Quality Control
- A. The Contractor shall conform to the requirements of Division 3 for concrete testing.
  - B. The Contractor shall test his entire installation and shall furnish the labor and materials required for these tests. Tests shall be performed in accordance with the requirements of the section of the specifications and in accordance with the requirements of the State Ordinances and Codes, and the National Electrical Code. The Contractor shall notify the Engineer of his readiness for such test. Final inspections are required along with final inspection certificates are required, prior to authorization of final payment.
  - C. Testing required for compliance with the Contract shall be stated in subsequent sections. All tests specified shall be completely documented indicating time of day, date, temperature and all pertinent test information. All required documentation of readings indicated above shall be submitted to the engineer prior to, and as one of the prerequisites for, final acceptance of the project.
  - D. Documentation
    1. All tests specified shall be completely documented indicating time of day, date, temperature and all pertinent test information.
    2. All required documentation of readings indicated above shall be submitted to the engineer prior to, and as one of the prerequisites for, final acceptance of the project.
- 3.6 Adjust and Clean
- A. All equipment and installed materials shall be thoroughly clean and free of all dirt, oil, grit, grease, etc.

- B. Factory painted equipment shall not be repainted unless damaged areas exist. These areas shall be touched up with a material suitable for the intended service. In no event shall nameplates be painted.
- C. At a scheduled meeting, the Contractor shall instruct the Owner or the Owner's representative in the operation and maintenance of all equipment installed under his Contract (in the presence of the Engineer).

**END OF SECTION 26 00 00**



**SECTION 26 05 20 - WIRES AND CABLES**

**PART 1 - GENERAL**

- 1.1 All conductors shall be properly marked showing manufacturer's name, insulation type, voltage rating and wire size. All insulation is to be rated for minimum of 600 volts.
- 1.2 Wire sizes shall be as shown. No wire smaller than No. 12 AWG shall be used. The maximum conductor size shall be 500 KCMIL.
- 1.3 Where the conductor length from the panel to the first outlet on a 120 volt exceeds 50 feet, the branch circuit conductors from the panel to the first outlet shall be increased by at least one size. Refer to the wire size chart on the drawings. Per NEC 250.122(B), equipment grounding conductors, where installed shall be increased in size proportionately according to the circular mil area of the ungrounded conductors.
- 1.4 Conductors shall be manufactured by US Wire and Cable, Triangle, Okonite, Southwire, or approved equivalent.
- 1.5 Wiring for 120/208-volt systems and 277/480-volt systems shall not be mixed in the same race way, pull or junction box.

**PART 2 - PRODUCT**

- 2.1 All conductors shall be copper and shall conform to Underwriters' Standards. Wires No. 10 and smaller shall be solid. Wires 8 and larger shall be stranded.
- 2.2 All wire shall be labeled two (2) feet on centers giving size, type voltage, rating, and manufacturer's name. Wire #6 and smaller #6 shall be factory color coded. Wire larger than #6 may be color coded with approved 2000-volt colored tape at all terminals of the run, and at all junctions.
- 2.3 Where applicable, all wire shall be color coded as follows, or approved by the Engineer:

A. 120/208-volt system:

Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green

B. 277/480-volt system:

Phase A	Brown
Phase B	Orange
Phase C	Yellow
Neutral	Natural Gray
Ground	Green

2.4 Insulation type shall be UL labeled for the appropriate type of use and temperature. Insulation types are as follows:

- A. The insulation type for interior wiring shall be dual-rated THHN/THWN or XHHW.
- B. The insulation type for wiring in exterior wet locations shall be THWN-2 or XHHW-2.

**PART 3 - EXECUTION**

- 3.1 Conductors shall be run in conduit and shall be continuous from outlet to outlet. Splices will not be made except within accessible outlet or junction boxes, troughs, or gutters.
- 3.2 Solid conductors shall be spliced by using Ideal "wing-nuts", 3M Company's "Scotchlok" connectors for branch circuit splices. Crimp connectors will not be allowed for branch circuit splicing.
- 3.3 Joints in stranded conductors shall be spliced by approved mechanical connectors and gum rubber tape or friction tape. Solderless mechanical connectors for splices and taps, provided with U/L-approved insulating covers, may be used instead of mechanical connectors plus tape.
- 3.4 On mechanical splices, taps or joints taping shall be with at least two (2) layers of approved gum rubber tape which will be laid on the half-lap followed by at least one (1) layer of friction or plastic tape laid on with half-lap. It is intended that all taping shall be a permanently secured insulation equal to that of the wire.
- 3.5 All conductors in any conduit shall be at one specific voltage. Conductors of different voltages shall be run in separate conduits.
- 3.6 Neutral conductors shall be properly installed as to prevent grounding of the neutrals in any conduit. Multi-wire circuits with shared neutral conductors are not allowed. Each single pole load shall have individual neutral for each circuit.
- 3.7 Neatly train and lace wiring inside boxes, equipment, and panelboards.
- 3.8 Make conductor lengths for parallel circuits equal.
- 3.9 Pull all conductors into a raceway at the same time. Use third party approved wire pulling lubricant for pulling #4 AWG and larger wires.

**3.10 Insulation Resistance Testing.**

All current carrying phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance and accidental grounds. This shall be done with a 500-volt megger. The procedures listed below shall be followed:

- A. Minimum readings shall be one million (1,000,000) or more ohms for #6 AWG wire and smaller, 250,000 ohms or more for #4 AWG wire or larger, between conductors and between conductor and the grounding conductor.
- B. After all fixtures, devices and equipment are installed and all connections completed to each panel, the contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and the grounded enclosure. If this reading is less than 250,000 ohms, the contractor shall disconnect the branch circuit neutral wires from this neutral bar. He shall then test each one separately to the panel and until the low readings are found. The contractor shall correct troubles, reconnect and retest until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder disconnected.
- C. The contractor shall send a letter to the engineer certifying that the above has been done and tabulating the megger readings for each panel. This shall be done at least four (4) days prior to the final inspection.

3.11 Use of split bolt connectors is not acceptable.

3.12 Prior to energizing, feeders and service conductor cables shall be tested for electrical continuity and short circuits. A copy of these tests should be sent to the engineer of record and the owner.

**END OF SECTION 26 05 20**

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**SECTION 26 05 33 - BOXES AND CABINETS****PART 1 - GENERAL**

- 1.1 The Electrical Contractor shall provide junction boxes, pull boxes, cable, support boxes, and wiring troughs as required by NEC and as otherwise indicated in the Drawings.
- 1.2 All necessary mounting hardware and accessories shall be provided for a complete installation.

**PART 2 - PRODUCT**

- 2.1 Outlet and junction boxes shall be 4" minimum size, octagonal in ceilings, 4" square or rectangular (4" x 4" minimum for walls) except as noted below. Ceiling outlet boxes shall not be less than 1 1/2" deep, but in no case shall the size and depth of boxes be less than the required by the NEC.
- 2.2 Outlet boxes shall be equipped with plaster rings of appropriate depth to finish flush with finished walls. Outlets in exposed masonry wall shall be equipped with extra deep square corner tile rings so that box may be installed in the core of the block.
- 2.3 Outlets for concealed work and ceiling outlets for exposed work shall be galvanized stamped steel. Boxes shall be as manufactured by ABB-Steel City, Hubbell-RACO, Appleton or equivalent.
- 2.4 Wall outlets for exposed conduit work shall be Crouse-Hinds, Appleton, Hubbell-Killark or equal, series FS and FD switch and receptacle threaded hub boxes, with matching FS and FD covers.
- 2.5 Junction boxes for change of direction or feeder taps shall be furnished where required, shall be of adequate size to prevent crowding conductors in accordance with the requirements of the electrical code and job requirements and shall be accessible.
- 2.6 Junction boxes on finished wall and ceilings shall be flush with covers.
- 2.7 Junction boxes larger than 5" square shall be galvanized and without pre-formed knockouts.

**PART 3 - EXECUTION**

- 3.1 Boxes and troughs shall be supported independently of conduit entering them. Brackets, threaded rod hangers with lock nuts, bolts, or other suitable supporting methods may be used.
- 3.2 Thru-the-wall outlet boxes shall not be permitted. Outlet boxes shown back to back on plans, shall be separate boxes connected where required using a loop of flexible metallic conduit with ground wire. Boxes shall be separated a minimum of 18 inches apart.
- 3.3 In general, outlets shall be installed at the heights indicated on the fixture and symbol legend.
- 3.4 Each outlet designated on the plans shall be provided with an outlet box.
- 3.5 Each outlet box which supports a fixture shall be provided with a fixture stud into the outlet box. Outlet box and/or fixture stud shall be attached with not less than three screws or bolts.
- 3.6 Exterior outlets shall be provided with watertight gaskets and covers.

**END OF SECTION 26 05 33**

**SECTION 260545 - CONDUIT AND CONDUIT FITTINGS****PART 1 - GENERAL**

- 1.1 Conduit shall be delivered to the project site in bundles of full-length pipes, each length marked with the trademark of the manufacturer and the Underwriters' Laboratories, Inc. stamp. Each conduit length shall be straight, true and free from scales, blisters, burrs and other imperfections.
- 1.2 Within the building parameters and above the floor slab, the rigid steel conduit specified shall be used unless specifically noted otherwise.
- 1.3 Conduit size for control wiring shall be a minimum of one-half (1/2) inch conduit. All branch circuit conduit shall be a minimum of one-half (1/2) inch. Percent filled and derating shall be in accordance with the National Electrical Code. Flexible metal and water-tite ("sealtite") conduit in size 1/2" and larger shall be acceptable for motor, appliance, and fixture connections from fixture junction boxes or appliance/motor disconnects provided a ground wire is installed in the flex and the flex assembly is an integral part of the fixture, shipped from the same factory as the fixture, and 3rd party agency approved for such use. This same requirement shall apply for motor/appliance connections.
- 1.4 All conduit shall be installed in accordance with the National Electrical Code.
- 1.5 Metallic conduits shall be manufactured by Allied, Wheatland, Cruse-Hinds, or equivalents.
- 1.6 Non-metallic conduits shall be manufactured by Prime Conduit, Cantex, Champion Fiberglass or equivalents.
- 1.7 Conduit fittings shall be manufactured by Rayco, T & B, Crouse Hinds, O-Z/Gedney or equivalents.
- 1.8 Surface mounted raceway shall be used as noted on the plans in lieu of exposed conduit. Surface mounted raceway shall be manufactured by Wiremold or approved equivalents.

**PART 2 - PRODUCT**

- 2.1 Thin Wall Conduit and Fittings
  - A. Electrical metallic tubing (EMT) shall be cold-rolled steel tubing with zinc coating on the outside and protected on the inside by a zinc, enamel or equivalent corrosion-resistant coating conforming to the latest requirements of ANSI. Conduit shall meet the Rigid Conduit Association Standards.
  - B. Electrical metallic tubing fittings shall be all steel plated hexagonal threaded compression type. No pot metal, indenter, or set screw fittings, shall be used. EMT connectors shall have insulated throats.
- 2.2 Rigid Steel Conduit and Fittings
  - A. Rigid steel conduit, including elbows and nipples, shall be standard weight, mild steel pipe, hot dipped galvanized, sherardized or zinc-coated conforming to the requirements of ANSI

C80.1, 1966 or later edition. Rigid steel conduit shall also meet the latest requirements of Underwriters' Laboratories, Inc. Standards for Rigid Metallic Conduit.

- B. Fittings shall be all steel plated hexagonal threaded fitting.

### 2.3 Flexible Metal Conduit and Fittings

- A. Flexible metal conduit shall be of the best grade interlocking spiral strip steel. The interlocking spiral strip construction shall be such as to permit bending of the conduit to a radius of four (4) times its internal diameter without distorting at any point. The interior and the exterior of the flexible conduit shall be smooth and free of burrs, sharp edges, or other defects which could damage the wire.
- B. Fittings shall be of the approved types, made of malleable iron and hot dipped galvanized.
- C. All connectors shall be steel compression fittings with insulated throats.
- D. Where watertight flexible conduit is required, it shall have an outer sheath of material similar to PVC.

### 2.4 Non-metallic Conduit

- A. Non-metallic conduit shall be UL listed, for its application. It shall be resistant to sunlight and chemical and moisture atmospheres and rated for use with 90 degrees Celsius conductors.
- B. The installation and usage of rigid non-metallic conduit shall comply with Article 352 of the National Electrical Code, along with any related or referenced sections.

## **PART 3 - EXECUTION**

### 3.1 General

- A. All conduit shall be run tight against walls, columns or ceilings.
- B. The conduit shall bend cold 90 degrees about a radius equal to ten (10) times its own diameter without signs of flaw or fracture in either pipe or protective coverings. All bends and offsets shall be made on a forming tool to prevent the conduit or its coating from being damaged in the bending. Conduit bends shall have a radius not less than ten (10) times the conduit diameter.
- C. Where conduits join any couplings or threaded fittings, the ends shall be made watertight. (All conduit runs, including boxes, couplings, and fittings used therein, shall be so installed and equipped as to prevent water from entering the conduit.)
- D. All conduits shall be carefully cleaned before and after erection. After cleaning, all ends of conduits shall be free from burrs and inside surfaces shall be free from imperfections likely to injure the wires or cables.
- E. In every instance, conduit shall be installed in such a manner that the conductors may readily and easily be drawn or pulled in without strain or damage to the insulation; and, also, so that defective conductors may be readily and easily withdrawn and replaced by new conductors.



- Long radius bends and a sufficient number of approved pull and junction boxes shall be approved for this purpose, and as may be directed by the Engineer. All conduit shall be securely supported and grounded.
- F. In unfinished areas, exposed conduit shall be run to conform to the building lines with special emphasis on neatness. Turns shall be made with galvanized outlet boxes, junction boxes, factory fittings and/or symmetrical bends. Locknuts and bushings shall be employed to provide full grounding and adequate protection of insulation. Double locknuts shall be used on all conduits entering sheet metal enclosures.
  - G. Support for all conduit shall be in accordance with the National Electrical Code. Conduit shall be supported by approved pipe straps or clamps, secured by means of toggle bolts on hollow masonry, expansion shields and matching screws or standard pre-set inserts on concrete or solid masonry, machine screws or bolts on metal surfaces, and wood screws on wood construction.
  - H. All empty conduit systems shall be capped or terminated in a junction box and shall be provided with nylon pull cord inside for future use.
  - I. Conduit terminating below grade shall be provided with means to prevent entry of dirt or moisture. Depth of burial shall not be less than two (2) feet below grade. All termination points shall be accurately marked and dimensioned on the As-Built Plans.
  - J. Where conduits of any type pass over a building expansion joint, a standard "expansion joint fitting" compatible with the type of raceway shall be provided.
  - K. Conduits installed on the interior of exterior building walls shall be spaced off the surface a minimum of 1/4" using "clamp-backs" or strut.

### 3.2 Thin Wall Conduit and Fittings

- A. Except for service and feeder conduits, electrical metallic tubing and fittings may be installed in lieu of rigid conduit in dry construction in furred spaces, ceiling cavities, chase spaces, interior portions other than concrete and solid plaster, or for exposed work except on mechanical structure or supports.
- B. Electrical metallic tubing shall not be installed.
  - 1. Where exposed to severe corrosive conditions and/or severe physical damage,
  - 2. Nearer than four (4) feet from finished floor in exposed areas
  - 3. In trade sizes larger than two (2) inches
  - 4. Located in exterior walls or in poured concrete.
  - 5. Any location outdoors.
  - 6. Where tubing, coupling, elbows and fittings would be in direct contact with the earth or underground (in/below slab-on-grade or in earth).

- C. A transition between a run of rigid conduit concealed in a wall and a run of thin wall conduit along a ceiling shall be made in an outlet box above the ceiling, if accessible, near the wall.

### 3.3 Rigid Steel Conduit and Fittings

- A. All conduit terminations shall be provided with insulating bushings.
- B. Conduit fittings shall not be used in lieu of pull boxes.
- C. Except where located under the ground floor slab, all service and feeder conduit shall be heavy wall (rigid galvanized).
- D. Rigid steel conduit shall be installed in exterior masonry walls, in wet locations where subject to severe physical damage, or where conduit trade size is two and one half (2 1/2) inches or larger.

### 3.4 Flexible Metal Conduit and Fittings

- A. Flexible metallic conduit shall be provided at the end of each conduit run terminating at the conduit box on electric motors, transformers or other equipment.
- B. The length of flexible conduit shall be in accordance with the National Electric Code.

### 3.5 Non-Metallic Conduit

- A. Thin wall rigid non-metallic conduit (schedule 40 PVC) shall only be used for concrete encasement.
- B. Except where embedded in concrete, conduit shall be supported to permit adequate lineal movement to allow for expansion and contraction of conduit due to temperature change. Where a temperature change in excess of 14 degrees Celsius is anticipated, such as direct burial, exposed outside of the building, or in un-insulated spaces inside the building (attics, crawl spaces, etc.), expansion joints shall be installed in accordance with the manufacturer's specifications.
- C. Heavy wall non-metallic conduit (schedule 80 PVC) shall be used where conduits are direct buried exterior to the building or exposed exterior to the building.
- D. PVC schedule 40 shall not be used exposed or concealed in gypsum wall but may be used in CMU walls. PVC schedule 40 may be used in elevated floor slabs and in foundation slabs. Minimum concrete cover shall be  $\frac{3}{4}$  inch at finished or formed surface and shall be 3 inches at concrete surface cast against earth or for slabs placed on-grade. Greater amounts of concrete cover shall be used in areas subject to damage. The placement of conduit in floor slabs must be thoroughly coordinated with the structural design. Potential conflicts with steel reinforcing bars and reductions in net concrete sections are among the issues that must be considered by the structural engineer.

### 3.6 Underground Raceways

- A. Where conduit is installed under the ground floor slab within the building foundations, schedule 40 PVC conduit shall be used. At the Contractor's option, this installation may consist of galvanized steel conduit encased with three (3) inches of concrete or rigid steel conduit with a minimum of 15 mils of PVC coating. Where thin wall non-metallic conduit is used under the ground floor slab, the elbows and turn out required to turn the raceway up into cabinets, equipment, boxes, etc. shall be of rigid steel.
- B. Branch circuit raceways run underground external to building foundation walls shall be run in raceways installed in accordance with the NEC and shall be of a type approved by the NEC as "suitable for direct burial." Minimum raceway size shall be 1 inch.
- C. All underground raceways shall be identified by underground line marking tape located directly above the raceway at 6 to 8 inches below finished grade. Tape shall be permanent, bright-colored, continuous printed, plastic tape compounded for direct burial not less than 6 inches wide and 4 mils thick. Printed legend shall be indicative of general type of underground line below.
- D. Raceways run underground internal to building foundation walls shall be of a type and installed by a method approved by the NEC.
- E. Where underground raceways are required to turn up into cabinets, equipment, etc., and on to poles, the elbow required and the stub-up out of the slab or earth shall be of rigid steel.
- F. The raceway system shall not be relied on for grounding continuity.
- G. Where passing through a "below grade" wall from a conditioned interior building space, raceways shall be sealed utilizing fittings similar and equal to OZ/GEDNEY type "FSK" thru-wall fitting with "FSKA" membrane clamp adapter if required.

### 3.7 Ductbank

- A. Trenches should be cut neatly and uniformly, sloping uniformly to required pitch.
- B. Ducts should be pitched to drain toward manholes and handholes and away from buildings and equipment. Minimum slope shall be 4 inches in 100 feet. Where necessary to achieve this between manholes, ducts should be sloped from a high point in the run to drain in both directions.
- C. Concrete encased nonmetallic ducts shall be supported on plastic separators coordinated with duct size and spacing. Separators shall be spaced close enough to prevent sagging and deforming of ducts. Separators to the earth and to ducts should be secured to prevent floating during placement of concrete. Steel or tie wires should not be used in such a way as to form conductive or magnetic loops around ducts or duct groups.
- D. Waterproof marking cord should be installed 130-pound tensile test (marked at least every foot), equivalent to Greenlee No. 435, in all ducts, including spares, after thoroughly rodding, clearing and swabbing all lines free of all obstructions.
- E. All ducts should be sealed at terminations, using sealing compound and plugs, as required to withstand 15 psi minimum hydrostatic pressure.

F. The arrangement of conduit in ductbank should be in accordance with OSHA requirements.

**END OF SECTION 26 05 45**

**SECTION 26 24 16 - PANEL BOARDS AND CIRCUIT BREAKER****PART 1 - GENERAL**

- 1.1 The Electrical Contractor shall provide all panelboards and circuit breakers as shown on the plans in accordance with this specification.
- 1.2 All equipment shall meet UL, NEC and NEMA Standards as applicable to the equipment specified herein.
- 1.3 All panelboards shall be equipped with a main circuit breaker or main lugs as indicated on the drawings.
- 1.4 All panelboards shall be equipped with branch breakers as shown on the drawings.
- 1.5 All panelboards identified on the drawings for use as service equipment shall be so labeled and UL listed for such use.
- 1.6 Full size insulated copper neutral bars shall be included in all panelboards. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection.
- 1.7 A copper ground bus shall be included in all panelboards.
- 1.8 All current-carrying parts of the bus assembly shall be copper with tin plating.
- 1.9 Panelboards shall be labeled with a UL short circuit rating not less than the rating indicated on the drawings.
- 1.10 The word "spare", unless noted otherwise on the panel schedules, shall be a single pole, 20-amp circuit breaker.
- 1.11 The word "space", unless noted otherwise on the panel schedules, shall be for a space in the panelboard for a standard size, single pole circuit breaker.
- 1.12 Terminals for feeder conductors to the panelboard mains and neutral shall be UL listed as suitable for the type of conductor specified. Terminals for branch circuit wiring, both breaker and neutral, shall be UL listed as suitable for the type of conductor specified.
- 1.13 Sub fed breakers are not acceptable.
- 1.14 Series rated panel boards or breakers are not acceptable.
- 1.15 All NEMA 1 panel boards shall have a hinged trim (Door in Door).
- 1.16 All panelboards shall have breakers, terminals, and Lugs UL approved use with 75°C rated conductors.

**PART 2 - PRODUCT**

2.1 This section shall be for panelboards whose characteristics shall not exceed the following:

Voltage	=	440	Maximum Branch Circuit	=	100 amps
Amps	=	600	Short Riding Circuit	=	22,000 amps

- A. Panelboards shall be Square D Company type NQ (bolt- on) or equivalent by Siemens, Eaton, or ABB.
- B. Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type.
- C. The panelboard bus assembly shall be enclosed in a steel cabinet. The size of the wiring gutters and gauge of steel shall be in accordance with NEMA, UL and National Electrical Code requirements for panelboards. The box shall be fabricated from galvanized steel or equivalent rust-resistant steel. Surface mounted cans shall be galvanized and without preformed knockouts.
- D. Fronts shall include doors and have flush, brushed stainless steel, cylinder tumbler-type locks with catches and spring-loaded door pulls. The flush lock shall not protrude beyond the front of the door. All panelboard locks shall be keyed alike. Door shall be mounted by completely concealed steel hinges. A circuit directory frame with a clear plastic covering and a directory card shall be provided on the inside of the door. Fronts shall be of code gauge, full finished steel with rust-inhibiting primer and baked enamel finish.
- E. Panelboard trims shall cover all live parts. Switching device handles shall be accessible.

2.2 This section shall be for panelboards whose characteristics shall not exceed the following:

Voltage	=	480	Maximum Branch Circuit	=	125 amps
Amps	=	600	Short Circuit Rating	=	65,000 amps 480 VAC
				=	100,000 amps 240 VAC

- A. Panelboards shall be Square D Company Type NF (bolt- on) or equivalent by Siemens, Eaton, or ABB.
- B. Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type.
- C. The panelboard bus assembly shall be enclosed in a steel cabinet. The size of the wiring gutters and gauge of steel shall be in accordance with NEMA, UL and National Electrical

Code requirements for panelboards. The box shall be fabricated from galvanized steel or equivalent rust-resistant steel. Surface mounted cans shall be galvanized and without preformed knockouts.

- D. Fronts shall include doors and have flush, brushed stainless steel, cylinder tumbler-type locks with catches and spring-loaded door pulls. The flush lock shall not protrude beyond the front of the door. All panelboard locks shall be keyed alike. Door shall be mounted by completely concealed steel hinges. A circuit directory frame with a clear plastic covering and a directory card shall be provided on the inside of the door. Fronts shall be of code gauge, full finished steel with rust-inhibiting primer and baked enamel finish.
- E. Panelboard trims shall cover all live parts. Switching device handles shall be accessible

2.3 This section shall be for panelboards whose characteristics shall not exceed the following:

Voltage	=	480	Maximum Branch Circuit	=	1,200 amps
Amps	=	1,200	Short Riding Circuit	=	200,000 amps

- A. Panelboards shall be Square D Company, Type I-Line or equivalent by Siemens, Eaton, or ABB
- B. Panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel are to be as specified in UL Standard 50 for cabinets. The size of wiring gutters shall be in accordance with NEMA, UL and NEC Standards for panelboards. Cabinets are to be equipped with spring latch and tumbler-lock on door of trim. Doors over 48" long shall be equipped with three-point latch and vault lock. All locks shall be keyed alike. End walls shall be removable. Fronts shall be of code gauge, full finished steel with rust inhibiting primer and baked enamel finish.
- C. The panelboard interior assembly shall be dead front with panelboard front removed. Main lugs or main breaker shall be barriered on five sides. The barrier in front of the main lugs shall be hinged to a fixed part of the interior. The end of the bus structure opposite the mains shall be barriered.
- D. A circuit directory frame with a clear plastic covering and a directory card shall be provided on the inside of the door.

2.4 Molded Case Circuit Breakers

- A. This specification covers molded case circuit breakers rated 15 through 1200 amperes 120VAC, 240VAC, 277VAC and 480VAC. Breakers covered under this specification may be installed in switchboards, panelboards, motor control centers, combination motor starters, busway plugs and individual enclosures.
- B. Circuit breakers shall be manufactured by Square D Company of the size as indicated on the drawings or equivalent by Siemens, Eaton or ABB. All breakers shall be bolt-on type.

- C. All circuit breakers shall have a quick-make, quick- break over center toggle type mechanism. The handle mechanism shall be trip-free to prevent holding contacts closed against a short circuit or sustained overload. All circuit breakers shall assume a position between on and off when tripped automatically. Multi- pole circuit breakers shall be common trip such that an overload or short circuit on any one pole will result in all poles opening simultaneously. Arc extinction is to be accomplished by magnetic arc chutes. All ratings shall be clearly visible.
- D. Automatic operation of all circuit breakers shall be obtained by means of thermal-magnetic tripping devices located in each pole providing inverse time delay and instantaneous circuit protection. Circuit breakers shall be calibrated to carry 100% rated current in an ambient of 40 degrees Celsius. Circuit breakers shall be ambient compensating in that, as the ambient temperature increases over 40 degrees Celsius, the circuit breaker automatically derates itself to better protect its associated conductor. The instantaneous magnetic trip shall be adjustable and accessible from the front of all circuit breakers on frame sizes 250 amps and above.
- E. The interrupting rating of each circuit breaker shall be as indicated on the drawings. The interrupting rating of the circuit breakers shall be at least equal to the available short circuit current at the line terminals of the circuit breaker and correspond to UL listed integrated short circuit current rating specified for the panelboards and switchboards.
- F. UL Class A (5 milliampere sensitivity) ground fault circuit protection shall be provided on 120 V ac branch circuits as specified on the plans or panelboard schedule. This protection shall be an integral part of the branch circuit breaker which also provides overload and short circuit protection for branch circuit wiring. Tripping of a branch circuit containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single pole circuit breaker with integral ground fault circuit interruption shall require no more panelboard branch circuit space than a conventional single pole circuit breaker.
- G. Motor starters, and other applications as indicated on drawings, shall be furnished with magnetic-only type molded case circuit breakers. Each breaker shall be provided with a single magnetic adjustment that will set all poles to the same trip current. Adjustment shall be continuous throughout the adjustable trip range. The magnetic trips shall be accessible from the front of these circuit breakers.

### **PART 3 - EXECUTION**

- 3.1 Panelboards shall be flush, or surface mounted as shown on the plans.
- 3.2 Panel enclosures shall not be used as junction or pull boxes for splicing conductors.
- 3.3 Each flush mounted panel shall be equipped with two empty one inch conduits sealed in the wall from a panel to a six inch square flush mounted box installed above a lay-in type ceiling or flush in the wall at the ceiling for a plaster or spline type acoustical tile ceiling.
- 3.4 All panels shall be equipped with neatly typed directory cards attached on the inside of the door.
- 3.5 GFI circuits shall be tested by the Contractor prior to the pre-final inspection.



- 3.6 Testing shall be performed by a qualified factory technician at the job site. All readings shall be tabulated by the contractor.
- 3.7 The number of branch circuit shall be identified with permanent wire tag attached to the wire.

**END OF SECTION 26 24 16**

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**SECTION 26 27 26 - WIRING DEVICES****PART 1 - GENERAL**

- 1.1 Switches, dimmer switches, photocell, contactors and receptacles, with proper cover plates, shall be provided where indicated on the Drawings.

**PART 2 - PRODUCT**

- 2.1 Switches, dimmer switches, photocell, contactors and receptacles shall be as specified in the Symbol Schedule of the Drawings.
- 2.2 All switches and receptacles shall be industrial specification grade or heavy-duty grade meeting NEMA WD 1, NEMA WD 6, DSCC W-C-596G, and UL-498 and shall be approved third-party listed.
- 2.3 Switches and receptacles shall be as manufactured by Hubbell, Pass and Seymour, Leviton or Eaton. Photocells shall be manufactured by Tork, Paragon, Bryant, or equivalent.
- 2.4 Cover plates for all wall mounted devices shall be provided as scheduled on the Drawings. Where covers are not specified, they shall be as follow.
  - A. Interior: type 302 stainless steel. Cover plate mounting screws shall be slotted head oval screws and shall match the finish and material of the plate and shall be furnished with the plate by the plate manufacturer.
  - B. Exterior, exposed work and wet locations: cover plates shall be extra-duty rated (NEC 406.9(B)(1)) galvanized cast ferrous metal, standard size, and shall be single or ganged as indicated on the drawings. Exterior mounted switch and receptacle plates, and those noted to be weatherproof, shall be weatherproof cover plates, standard size, single or ganged as indicated on the drawings, and shall be "approved" third party listed as "rain-tight while in use."
- 2.5 All devices shall have a hex-head green grounding screw for use in connecting device to green grounding conductor run in the conduit system.
- 2.6 All GFI devices shall be the feed through type.
- 2.7 All standard duplex receptacles shall be 20-amp, 125 volt rated.
- 2.8 All devices subject to use in a wet location shall be listed as weather resistant.
- 2.9 All switches shall be rated 20-amp, 120/277 volt. Toggle switches shall have quiet operating mechanisms without the use of mercury switches.

**PART 3 - EXECUTION**

- 3.1 Mounting height shall be as indicated on the Drawings. Coordinate with other trades so that devices will miss equipment installed by others.
- 3.2 Where two or more devices are ganged, they shall be in a common box with a ganged plate.

- 3.3 All devices shall have a green ground conductor to run parallel with the phase conductor back to the electrical panel.
- 3.4 In all areas where carpet is to be installed as finished floor material, unless otherwise specified, the Electrical Contractor will furnish solid brass carpet flanges for installation on floor outlet boxes. Flanges will be furnished and installed on all active outlets after the carpet is installed. Where a specified number of outlet fittings are to be furnished to the Owner, for each fitting not installed during the construction period, it will be turned over to the Owner with the receptacle, carpet flange and all necessary appurtenances.
- 3.5 Provide quantity of 2% spare cover plates of each type to the owner.

**END OF SECTION 26 27 26**

## **SECTION 26 27 27 - DISCONNECTS**

### **PART 1 - GENERAL**

- 1.1 Disconnect switches shall be provided where indicated on the drawings, or as required by the National Electrical Code (NEC).

### **PART 2 - PRODUCT**

- 2.1 Disconnects shall be heavy duty as manufactured by Square D Company, Siemens, Eaton or ABB.
- 2.2 Disconnects shall be furnished with factory finish paint and appropriate knockouts for conduit connections.
- 2.3 All disconnects shall have side hinged type doors. Front operated handles will not be permitted.
- 2.4 All fused disconnects shall be equipped with positive pressure fuse clips and shall have visible disconnecting blade switches.
- 2.5 NEMA 1 enclosures shall be provided where installed indoors. NEMA 3R enclosures shall be provided where exposed to the elements, unless noted otherwise.
- 2.6 All disconnects shall have copper bus.
- 2.7 Disconnects shall have provisions for locking in on and off positions.
- 2.8 Disconnects shall have defeatable door interlocks that prevent the door from opening when the operating handles is in the "on" position.
- 2.9 Disconnects shall have handles whose positions are easily recognizable in the "on" or "off" position. For safety reasons, padlock shall be provided for switches located in the public areas.
- 2.10 Required fuses shall be manufactured by Eaton-Bussman, Littelfuse, Mersen or approved equivalent.

### **PART 3 - EXECUTION**

- 3.1 Disconnect switches shall be mounted as indicated on the Drawings and shall be independently supported. Conduits entering the disconnect switch shall not be used to support switches.
- 3.2 Where fused disconnect switches are required or shown on the plans, standard fuses shall be used unless the switch protects an individual motor circuit, then dual element fuses shall be used.
- 3.3 The electrical contractor shall provide to the owner the spare fuses, 10% of the quantity of fuses used of each type and rating, with a minimum of one set of each type.

**END OF SECTION 26 27 27**

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**SECTION 265100 - LIGHTING FIXTURES****PART 1 - GENERAL**

- 1.1 The Contractor shall provide all fixtures and lamps where indicated on the Drawings.
- 1.2 Work shall include all stems, canopies and accessories necessary for a complete lighting fixture installation.
- 1.3 No PCB ballasts shall be accepted.
- 1.4 All lighting systems shall comply with the 2018 North Carolina State Energy Code and North Carolina Senate Bill 1946 and G.S. 143-64.17.

**PART 2 - PRODUCT**

- 2.1 Fixtures shall be as specified in the Fixture Schedule on the Drawings or approved equivalents.
- 2.2 All outdoor fixtures shall bear the approved third party test label for damp or wet locations as applicable. Where the ambient falls below 50°F that all fluorescent lamps and ballasts shall be rated for operation at 0°F.
- 2.3 Unless otherwise noted, all fixtures shall be new, free of defects and imperfections. Damaged fixtures shall be replaced at this Contractor's expense.
- 2.4 All acrylic lenses for lay-in troffers and wrap around fixtures shall have a nominal lens thickness of 0.125" unless noted otherwise on plans.
- 2.5 LED Luminaries:
  - A. LED driver manufacturers should have a minimum of five years of experience with the manufacture of LED drivers. All drivers shall have a minimum warranty of five years.
  - B. Where dimming is required, fixtures shall be dimmable down to 1% with standard 120/277 volt, electronic, low voltage dimmers.
  - C. Minimum color rendering index (CRI) shall be 80. Color temperature and performance shall conform to the parameters established by ENERGY STAR SSL standards (refer to ANSI-C78.377-2008).
  - D. Optical design shall be low glare, 50% cut-off.
  - E. Rated for 50,000 hours at 70% lumen maintenance.
  - F. LED driver shall be high efficiency with a minimum power factor of .90
  - G. 5 year, 100% warranty coverage for the driver, LED module, housing and trim. For the 1st year this shall be a complete parts and labor warranty. The 4th and 5th years shall cover parts only.
  - H. Total harmonic distortion:  $\leq 20\%$  (at full luminaire output and across specified voltage range)

- I. Transient and surge protection: ANSI C62.41-2002 Category A surge protection standards up to and including 2.5 kV for interior fixtures.
  - J. Sound: Class A not to exceed a measured value of 24dB.
  - K. Maximum standby power: 1W
  - L. LED arrays in the product(s) will be considered defective in material or workmanship if a total of 10% or more of the individual light-emitting diodes in the product(s) fail to illuminate during normal operation after installation.
- 2.6 Emergency Exit Lights per the State Construction Office requirements.
- A. It shall be completely self-contained, provided with maintenance-free battery, automatic charger, and other features. Luminaire must be third-party listed as emergency lighting equipment, and meet or exceed the following standards; NEC, N.C. Building Code, Energy Code, NFPA-101, and NEMA Standards.
    - 1. Battery
      - a. It shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Must have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degree C to 60 degrees C and contain a resealable pressure vent, a sintered + positive terminal and – negative terminal.
    - 2. Charger
      - a. It shall be fully automatic solid state type, full wave rectifying, with current limiting. Charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated when the voltage drops below 80 percent. A low voltage disconnect switch shall be included if LEAD Battery is used, to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.
    - 3. Additional Features
      - a. Pilot light to indicate the unit is connected to AC power. The battery shall have high rate charge pilot light, unless self-diagnostic type. A test switch to simulate the operation of the unit upon loss of AC power by energizing the lamps from the battery. This simulation must also exercise the transfer rely.
    - 4. Warranty
      - a. The entire unit shall be warranted for three years. The battery must have an additional two more years pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contract document.
    - 5. LED
      - a. The use of LED is required due to their reliable performance, low power consumption, and limited maintenance requirements. Maximum LED failure rate



shall be 25% within a seven (7) year period; otherwise, if exceeded, manufacturer shall replace the complete unit at no charge to the owner.

6. Unit Test

- a. Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours. Battery shall be tested for 90 minutes, in accordance with NEC 700. The battery test shall be done 10 days prior to final inspection by the State Construction Office. Any unit which fails the test must be repaired or replaced, and tested again. Copy of the test report shall be included with the project record documentation.

2.7 Emergency Lights per the State Construction Office requirements

- A. Shall be completely self-contained, provided with maintenance-free 12 volt battery, automatic charger, two lamps and other features. Fixture shall be third party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, N.C. Building Code, UL 924, NC Energy Code, NFPA-101, and NEMA Standards.

1. Additional Features

- a. Pilot light to indicate the unit is connected to AC power. The battery shall have high rate charge pilot light, unless self-diagnostic type. A test switch to simulate the operation of the unit upon loss of AC power by energizing the lamps from the battery. This simulation must also exercise the transfer rely. If fluorescent emergency unit is used, a LED charging indicator light must be easily visible after installation and a remote test switch shall be installed adjacent to the fixture.

2. Battery

- a. It shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Must have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degrees C to 60 degrees C and contain a resealable pressure vent, a sintered + positive and -negative terminal.

3. Charger

- a. It shall be fully automatic solid state type, full wave rectifying, with current limiting. Charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated when the voltage drops below 80%. A low voltage disconnect switch shall be included in LEAD battery is used, to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.

4. Warranty

- a. The entire unit shall be warranted for three years. The battery must have an additional two more years pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contact document.

5. Unit Test

- a. Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours. Battery shall be tested for 90 minutes, in accordance with NEC 700. The battery test shall be done 10 days prior to final inspection by the State Construction Office. Any unit which fails the test must be repaired or replaced, and tested again. Copy of the test report shall be included with the project record documentation.
1. Emergency Power Backup unit.
    - B. The unit is used for controlling designated light fixtures as shown on plan to be used as emergency light. The unit shall have rating as shown on plan. Unit shall be third party listed as emergency power backup unit for emergency light, and meet or exceed the following standards: NEC, N.C. Building Code, UL 924, NC Energy Code, NFPA-101, and NEMA Standards.
      1. Battery
        - a. It shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Must have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0 degree C to 60 degrees C and contain a resealable pressure vent, a sintered + positive terminal and – negative terminal.
      2. Output characteristic.
        - a. It shall provide 60Hz sinusoidal waveform output and compatible with LED and fluorescent light fixtures. Transfer time shall be less than 1 second.
      3. Warranty
        - a. The entire unit shall be warranted for three years. The battery must have an additional two more years pro-rated warranty. Warranty shall start from the date of project final acceptance. Warranty shall be included in the contract document.

### **PART 3 - EXECUTION**

- 3.1 All fixtures shall be installed in accordance with the National Electric Code.
- 3.2 All fixtures other than the lay-in type shall be individually supported from building structure with 1/4" threaded rods and nuts.
- 3.3 Where a recessed or downlight fixture replaces a section or part of a ceiling tile, fixture is to be supported at the two (2) opposite ends to the steel frame of the building. Supports shall be provided with the same type of wire as used to support the lay-in ceiling track. Attach one end of the wire to one corner of the luminaire and the other end to the building's structural system. The lay-in luminaire shall then be screwed to the main runners of the lay-in ceiling track at all four (4) corners using sheet metal screws. For fire rated suspended ceiling, luminaire shall be supported to the Building Structure as per the Ceiling Design Criteria, luminaire shall then be screwed to the main runners of the suspended ceiling track at all four (4) corners using sheet metal screws.
- 3.4 The complete emergency lighting system shall be tested by throwing the circuit breakers feeding the emergency lighting circuits. One and one-half hours thereafter, the battery voltages shall be

recorded in a report to be submitted to the Engineer. This test shall be performed just prior to final inspection, under witness of the state electrical inspector, and in accordance with NEC Articles 700.4 (A) and (D).

**END OF SECTION 265100**

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**SECTION 28 31 00 ADDRESSABLE FIRE ALARM SYSTEM****PART 1 - GENERAL**

## 1.1 General description of system and requirements.

- A. The Electrical Contractor shall provide a complete supervised Class A fire alarm system as shown on the plans. All fire and smoke detection and alarms systems shall comply with the most recent applicable sections of 2013 NFPA 72 and the 2018 North Carolina State Building Code.
- B. The system shall include fire alarm panel, pull stations, alarm horns, all accessories and labor for a complete installation in accordance with the applicable requirements.
- C. This will be a new addressable fire alarm control system. The panel shall have the necessary controllers and hardware to network with future new panels in other buildings on the campus. This contractor will provide all parts, modules, devices, etc., as required.
- D. The Contractor shall furnish and install, in accordance with the manufacturer's instructions, all wiring, conduit and outlet boxes required for the erection of a complete system as described herein and as shown on the drawings. Unless otherwise noted on the riser, all wiring shall be in a separate conduit system and shall be concealed in finished spaces. Conduit installation shall be as specified in Section 260545.
- E. All wiring shall be in a minimum of 1/2" conduit and of the same approved type as used for electric light and power wiring and shall meet the requirements of all national and state electrical codes.

## 1.2 Standard

- A. The latest issue of specifications, standards and publications listed below, including items called out in fire alarm check list, amendments and errata, form a part of this specification.
  - 1. NFPA 72-2013
  - 2. NFPA 70-2017
  - 3. 2018 North Carolina Fire Code.
  - 4. Local Codes and Standards
  - 5. ANSI A17.1

## 1.3 Quality Assurance

- A. The system and all its components shall be listed and approved by U.L. Inc. provided FACP.
- B. All fire and smoke detection and alarm systems shall comply with the North Carolina State Building Code and NFPA 72.
- C. Comply with the local authority having jurisdiction.

- D. The manufacturer's authorized representative that terminates the FACP and performs all tests and inspections shall be NICET Level II certified and have at least two years of experience installing fire alarm systems. Furthermore, the manufacturer's authorized distributor must have at least one employee with a NICET Level III certification.

#### 1.4 Submittals

- A. Shop drawing submittal. See general requirements in section 260000. Shop drawings to comply with NFPA 72 Revision 2013 National Fire Alarm and Signaling Code 7.2.
1. Construction documents per section 907.1.1 of the 2018 North Carolina Fire Code.
    - a. Fire alarm installation drawings. The drawings shall indicate the location of each alarm notification and alarm initiating device, fire control panel, and annunciator. Provide a wiring and conduit diagram prepared by an authorized representative of the system manufacturer.
    - b. Provide riser diagram and floor plans showing conduit runs and wires.
    - c. Product Data: Submit manufacturer's technical data for equipment and devices indicated.
    - d. Identify each item of equipment and device using the same symbol as shown on the drawings.
    - e. Provide battery-sizing calculations.
    - f. Provide voltage drop calculations.
  2. Copies of the NICET Level III certification of personal who supervises the installation.
- B. Operation and Maintenance Manuals: Provide four (4) copies of the Operation and Maintenance Manuals bound in three-ring, vinyl covered binders. Manual shall contain all approved submittal information submitted including manufacturer's drawings. Include a certified copy of each test report. Also include instructions for system troubleshooting.
- C. Test Report(s): Submit a letter and a copy of the test report indicating proper functioning of the system, and conformance to the requirements of the Contract Documents.
- D. Approval of samples, cut sheets, shop drawings, and other matter submitted by the Contractor shall not relieve the Contractor's responsibility for full compliance with the specifications, unless the attention of the Engineer is called to each non-complying feature by letter accompanying the submitted matter, and specific deviation authorization is received.

#### 1.5 Authority Having Jurisdiction (AHJ):

- A. The AHJ shall be the Pamlico County Fire Marshal. All permits and inspections shall be obtained and coordinated with the fire department officials responsible for plan review, issuing permits, and site inspection and approval.

## PART 2 - PRODUCT

## 2.1 General Criteria for Addressable Fire Alarm Systems:

- A. The system will be new addressable fire alarm panel with network capability.
- B. The system is an addressable type, with a 24vdc nominal operating voltage. All equipment supplied must be specifically listed for its intended use and shall be installed in accordance with any instructions included in its listing.
- C. The system is to have multiple access levels so owner's authorized personnel can disable individual alarm inputs or normal system responses (outputs) for alarms, without changing the system's executive programming or affecting operation of the rest of the system.
- D. The procedures on how to accomplish this must be included in the training required to be given to the owner's designated personnel and must also be part of the written documentation provided by the fire alarm equipment supplier.
- E. A new Remote Annunciator (RA) with audible-visible trouble indication shall be provided as indicated on the drawings.
- F. The FACP and all other control equipment locations, including any transponders, communicators such as Annunciators, DACT, DACR sub-panels, and booster power supplies, must be protected by a spot type smoke detector located within 15 feet of the equipment (measured horizontally) in a conditioned space.
- G. Each addressable fire alarm system must include an LED-type "zone" Annunciator located at lobby. As a minimum, this Annunciator is to indicate the specific type of alarm or supervisory signal (smoke detector, etc.) for groups of addressable devices. The area ("zone") that is represented by each LED shall not exceed 1 floor or 22,500 square feet and must not cross building fire walls or smoke compartments.

EXCEPTION #1: FACP or Remote Annunciator is located at the main response point for emergency personnel, has a multi-line display that automatically defaults to displaying a minimum of the first five alarms plus the last alarm received.

EXCEPTION #2: Systems in 1 or 2-story buildings, which have 30 or fewer initiating devices, are permitted to omit the LED-type "zone" annunciator.

- H. Alarm notification appliances (audible and visible) are to comply with NFPA 72, the North Carolina Building Code, and North Carolina Accessibility Code criteria for intensity and placement. The standard audible evacuation signal is the ANSI S3.41 three-pulse temporal pattern except it shall not be used if the planned action during fire emergency is to relocate occupants or protect in place, instead of immediate evacuation (e.g., some health care facilities, prisons). All strobe lights installed in a single space must be synchronized. Contact the AHJ for more information.
- I. Alarm notification appliance (NAC) circuits shall be NFPA 72 Style Y (Class B). The load connected to each circuit must not exceed 80% of rated module output and the coverage of each circuit shall not exceed 3 floors (to limit the effect of faults, and to facilitate troubleshooting). The NAC voltage drop during alarm must not exceed 14% of the voltage measured across the batteries at that time. To achieve this, the design must consider wire

size, length of circuit, device load, inherent voltage loss within the FACP's power supply, etc. The contractor shall use power outage testing to verify that the NAC circuit was designed and installed properly.

- J. The following protection against voltage transients and surges must be provided by the fire alarm equipment supplier, and installed by the electrical contractor:

On AC Input: A feed-through (not shunt-type) branch circuit transient suppressor **such as** the EFI E100HW120, Leviton 51020-OWM, Emerson/Northern Technologies TCS-HWR, Transtector ACP100BW series, or any equivalent UL 1449 - 2nd Edition Listed device submitted to and approved by the electrical design engineer. Install suppressor in a listed enclosure near the electrical panelboard, and trim excess lead lengths. Wind small coil in the branch circuit conductor just downstream of the suppressor connection. Coil to be 5 to 10 turns, about 1" diameter, and securely tie-wrapped. This series impedance will improve the effectiveness of the suppressor in clipping fast rise time voltage transients

On DC Circuits Extending Outside Building: Adjacent to the FACP, and also near point of entry to outlying building, provide "pi"-type filter on each leg, consisting of a primary arrester, series impedance, and a fast acting secondary arrester that clamps at no more than 15v above the nominal circuit voltage. Including but not exclusive to the Innovative Technology D2S33-2ML, Simplex 2081-9027/-9028, Transtector TSP8601, Ditek DTKxLVL series, Citel America B280-24V, Leviton 3824-OWM, Northern Technologies DLP-42. Submit data on others to the engineer for approval. UL 497B listing is normally a prerequisite for their consideration. Devices using only MOV active elements are not acceptable.

- K. Systems are to be provided with a separate and independent source of secondary power. Alarm and stand-by secondary power capacity shall be in accordance with NFPA 72.

Include a copy of system battery sizing calculations with the shop drawing submittal to the engineer. Use manufacturer's battery discharge curve to determine expected battery voltage after 60/24 hours of providing standby power. Then use calculated Notification Appliance Circuit current draw in the alarm mode to determine expected voltage drop at EOL, based on conductor resistance per manufacturer's data sheet or NEC 2014, Table 8. Double the ohms per foot since two conductors are required to power the circuit. Also, add any inherent voltage drop caused by the system's power supply.

The voltage drop at EOL must not exceed 14% of the expected battery voltage, after the required standby time plus alarm time. (Typically, for a 24-volt system, this limits the voltage drop from the battery to the EOL to 3 volts). Determine "worst case" voltage at far end of each NAC, by subtracting its calculated V-drop from the expected battery voltage. The result must be no less than the minimum listed operating voltage for the alarm notification appliances used.

All these calculations must be placed on a dedicated sheet of as-built drawings, for future reference by fire alarm service technicians. NAC voltage drop will to be verified during system tests.

## 2.2 Monitoring of Signals by Supervising Station:



### 2.3 Smoke Detector Application and Installation:

- A. All addressable spot type and duct smoke detectors shall be the analog type and the alarm system shall automatically compensate for detector sensitivity changes due to ambient conditions and dust build-up within detectors. This feature must be armed, and sensitivities set prior to acceptance of the system.
- B. Spot-type detectors must be the plug-in type, with a separate base (not a mounting ring), to facilitate their replacement and maintenance. The base shall have integral terminal strips for circuit connections, rather than wire pigtailed. Each detector or detector base shall incorporate an LED to indicate alarm.
- C. Spot-type smoke detectors shall have a built-in locking device to secure the head to the base, for tamper resistance. For detectors mounted within 12 feet of the floor, activate this lock after the system has been inspected and given final acceptance.
- D. Unless suitably protected against dust, paint, etc., spot type smoke detectors shall not be installed until the final construction clean-up has been completed. In the event of contamination during construction, the detectors must be replaced.

CAUTION: Covers supplied with smoke detector heads do **not** provide protection against heavy construction dust or spray painting. They are suitable only during final, minor cleanup or touchup operations.

- E. A detector installed where accidental damage or deliberate abuse is expected shall be provided with a guard that is listed for use with it and is acceptable to the AHJ.
- F. Identification of individual detectors is required. Assign each a unique number as follows, in sequence starting at the FACP: (Addressable Loop # -- Device #) Put on the as-built plans, and also permanently mount on each detector's base so that it's readable standing on the floor below without having to remove the smoke detector. Exception: For detectors with housings (i.e., air duct, projected beam, air sampling, flame), apply the identification to a suitable location on exterior of their housing.
- G. All air duct/plenum detectors must have a Remote Alarm Indicator Lamp (RAIL) installed in the nearest corridor or public area and identified by an engraved label affixed to the wall (at 6' 8" AFF minimum) or ceiling. Duct smoke detectors are permitted to be installed only inside an air duct. It is not appropriate to mount them in front of a return air opening. Duct detectors shall also be installed in a manner that provides suitable, convenient access for required periodic cleaning and calibration.
- H. Duct detector sampling tubes shall extend the full width of the duct. Those over 36 inches long must be provided with far end support for stability.

NOTE: The preferred method for providing support is to extend the intake tube through the far side of the duct, seal around the tube where it penetrates the duct wall and plug the end with a rubber stopper. This facilitates visual inspection, intake tube cleaning, and injection of smoke or equivalent aerosol for testing the detector.

- I. Each duct detector installation shall have a hinged or latched duct access panel, 12x12 inches minimum, for sampling tube inspection and cleaning. Indicate airflow direction on the duct, adjacent to the detector, using stencil or permanent decal.
- 2.4 Fire and Life Safety Criteria for Doors Controlled by Fire Alarm System:
- A. For life safety reasons, any exit or exit access doors that are locked to delay egress shall have hardware in accordance with the NC Building Code (2018 edition as adopted by the North Carolina Building Code Council). These doors must immediately unlock upon any fire alarm signal, loss of building AC power, disablement of the fire alarm system (defined as loss of its 24vdc power), or upon manual operation of an unlock switch at a constantly attended location.
  - B. Where installed on smoke or fire doors, power failure shall cause these mechanisms to default to the egress mode with normal mechanical latching.

### **PART 3 - EXECUTION**

#### 3.1 System Configuration and Installation:

- A. Signaling Line Circuits (SLC's, also called addressable loops) must be NFPA Style 6 (Class A) with no "T" taps. Each must have a minimum of 200% spare addresses, for future use. Individual loops are not permitted to cover more than 1 floor of a building.
- B. To minimize wiring fault impact, isolation modules shall be provided in all the locations listed below. If ceiling height  $\leq 10$  feet, isolator base type initiating devices are permitted to be used to satisfy any or all the following:
  1. In or immediately adjacent to the FACP, at each end of the addressable loop. These two isolators must be in the same room as the FACP and within 15 feet.
  2. After each 25 initiating devices and control points on the addressable loop, or a lesser number where recommended by the manufacturer. (Check instructions.)
  3. For loops with less than 25 devices and control points, install an isolator at the approximate middle of the loop (in addition to those at the FACP).
  4. Near the point any addressable circuit extends outside the building, except for those attached to the building exterior walls and well sheltered by walkways.
  5. For loops covering more than one floor, install isolator at terminal cabinet on each floor (with additional isolator[s] on any floor with over 25 addresses).
- C. Each isolation module must be clearly labeled, readily accessible for convenient inspection (not above a lay-in ceiling), and shown on as-built drawings
- D. All fire alarm system wiring shall be in metal conduit or surface metal raceway.

EXCEPTION #1: PVC conduit is permitted to be used underground, in concrete, and in locations subject to severe corrosion (such as coastal facilities).

All conduits that penetrate outside walls from air conditioned space must have internal sealing (duct-seal), to prevent condensation from infiltrating humid air.

- E. There shall be no splices in the system other than at device terminal blocks, or on terminal blocks in cabinets. "Wire nuts" and crimp splices will not be permitted. Permanent wire markers shall be used to identify all connections at the FACP and other control equipment, at power supplies, and in terminal cabinets.
- F. In multistory buildings, all circuits leaving the riser on each floor shall feed through a labeled terminal block in a hinged enclosure accessible from the floor. If building layout requires the terminal cabinet to be above a drop ceiling, its location must be clearly and permanently identified with a placard readable from floor. Terminal block screws shall have pressure wire connectors of the self-lifting or box lug type.
- G. Addressable loop (signaling line) circuits shall be wired with type FPL/FPLR/FPLP fire alarm cable, AWG 18 minimum, low capacitance, twisted shielded copper pair. Cable shield drain wires are to be connected at each device on the loop to maintain continuity, taped to insulate from ground, and terminated at the FACU. Acceptable cables include Atlas 228-18-1-1STP, BSCC S1802s19 (same as EEC 7806LC), West Penn D975, D991 (AWG 16), D995 (AWG 14), or equal wire having capacitance of 30pf/ft. maximum between conductors. Belden 5320FJ cable is acceptable if only FPL rating needed. The cable jacket color shall be red, with red (+) and black (-) conductor insulation.

EXEMPTION #1: Unshielded cable, otherwise equal to the above, is permitted to be used if the manufacturer's installation manual requires, or states preference for, unshielded cable.

EXEMPTION #2: In underground conduit, use Type TC or PLTC cable (PE insulated) to avoid problems from moisture.

- H. Addressable interface modules (used to monitor all contact type initiating devices) must be in a conditioned space, unless they are tested, listed, and marked for continuous duty across the range of temperatures and humidity expected at their installed location.
- I. Except as required by C.1.7, all other circuits in the system shall be wired with AWG 14 (minimum), stranded copper, THHN/THWN conductors, installed in conduit. Color code as shown below throughout the system, without color change in any wire run:

Alarm notification Appliance Circuits (horns/strobes)	Blue (+)/Black (-)
Separate 24vdc Operating Power (for equipment)	Yellow (+)/Brown (-)
Door Control Circuits (magnet power, if from system)	Orange

Circuits from addressable monitor modules to Monitored Devices (AWG 14)	Violet (+)/Grey (-)
-------------------------------------------------------------------------	---------------------

NOTE: THHN/THWN conductors are permitted only if larger than #16 AWG NCSEC 760.49(B)

- J. Notification Appliance Circuit booster ("ADA") power supplies must be individually monitored by the FACP and protected by a smoke detector per NFPA 72. They shall not be located above a ceiling, or in non-conditioned space.

NOTE: A 24vdc power circuit serving addressable control relays must also be monitored for integrity.

- K. All junction boxes shall be painted red prior to pulling the wire. Those installed in finished areas are permitted to be painted outside to match the finish color.
- L. The branch circuit breaker(s) supplying the system must be physically protected by panelboard lock or handle lock and each must be identified with a 1/4" permanent red dot applied to handle or exposed body area.
- M. Provide an engraved label at each fire alarm system control unit, system sub-panel or data gathering panel, supplementary notification appliance (SNAC) panel, digital alarm communicator, etc., identifying its 120vac power source, as follows: Panelboard location, panelboard identification, and branch circuit number.
- N. Unless the AHJ requires otherwise, all duct smoke detectors shall be programmed for supervisory alarm (not general alarm).
- O. Fire Alarm System notification circuit end of line (EOL) resistor shall located as follows:
  1. In a location that is accessible to fire alarm maintenance personnel.
  2. In an area where maintenance or testing at the EOL resistor location will not be disruptive to the normal use of the facility.
  3. In an area that is not easily accessible to the normal building occupants (objective is to avoid accidental or malicious damage by building occupants).
  4. In an area that is no higher than 9 ft. or lower than 7 ft. from the floor level.
  5. Not located in a stairway or bathroom location.

3.2 Programming, Testing, and Certification:

- A. All connections to the FACP and the system's programming shall be done only by the manufacturer, or by an authorized distributor that stocks a full complement of spare parts for the system. The technicians who do this are required to be trained and individually certified by the manufacturer, for the FACP model/series being installed. This training and certification must have occurred within the most recent 24 months, except that a NICET Level III certification will extend this to 36 months. Copies of the certifications must be part

of the Shop Drawing submittal to the engineer, prior to installation. The submittal cannot be approved without this info.

The technician who makes final connections and programs the FACP is legally the "installer" even though most field connections to system devices and appliances are normally made by electrical contractor personnel. The responsibility for assuring a proper installation overall rests with this individual. In addition to doing the final hookups and activating the system, this individual is expected to check enough field connections to assure a proper job was done. The absence of system "trouble" signals is not a sufficient measure of the field wiring, which could have "T" taps, the wrong type of wire, improper terminations, ground (drain wire) issues, etc.

NOTE: This means the electrical contractor is not permitted to apply power to the FACP or any system power supplies, or to make any connections to them. However, the electrical contractor is responsible for installing and making field connections to initiating devices, notification appliances, control relays, and other components.

- B. When programming the system, activate the automatic drift compensation feature for all spot-type smoke detectors. Systems with alarm verification are not to have this feature activated without written direction from the owner's representative or the AHJ. Alarm verification must not be used with multi-sensor/multi-criteria detectors under any circumstances, as inadequate system response may result.

- C. Set spot-type smoke detector sensitivities to normal/medium.

NOTE: Print a complete **System Status and Programming Report**, this must include the program settings for each alarm initiating device and the current sensitivity of each analog addressable smoke detector.

- D. The manufacturer or authorized distributor must 100% test all site-specific software functions for the system and then provide a detailed report or check list showing the system's operational matrix. This documentation must be part of the "System Status and Programming Report."
- E. Upon completion of the installation and its programming, the installer's technician shall test every alarm initiating device for proper response and indication, and all alarm notification appliances for effectiveness. Also, in coordination with the other building system contractors, all other system functions shall be verified, including (where applicable) elevator capture and the control of HVAC systems, door locks, pressurization fans, fire or smoke doors/dampers/shutters, etc. The engineer must be notified in advance of these 100% tests, to permit witnessing them if desired.
- F. The installer must fill out and submit the following documentation to the owner, through the engineer, prior to the AHJ's system acceptance inspection:  
The NFPA 72-2013, "Record of Completion" Form. Use this form (no substitutes) to detail the system installation and to certify that: (a.) It was done per Code, and (b.) The Code-required 100% test was performed. The fire alarm installer (manufacturer or authorized distributor's technician) must sign this form. If a representative of the AHJ, owner, or engineer witnesses the tests, in whole or in part, they must also sign the form to signify that fact only (annotating the form as needed to clarify their limited role). The System Status and

Programming Report described in C.2.c. This must be generated on the day of the system acceptance inspection.

### 3.3 Documentation, Owner Training, and Spare Parts:

- A. The contractor shall provide to the engineer two bound copies of the following technical information, for transmittal to the owner:
  - 1. As-built wiring diagram showing all loop numbers and device addresses in the system, plus equipment terminal numbers.
  - 2. Manufacturer's detailed maintenance requirements.
  - 3. Technical literature on all control equipment, isolation modules, power supplies, alarm/supervisory signal initiating devices, alarm notification appliances, relays, etc.
  - 4. The as-built "calculations" sheet referenced in previous sections.
- B. Complete configuration data (site-specific programming) for the system must be stored on electronic media and archived by the fire alarm system manufacturer or authorized distributor. A jump drive or CD copy of this data shall be submitted to the engineer for transmission to the owner on the day the system is commissioned.
- C. The manufacturer, or authorized distributor, must maintain software version (VER) records on the system installed. The system software shall be upgraded free of any charge if a new VER is released during the warranty period. For new VER to correct operating problems, free upgrade shall apply during the entire life of the system.
- D. Basic operating instructions shall be framed and permanently mounted at the FACP. (If the owner concurs, they may instead be affixed to the inside of the FACP's door.) In addition, the NFPA 72 "Record of Completion" must either be kept at/in the FACP, or its location shall be permanently indicated there by engraved label.
- E. Provide an engraved label inside the FACP identifying its 120vac power source, as follows:  
Panelboard location, panelboard identification, and branch circuit number.

### 3.4 The manufacturer's authorized representative must thoroughly and competently instruct the owner's designated employees in proper operation of the system and in all required periodic maintenance. A minimum of two hours on-site time will be allocated for this purpose and, for facilities which operate on a 24-hour basis (such as prisons, hospitals, etc.), an additional hour of instruction will be individually provided for the second and third shift. Two copies of a written, bound summary will be provided, for future reference.

- A. The following spare parts shall be provided with the system. For multi-building projects, calculate quantities separately for each building that contains a dedicated fire alarm control panel. If FACP also serves auxiliary buildings (e.g., storage, boiler/chiller), calculate as if one building. Increase decimal quantities to the next higher whole number:

Fuses (If Used)	2 of each size in system
Manual Fire Alarm Boxes	2% of installed quantity
Addressable Control Relays	4% of installed quantity
Indoor Horns/Speakers with Strobes Lights	4% of installed quantity
Indoor Strobe-only Notification Appliances	4% of installed quantity
Monitor Modules (Addressable Interface)	4% of installed quantity
Isolation Modules / Isolation Bases	4% of installed quantity
Addressable, Electronic Heat Detectors	4% of installed quantity
Spot-Type Smoke Detectors / Sounder Bases	6% of installed quantity

No spares are required for projected beam, air sampling, or duct smoke detectors.

**END OF SECTION 283100**

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## SECTION 31 05 13

### SOILS FOR EARTHWORK

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Subsoil materials.
  - 2. Topsoil materials.
  
- B. Related Sections:
  - 1. Section 31 05 16 - Aggregates for Earthwork.
  - 2. Section 31 22 13 - Rough Grading.
  - 3. Section 31 23 17 - Trenching.
  - 4. Section 31 23 23 - Fill.
  - 5. Section 31 25 13 - Erosion Controls: Slope protection and erosion control.
  - 6. Section 31 37 00 - Riprap.
  - 7. Section 32 91 19 - Landscape Grading.
  - 8. Section 32 92 19 - Seeding and Soil Supplements.
  - 9. Section 32 92 23 - Sodding.
  - 10. Section 32 93 00 - Plants.
  - 11. Section 33 46 00 - Subdrainage: Filter aggregate.
  - 12. Document: Geotechnical report; bore hole locations and findings of subsurface materials.

##### 1.2 UNIT PRICES - MEASUREMENT AND PAYMENT

- A. Subsoil:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes excavating existing subsoil, supplying subsoil materials and stockpiling.
  
- B. Topsoil:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes excavating existing topsoil, supplying topsoil materials, stockpiling and re-spreading of topsoil.

##### 1.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
  
- B. ASTM International:
  - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>

2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

#### **1.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in airtight containers, four, 20-lb samples of each type of proposed fill material to Engineer.
- C. Materials Source: Submit name of imported materials source.
- D. Manufacturer's Certificate(s): Certify that subsoil and/or topsoil products meet or exceed specified requirements.

#### **1.5 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  1. Materials Resources Certificates:
    - a. Certify recycled material content for recycled content products.
    - b. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  1. Provide cost data for the following products:
    - a. Products with recycled material content.
    - b. Local and regional products.

#### **1.6 QUALITY ASSURANCE**

- A. Furnish each subsoil and/or topsoil material from single sources, respectively, throughout the Work.
- B. Sustainable Design Requirements:
  1. Recycled Content Materials: Furnish materials with recycled content, where feasible.
  2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- C. Perform all Work in accordance with Local government and NCDOT standards.

## **PART 2 PRODUCTS**

### **2.1 SUBSOIL MATERIALS**

- A. Subsoil Type S1 – In Situ Material: Conforming to Local government and NCDOT standards and in compliance with Geotechnical Engineering report.
- B. Subsoil Type S2 – Fill and Backfill Material:
  - 1. Excavated and re-used material; select or local borrow; structural. In compliance with Geotechnical Engineering report.
  - 2. Graded.
  - 3. Free of organics and debris with a low- to moderate-plasticity soil. A liquid limit less than 60 and a plasticity index less than 30 or a granular material with at least 15% fines (silt or clay).

### **2.2 TOPSOIL MATERIALS**

- A. Topsoil Type S3 – Landscape Material: Conforming to Local government and NCDOT standards.
  - 1. Excavated and reused material.
  - 2. Graded.
  - 3. Free of roots, rocks larger than 1/2-inch, subsoil, debris, large weeds and foreign matter.
    - a. Screening: Single screened.

### **2.3 SOURCE QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Testing and Inspection Services.
- B. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D698.
- C. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D698.
- D. When tests indicate materials do not meet specified requirements, change material and retest.
- E. Furnish materials of each type from the same source throughout the Work.

## **PART 3 EXECUTION**

### **3.1 EXCAVATION**

- A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.
- B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.
- C. Remove excess excavated materials, subsoil and topsoil, not intended for reuse from site.

- D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.

### **3.2 STOCKPILING**

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Stockpile topsoil 8-feet high maximum.
- E. Prevent intermixing of soil types or contamination.
- F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- G. Stockpile any potentially hazardous materials on impervious material. Cover to prevent erosion and leaching until disposed of.

### **3.3 STOCKPILE CLEANUP**

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent freestanding surface water.
- B. If borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent freestanding surface water.

**END OF SECTION**

## SECTION 31 05 16

### AGGREGATES FOR EARTHWORK

#### PART 4 GENERAL

##### 4.1 SUMMARY

- A. Section Includes:
  - 1. Coarse aggregate materials.
  - 2. Fine aggregate materials.
  
- B. Related Sections:
  - 1. Section 31 05 13 - Soils for Earthwork: Fill and grading materials.
  - 2. Section 31 22 13 - Rough Grading.
  - 3. Section 31 23 17 - Trenching.
  - 4. Section 31 23 23 - Fill.
  - 5. Section 31 25 13 - Erosion Controls: Slope protection and erosion control.
  - 6. Section 31 37 00 - Riprap.
  - 7. Section 32 11 23 - Aggregate Base Courses.
  - 8. Section 32 91 19 - Landscape Grading.
  - 9. Section 33 41 00 - Storm Utility Drainage Piping.
  - 10. Section 33 46 00 - Subdrainage: Filter aggregate.
  - 11. Document: Geotechnical report; bore hole locations and findings of subsurface materials.

##### 4.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Aggregate:
  - 1. Basis of Measurement: By ton.
  - 2. Basis of Payment: Includes supplying aggregate materials, stockpiling.

##### 4.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. AASHTO M147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
  - 2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
  
- B. ASTM International:
  - 1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - 2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).

4. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
5. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

#### **4.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in airtight containers, four, 20-lb samples of each type of proposed aggregate fill material to Engineer.
- C. Materials Source: Submit name of imported materials suppliers.
- D. Manufacturer's Certificate: Certify that aggregate products meet or exceed specified requirements.

#### **4.5 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  1. Materials Resources Certificates:
    - a. Certify recycled material content for recycled content products.
    - b. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  1. Provide cost data for the following products:
    - a. Products with recycled material content.
    - b. Local and regional products.

#### **4.6 QUALITY ASSURANCE**

- A. Furnish each aggregate material from single source throughout the Work.
- B. Sustainable Design Requirements:
  1. Recycled Content Materials: Furnish materials with recycled content, where feasible.
  2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- C. Perform all Work in accordance with Local government and NCDOT standards.

## **PART 5 PRODUCTS**

### **5.1 COARSE AGGREGATE MATERIALS**

- A. All gradations of coarse aggregate materials referred to on site drawings utilize the nomenclature established by the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions. All fine aggregate materials to be used shall conform to these standards and to any issued by the Municipality, as applicable.

### **5.2 FINE AGGREGATE MATERIALS**

- A. All gradations of fine aggregate materials referred to on site drawings utilize the nomenclature established by the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions. All fine aggregate materials to be used shall conform to these standards and to any issued by the Local government, as applicable.

### **5.3 SOURCE QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Testing and inspection services.
- B. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with ASTM C136.
- C. Fine Aggregate Material - Testing and Analysis: Perform in accordance with ASTM C136.
- D. When tests indicate materials do not meet specified requirements, change material and re-test.

## **PART 6 EXECUTION**

### **6.1 EXCAVATION**

- A. Remove excess excavated materials not intended for reuse, from site.
- B. Remove excavated materials not meeting requirements for coarse aggregate materials and fine aggregate materials from site.

### **6.2 STOCKPILING**

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.

- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
- E. Stockpile any potentially hazardous materials on impervious material. Cover to prevent erosion and leaching until disposed of.

**6.3 STOCKPILE CLEANUP**

- A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent freestanding surface water.

**END OF SECTION**



## **SECTION 31 10 00**

### **SITE CLEARING**

#### **PART 7 GENERAL**

##### **7.1 SUMMARY**

- A. Section Includes:
  - 1. Removing surface debris.
  - 2. Removing designated paving, curbs, and misc. concrete.
  - 3. Removing designated trees, shrubs, and other plant life.
  - 4. Removing abandoned utilities.
  - 5. Excavating topsoil.
  
- B. Related Sections:
  - 1. Section 02 41 16 - Structure Demolition: Removing underground storage tanks and designated utilities.
  - 2. Section 31 22 13 - Rough Grading.
  - 3. Section 31 23 18 - Rock Removal.

##### **7.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Site Clearing:
  - 1. Basis of Payment: Includes clearing site, loading and removing waste materials from site, applying herbicide to designated plant life.

##### **7.3 SUBMITTALS**

- A. None required.

##### **7.4 QUALITY ASSURANCE**

- A. Perform Work in accordance with Local, State and Federal Standards.
- B. Conform to State & Federal code for environmental requirements.

#### **PART 8 PRODUCTS**

Not Used.

##### **8.1 MATERIALS**

Not Applicable.

## **PART 9 EXECUTION**

### **9.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify existing plant life designated to remain is tagged or identified.

### **9.2 PREPARATION**

- A. Call ULOCO not less than two working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.

### **9.3 PROTECTION**

- A. Locate, identify, and protect utilities indicated to remain, from damage.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping per plans.
- C. Protect bench marks, survey control points, and existing structures from damage or displacement.

### **9.4 CLEARING**

- A. Clear areas required for access to site and execution of Work.
- B. Remove trees and shrubs, stumps, root systems as required.
- C. Clear undergrowth and deadwood, without disturbing subsoil..

### **9.5 REMOVAL**

- A. Remove debris, rock, and extracted plant life from site.
- B. Remove paving, curbs, and misc. concrete.
- C. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.
- D. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.
- E. Do not burn or bury materials on site. Leave site in clean condition.

### **9.6 TOPSOIL EXCAVATION**

- A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.

- B. Do not excavate wet topsoil.
- C. Stockpile in area designated on site to depth not exceeding eighteen feet and protect from erosion.
- D. Remove excess topsoil not intended for reuse, from site.
  - 1. All areas not covered by building and/or parking shall receive four inches of topsoil. No grass shall be seeded, sprigged or sodded in clay base.

**END OF SECTION**



**SECTION 31 22 13**

**ROUGH GRADING**

**PART 10 GENERAL**

**10.1 SUMMARY**

- A. Section Includes:
  - 1. Excavating topsoil.
  - 2. Excavating subsoil.
  - 3. Cutting, grading, filling, rough contouring and compacting site for site facilities, building pads and transportation areas.
  
- B. Related Sections:
  - 1. Section 31 05 13 - Soils for Earthwork: Soils for fill.
  - 2. Section 31 05 16 - Aggregates for Earthwork: Aggregates for fill.
  - 3. Section 31 10 00 - Site Clearing: Excavating topsoil.
  - 4. Section 31 23 16 - Excavation: Building excavation.
  - 5. Section 31 23 17 - Trenching: Trenching and backfilling for utilities.
  - 6. Section 31 23 23 - Fill: General building area backfilling.
  - 7. Section 31 25 13 - Erosion Controls: Slope protection and erosion control.
  - 8. Section 32 91 19 - Landscape Grading: Finish grading with topsoil to contours.

**10.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Topsoil Fill Material:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes, at minimum, excavating existing soil, supplying soil materials, stockpiling, scarifying substrate surface, placing where required and compacting.
  
- B. Subsoil Fill Material:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes, at minimum, excavating existing subsoil, supplying subsoil materials, stockpiling, scarifying substrate surface, placing where required, and compacting.
  
- C. Structural Fill Material:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes excavating existing subsoil, supplying structural fill materials, stockpiling, scarifying substrate surface, placing where required and compacting.
  
- D. Granular Fill Material:
  - 1. Basis of Measurement: By the cubic yard.

2. Basis of Payment: Includes, at minimum, supplying granular fill materials, stockpiling, scarifying substrate surface, placing where required, and compacting.

### 10.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
  1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  3. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
  4. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
  6. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
  7. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
  8. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
  9. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

### 10.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Samples: Submit, in air-tight containers, four, 10-lb samples of each type of fill to Engineer for testing.
- C. Materials Source: Submit name of imported materials suppliers.
- D. Manufacturer's Certificate: Certify that all materials meet or exceed the aforementioned ASTM standards and the requirements of the Local government & NCDOT, as applicable.

### 10.5 SUSTAINABLE DESIGN SUBMITTALS

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  1. Materials Resources Certificates:
    - a. Certify recycled material content for recycled content products.

- b. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Products with recycled material content.
    - b. Local and regional products.

## **10.6 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

## **10.7 QUALITY ASSURANCE**

- A. Perform Work in accordance with ASTM C136, ASTM D2419 and ASTM D2434.
- B. Sustainable Design Requirements:
  - 1. Recycled Content Materials: Furnish materials with recycled content.
  - 2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- C. Perform all Work in accordance with NCDOT and Local government Standards, as applicable.

## **PART 11 PRODUCTS**

### **11.1 MATERIALS**

- A. Topsoil: Type S3 as specified in Section 31 05 13.
- B. Subsoil Fill: Type S2 as specified in Section 31 05 13.
- C. Structural Fill: As referenced in Section 31 05 16.
- D. Granular Fill: As referenced in Section 31 05 16.

## **PART 12 EXECUTION**

### **12.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify site conditions, survey bench mark and intended elevations for the Work are as indicated on Drawings.

## 12.2 PREPARATION

- A. Call Local Utility Line Information service at (800) 632-4949 not less than three working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Notify appropriate utility company to remove or relocate utilities, as necessary.
- D. Protect utilities indicated to remain from damage.
- E. Protect plant life, lawns and other features remaining as a portion of final landscaping.
- F. Protect benchmarks, survey control points and all existing features designated to remain from excavating equipment and vehicular traffic.

## 12.3 TOPSOIL EXCAVATION

- A. Excavate topsoil from the entire site without mixing with foreign materials for use in finish grading.
- B. Do not excavate wet topsoil.
- C. Stockpile in area designated on site to depth not exceeding 8-feet and protect from erosion.
- D. Remove excess topsoil not intended for reuse, from site.

## 12.4 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Do not excavate wet subsoil.
- C. When excavating through roots, perform Work by hand and cut roots with sharp axe.
- D. Remove excess subsoil not intended for reuse, from site.
- E. Stockpile subsoil in area designated on site to depth not exceeding 8-feet and protect from erosion.
- F. Benching Slopes: Horizontally bench existing slopes greater than 1: 4 to key placed fill material to slope to provide firm bearing.
- G. Stability: Replace damaged or displaced subsoil as specified for fill.

## 12.5 FILLING

- A. Fill areas to contours and elevations with unfrozen materials.



- B. Place material in continuous layers as follows:
  - 1. Subsoil Fill: Maximum 12-inches compacted depth.
  - 2. Structural Fill: Maximum 8-inches compacted depth.
  - 3. Granular Fill: Maximum 8-inches compacted depth.
- C. Maintain optimum moisture content of fill materials to attain required compaction density.
- D. Slope grade away from building at minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
- E. Make grade changes gradual. Blend slope into level areas.
- F. Repair or replace items indicated to remain damaged by excavation or filling.
- G. Install Work in accordance with all applicable North Carolina and Local government standards.

## **12.6 TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Top Surface of Sub-grade: Plus or minus 1/10 foot from required elevation.

## **12.7 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557, ASTM D698 and/or AASHTO T180, as applies.
- C. Perform in place compaction tests in accordance with the following, as applies:
  - 1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
  - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

**END OF SECTION**



## **SECTION 31 23 16**

### **EXCAVATION**

#### **PART 13 GENERAL**

##### **13.1 SUMMARY**

- A. Section Includes:
  - 1. Soil densification.
  - 2. Excavating for building foundations.
  - 3. Excavating for paving, roads and parking areas.
  - 4. Excavating for slabs-on-grade.
  - 5. Excavating for site structures.
  - 6. Excavating for landscaping.
  
- B. Related Sections:
  - 1. Section 31 05 13 - Soils for Earthwork: Stockpiling excavated materials.
  - 2. Section 31 05 16 - Aggregates for Earthwork: Stockpiling excavated materials.
  - 3. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
  - 4. Section 31 23 17 - Trenching: Excavating for utility trenches.
  - 5. Section 31 23 23 - Fill.
  - 6. Section 31 25 13 - Erosion Controls: Slope protection and erosion control.
  - 7. Document: Geotechnical report; bore hole locations and findings of subsurface materials.

##### **13.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Excavating Soil Materials:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes general excavating to required elevations, loading and placing materials in stockpile and/or removing materials from site. (Over Excavating: Payment will not be made for over excavated work nor for replacement materials.)

##### **13.3 REFERENCES**

- A. ASTM International:
  - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 2. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
  - 3. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
  - 4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

- B. Local utility standards when working within 24 inches of utility lines.

#### **13.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- C. Shop Drawings: Indicate soil densification grid for each size and configuration footing requiring soils densification.

#### **13.5 QUALITY ASSURANCE**

- A. Perform all Work in accordance with Local government and NCDOT standards.

#### **13.6 QUALIFICATIONS**

- A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of North Carolina.

### **PART 14 PRODUCTS**

Not Used.

### **PART 15 EXECUTION**

#### **15.1 PREPARATION**

- A. Call Local Utility Line Information service at 800-632-4949 not less than three working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum.
- C. Notify appropriate utility company to remove or relocate utilities, as necessary.
- D. Protect utilities indicated to remain from damage.
- E. Protect plant life, lawns and other features remaining as a portion of final landscaping.
- F. Protect benchmarks, survey control points and all existing features designated to remain from excavating equipment and vehicular traffic.

#### **15.2 SOIL DENSIFICATION - VIBRO-COMPACTION**

- A. Vibro-compact substrates below footing bearing surfaces for footings as indicated on Drawings before excavating site.

- B. Densify existing subsoils with relative density rating of compact to dense to attain relative density rating of very dense.
  - 1. Densify subsoils to depth of feet.
- C. Densification Equipment:
  - 1. Depth Vibrator: Poker type with follower tubes with visible marking every 12 inches to enable insertion depth measurement.
  - 2. Motion: radial in horizontal plane.
  - 3. Data Acquisition System: Record amps or pressure of the vibrator motor over time and depth.
- D. Perform densification in presence of Geotechnical Engineer directly under each footing with vibrator inserted in grid pattern at maximum 6 feet on center.
  - 1. Arrange compaction grid for each footing for maximum number of insertion points and with outermost insertion points within the bearing area of footings.
  - 2. Adjust compaction grid arrangement and spacing as directed by Engineer to achieve required densification.
- E. Insert vibrator to maximum specified depth. Densify soils for 30 seconds or other time as directed by Geotechnical Engineer. Withdraw vibrator every 12 inches increments and repeat densification at each increment.
  - 1. When subsurface obstruction prevents vibrator insertion to specified depth, request instructions from Engineer to compensate for obstruction.
- F. Tolerances:
  - 1. Maximum Deviation from Center of Completed Compaction: 8 inches from indicated position.
  - 2. Maximum Deviation from Vertical: 4 degrees during vibrator insertion.

### 15.3 EXCAVATION

- A. Underpin adjacent structures that may be damaged by excavation work.
- B. Excavate subsoil to accommodate construction operations, building foundations, paving and traffic areas, and site structures.
- C. Excavate to working elevation for piling work.
- D. Compact disturbed load-bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 31 23 23 and Section 31 23 17.
- E. Slope banks with machine to angle of repose or less until shored.
- F. Do not interfere with 45 degree bearing splay of foundations.
- G. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- H. Trim excavation. Remove loose matter.
- I. Notify Architect/Engineer of unexpected subsurface conditions.

- J. Correct areas over excavated with structural fill as directed by Architect/Engineer.
- K. Remove excess and unsuitable material from site.
- L. Stockpile subsoil in area designated on site to depth not exceeding 8-feet and protect from erosion.
- M. Repair or replace items indicated to remain damaged by excavation.

**15.4 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Request visual inspection of bearing surfaces by Architect/Engineer before installing subsequent work.

**15.5 PROTECTION**

- A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

**END OF SECTION**

## SECTION 31 23 17

### TRENCHING

#### PART 16 GENERAL

##### 16.1 SUMMARY

- A. Section Includes:
  - 1. Excavating trenches for utilities from 5-feet outside building to utility service.
  - 2. Compacted fill from top of utility bedding to subgrade elevations.
  - 3. Backfilling and compaction.
  
- B. Related Sections:
  - 1. Section 31 05 13 - Soils for Earthwork: Soils for fill.
  - 2. Section 31 05 16 - Aggregates for Earthwork: Aggregates for fill.
  - 3. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
  - 4. Section 31 23 16 - Excavation: General building excavation.
  - 5. Section 31 23 23 - Fill: General backfilling.
  - 6. Section 31 37 00 - Riprap.
  - 7. Section 32 91 19 - Landscape Grading: Filling of topsoil over backfilled trenches to finish grade elevation.
  - 8. Section 33 31 00 - Sanitary Utility Sewerage Piping: Sanitary sewer piping and bedding from building to utility service.
  - 9. Section 33 41 00 - Storm Utility Drainage Piping: Storm sewer piping and bedding from building to utility service.
  - 10. Section 33 46 00 - Subdrainage: Building perimeter drainage, filter aggregate, filter fabric, and granular cover.
  - 11. Document: Geotechnical report; bore hole locations and findings of subsurface materials.

##### 16.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Trenching:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes excavating to required elevations, protecting excavation, stockpiling excavated materials and removing excavated materials from site. Over Excavating: Payment is not made for over excavated work nor for replacement materials.
  
- B. Subsoil Fill:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes furnishing fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.
  
- C. Structural Fill:

1. Basis of Measurement: By cubic yard.
  2. Basis of Payment: Includes furnishing fill material, stockpiling, shaping substrate surface, placing where required, and compacting.
- D. Granular Fill:
1. Basis of Measurement: By cubic yard.
  2. Basis of Payment: Includes furnishing fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.
- E. Concrete Fill:
1. Basis of Measurement: By cubic yard.
  2. Basis of Payment: Includes furnishing materials, forming, mixing and placing where required, and curing.

### 16.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  3. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
  4. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
  6. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
  7. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

### 16.4 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, or cable.

### 16.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.
- C. Product Data: Submit data for geotextile fabric indicating fabric and construction.



- D. Samples: Submit, in air-tight containers, four, 20-lb samples of each type of fill to Engineer for testing.
- E. Materials Source: Submit name of imported fill materials suppliers.
- F. Manufacturer's Certificate(s): Certify Products meet or exceed specified requirements.

#### **16.6 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify recycled material content for recycled content products.
    - b. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Products with recycled material content.
    - b. Local and regional products.

#### **16.7 QUALITY ASSURANCE**

- A. Sustainable Design Requirements:
  - 1. Recycled Content Materials: Furnish materials with recycled content, where possible.
  - 2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- B. Perform all Work in accordance with Local government and NCDOT Standards, as applicable.

#### **16.8 QUALIFICATIONS**

- A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of North Carolina.

#### **16.9 FIELD MEASUREMENTS**

- A. Verify field measurements prior to fabrication.

#### **16.10 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

## **PART 17 PRODUCTS**

### **17.1 FILL MATERIALS**

- A. All types of fill materials referred to on site drawings utilize the nomenclature established by the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions. All course aggregate materials to be used shall conform to these standards and to any issued by the Local government, as applicable.

### **17.2 ACCESSORIES**

- 1. Geotextile Fabric: Non-biodegradable, woven.

## **PART 18 EXECUTION**

### **18.1 LINES AND GRADES**

- A. Lay pipes to lines and grades indicated on Drawings.
  - 1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.
  - 2. Use laser-beam instrument with qualified operator to establish lines and grades.

### **18.2 PREPARATION**

- A. Call Local Utility Line Information service at 800-632-4949 not less than three working days before performing Work.
  - 1. Request underground utilities to be located and marked within and surrounding construction areas.
- B. Identify required lines, levels, contours, and datum locations.
- C. Protect plant life, lawns and other features remaining as a portion of final landscaping.
- D. Protect benchmarks, survey control points and all existing features designated to remain from excavating equipment and vehicular traffic.
- E. Maintain and protect above and below grade utilities indicated to remain.
- F. Establish temporary traffic control [and detours] when trenching is performed in public right-of-way. Relocate controls and reroute traffic as required during progress of Work.

### **18.3 TRENCHING**

- A. Excavate subsoil required for utilities to utility service.
- B. Remove lumped subsoil, boulders, and rock up of 1/6 cubic yard, measured by volume. Remove larger material as specified in Section 31 23 16.
- C. Perform excavation within 24 inches of existing utility service in accordance with utility's requirements.

- D. Do not advance open trench more than 200 linear feet ahead of installed pipe.
- E. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.
- F. Excavate bottom of trenches maximum 2-feet wider than outside diameter of pipe.
- G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and utilities.
- H. Do not interfere with bearing splay of foundations.
- I. When Project conditions permit, slope side walls of excavation starting 2-feet above top of pipe. When side walls can not be sloped, provide sheeting and shoring to protect excavation as specified in this section.
- J. When subsurface materials at bottom of trench are loose or soft, notify Engineer and request instructions.
- K. Cut out soft areas of subgrade not capable of compaction in place. Backfill and compact to density equal to or greater than requirements for subsequent backfill material.
- L. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- M. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.
- N. Remove excess subsoil not intended for reuse, from site.

#### **18.4 SHEETING AND SHORING**

- A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.
- B. Support trenches more than 5-feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
- C. Design sheeting and shoring to be removed at completion of excavation work.
- D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.
- E. Repair damage to Work due to settlement, water or earth pressure, or other causes resulting from inadequate sheeting, shoring, or bracing.

#### **18.5 BACKFILLING**

- A. Backfill trenches to contours and elevations with unfrozen fill materials.

- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
- C. Place geotextile fabric prior to placing subsequent fill materials.
- D. Place fill material in continuous layers and compact in accordance with schedule at end of this section.
- E. Employ placement method that does not disturb or damage foundation perimeter drainage, utilities in trench, and other subsurface utilities to remain.
- F. Maintain optimum moisture content of fill materials to attain required compaction density.
- G. Do not leave more than 50-feet of trench open at end of working day.
- H. Protect open trench to prevent danger to the public.

#### **18.6 TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Top Surface of Backfilling: Plus or minus 0.08 feet from required elevations.
- C. Top Surface of General Backfilling: Plus or minus 0.10 feet from required elevations.

#### **18.7 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform laboratory material tests in accordance with ASTM D1557. ASTM D698. AASHTO T180.
- C. Perform in place compaction tests in accordance with the following:
  - 1. Density Tests: ASTM D1556, ASTM D2167 or ASTM D2922.
  - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, contact Engineer for direction.

#### **18.8 PROTECTION OF FINISHED WORK**

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

**END OF SECTION**

## SECTION 31 23 23

### FILL

#### PART 19 GENERAL

##### 19.1 SUMMARY

- A. Section Includes:
  - 1. Backfilling building perimeter to subgrade elevations.
  - 2. Backfilling site structures to subgrade elevations.
  - 3. Fill under slabs-on-grade.
  - 4. Fill under paving.
  - 5. Fill for over-excavation.
  
- B. Related Sections:
  - 1. Section 31 05 13 - Soils for Earthwork: Soils for fill.
  - 2. Section 31 05 16 - Aggregates for Earthwork: Aggregates for fill.
  - 3. Section 31 22 13 - Rough Grading: Site filling.
  - 4. Section 31 23 16 - Excavation.
  - 5. Section 31 23 17 - Trenching: Backfilling of utility trenches.
  - 6. Section 31 37 00 - Riprap.
  - 7. Section 32 91 19 - Landscape Grading: Filling of topsoil to finish grade elevation.
  - 8. Section 33 46 00 - Subdrainage: Filter aggregate [and filter fabric].
  - 9. Document: Geotechnical report; bore hole locations and findings of subsurface materials.

##### 19.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Fill Material:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes supplying fill materials, stockpiling, [scarifying substrate surface,] placing where required, and compacting.
  
- B. Structural Fill Material:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.
  
- C. Concrete Fill:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes supplying fill material, forming, mixing and placing where required, and curing.

##### 19.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:

1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. ASTM International:
1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  2. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
  3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
  5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
  6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
  7. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

#### 19.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for geotextile fabric indicating fabric and construction.
- C. Samples: Submit, in airtight containers, four, 20-lb samples of each type of proposed fill material to Engineer.
- D. Materials Source: Submit name of imported fill materials suppliers.
- E. Manufacturer's Certificate(s): Certify that fill materials meet or exceed specified requirements.

#### 19.5 SUSTAINABLE DESIGN SUBMITTALS

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  1. Materials Resources Certificates:
    - a. Certify source and origin for salvaged and reused products, as applies.
    - b. Certify recycled material content for recycled content products.
    - c. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  1. Provide cost data for the following products:
    - a. Salvaged products.
    - b. Reused products.

- c. Products with recycled material content.
- d. Local and regional products.

## **19.6 QUALITY ASSURANCE**

- A. Sustainable Design Requirements:
  - 1. Recycled Content Materials: Furnish materials with recycled content.
  - 2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- B. Perform all Work in accordance with City of Rocky Mount and NCDOT standards.

## **PART 20 PRODUCTS**

### **20.1 FILL MATERIALS**

- A. All fill material (including Structural and Concrete) to be used during construction shall conform to the standards set forth in NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions. Fill materials must, also, conform to any and all standards issued by the City of Rocky Mount, as applicable.

### **20.2 ACCESSORIES**

- A. Geotextile Fabric: Non-biodegradable, woven.

## **PART 21 EXECUTION**

### **21.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- C. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.
- D. Verify structural ability of unsupported walls to support loads imposed by fill.

### **21.2 PREPARATION**

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with structural or granular fill (per Engineer's instruction) and compact to density equal to or greater than requirements for subsequent fill material.
- C. Scarify subgrade surface to depth of 6-inches.

- D. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

### **21.3 BACKFILLING**

- A. Backfill areas to contours and elevations with unfrozen materials.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Place geotextile fabric over fill material prior to placing next lift of fill.
- D. Place fill material in continuous layers and compact in accordance with schedule at end of this section.
- E. Employ placement method that does not disturb or damage other work.
- F. Maintain optimum moisture content of backfill materials to attain required compaction density.
- G. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.
- H. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- I. Slope grade away from building at minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.
- J. Make gradual grade changes. Blend slope into level areas.
- K. Remove surplus backfill materials from site.
- L. Leave fill material stockpile areas free of excess fill materials.

### **21.4 TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Top Surface of Backfilling Within Building Areas: Plus or minus 1-inch from required elevations.
- C. Top Surface of Backfilling Under Paved Areas: Plus or minus 1-inch from required elevations.
- D. Top Surface of General Backfilling: Plus or minus 1-inch from required elevations.

### **21.5 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.



- B. Perform laboratory material tests in accordance with ASTM D1557. ASTM D698. AASHTO T180.
- C. Perform in place compaction tests in accordance with the following:
  - 1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
  - 2. Moisture Tests: ASTM D3017.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- E. Proof roll compacted fill surfaces under slabs-on-grade, pavers, and all paving.

**21.6 PROTECTION OF FINISHED WORK**

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.
- B. Reshape and re-compact fills subjected to vehicular traffic.

**END OF SECTION**



**SECTION 31 25 13**

**EROSION CONTROLS**

**PART 22 GENERAL**

**22.1 SUMMARY**

- A. Section Includes:
  - 1. Diversion Channels.
  - 2. Rock Energy Dissipator.
  - 3. Rock Basin.
  - 4. Rock Barriers.
  - 5. Sediment Ponds.
  - 6. Sediment Traps.
  
- B. Related Sections:
  - 1. Section 31 05 13 - Soils for Earthwork.
  - 2. Section 31 05 16 - Aggregates for Earthwork.
  - 3. Section 31 10 00 - Site Clearing.
  - 4. Section 31 23 16 - Excavation.
  - 5. Section 31 23 23 - Fill.
  - 6. Section 31 37 00 - Riprap.
  - 7. Section 32 13 13 - Concrete Paving.
  - 8. Section 32 91 19 - Landscape Grading.
  - 9. Section 32 92 19 - Seeding and Soil Supplements.
  - 10. Section 33 42 13 - Pipe Culverts.

**22.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Diversion Channel:
  - 1. Basis of Measurement: By linear foot.
  - 2. Basis of Payment: Includes excavating, windrowing, compacting, seeding, and mulching.
  
- B. Rock Energy Dissipator:
  - 1. Basis of Measurement: By each unit.
  - 2. Basis of Payment: Includes cleaning, excavating, backfilling, placing embankment, placing geotextile fabric, placing rock, and required grouting.
  
- C. Rip Rap Outlet Protection:
  - 1. Basis of Measurement: By tons.
  - 2. Basis of Payment: Includes placing rock, and coarse aggregate filter blanket.
  
- D. Sediment Basin:
  - 1. Basis of Measurement: By each unit.
  - 2. Basis of Payment: Includes excavating, removing unsuitable material, backfilling, placing embankment, clearing, placing rock, and grouting.

- E. Skimmer Sediment Basin:
  - 1. Basis of Measurement: By each unit.
  - 2. Basis of Payment: Includes clearing, excavating, piping, placing riser footing, constructing embankment and trench and rock basin, seeding and mulching.
- F. Temporary Sediment Trap:
  - 1. Basis of Measurement: By each unit.
  - 2. Basis of Payment: Includes clearing, excavating, forming embankment, placing aggregate or rock and geotextile fabric, seeding, and mulching.
- G. Cleaning Sedimentation Structures:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes removal, hauling and disposal of sediment and other debris in system.

### 22.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. AASHTO T88 - Standard Specification for Particle Size Analysis of Soils.
  - 2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
- B. American Concrete Institute:
  - 1. ACI 301 - Specifications for Structural Concrete.
- C. ASTM International:
  - 1. ASTM C127 - Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
  - 2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  - 4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
  - 5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- D. Precast/Prestressed Concrete Institute:
  - 1. PCI MNL-116S - Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

### 22.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Product Data: Submit data on joint filler, joint sealer, admixtures, curing compounds and/or geotextile, as applies.
- C. Test Reports: Indicate certified tests results for precast concrete at manufacturing facility, cast-in-place concrete in-field and granular backfill, as applies.

- D. Manufacturer's Certificate: Certify Products meet or exceed Local government, NCDENR and NCDOT Standards, latest editions.

## **22.5 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify recycled material content for recycled content products.
    - b. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Products with recycled material content.
    - b. Local and regional products.

## **22.6 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

## **22.7 QUALITY ASSURANCE**

- A. Perform Work in accordance with requirements of Section 31 05 13, Section 31 05 16, Section 31 10 00, Section 31 23 16, Section 31 23 23, Section 31 37 00, Section 32 13 13, Section 32 91 19, Section 32 92 19, Section 33 42 13, Section 03 10 00, Section 03 20 00, Section 03 30 00, Section 03 41 00, Section 04 05 03, Section 05 12 00, Section 05 50 00, and Section 07 90 00.
- B. Sustainable Design Requirements:
  - 1. Recycled Content Materials: Furnish materials with recycled content when possible.
  - 2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- C. Perform Work in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

## **22.8 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

## **22.9 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not place grout when air temperature is below freezing.
- C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

## **PART 23 PRODUCTS**

### **23.1 ROCK AND GEOTEXTILE MATERIALS**

- A. Furnish materials in accordance with Local government, NCDENR and NCDOT Standards, latest editions.
- B. Rock: As specified in Section 31 37 00.
- C. Geotextile Fabric: As specified in Section 31 37 00.

### **23.2 CONCRETE MATERIALS AND REINFORCEMENT**

- A. Cement: Type III, grey, as specified in Section 03 30 00.
- B. Fine and Coarse Aggregates: as specified in Section 03 30 00.
- C. Water: Clean and not detrimental to concrete.
- D. Aggregate, Sand, Water, Admixtures - Precast: Determined by precast fabricator, as appropriate to design requirements.
- E. Reinforcement Steel: As specified in Section 03 20 00. Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.
- F. Welded Steel Wire Fabric: Galvanized, as specified in Section 03 20 00. Furnish in accordance with Local government and NCDOT standards, latest editions.

### **23.3 BLOCK, STONE, AGGREGATE, AND SOIL MATERIALS**

- A. Precast Solid Concrete Block: Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.
- B. Stone: As specified in Section 04 42 13. Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.
- C. Coarse Aggregate: As specified in Section 31 05 16. Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

- D. Soil Backfill: As specified in Section 31 05 13. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter. Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

#### **23.4 PLANTING MATERIALS**

- A. Seeding and Soil Supplements: As specified in Section 32 92 19 and on plan sheets. Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.
- B. Mulch: As specified in Section 32 92 19 and on plan sheets. Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

#### **23.5 PIPE MATERIALS**

- A. Pipe: Concrete, as specified in Section 33 42 13, and/or HDPE per plans. Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

#### **23.6 ACCESSORIES**

- A. Joint Sealers: As specified in Section 07 90 00. Furnish in accordance with Local government and NCDOT Standards, latest editions.
- B. Joint Filler: As specified in Section 07 90 00. Furnish in accordance with Local government and NCDOT Standards, latest editions.
- C. Building Paper: Furnish in accordance with Local government and NCDOT Standards, latest editions.
- D. Grout: As specified in Section 04 05 03. Furnish in accordance with Local government and NCDOT Standards, latest editions.
- E. Steel Plate Anti-Vortex Device: Furnish in accordance with Local government and NCDOT Standards, latest editions.
- F. Welding Material: Furnish in accordance with Local government and NCDOT Standards, latest editions.
- G. Anti-Seep Collar: Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.
- H. Trash Rack: Furnish in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

#### **23.7 MIXES**

- A. Concrete: 3,000 – 4,000 psi, as specified in Section 03 30 00. Furnish in accordance with Local government and NCDOT Standards, latest editions.

**23.8 SOURCE QUALITY CONTROL (AND TESTS)**

- A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Provide composition reports and test results on cement, aggregates, and mixes to ensure conformance with specified requirements.
- C. Make all material reports and test results available to Engineer at least twenty-one calendar days before the approval of Engineer is required.
- D. All composition reports and test results must be certified authentic and valid by the material manufacturer and/or a third party qualified to provide and certify such analyses.

**PART 24 EXECUTION**

**24.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted stabilized soil is acceptable and ready to support devices and imposed loads.
- C. Verify gradients and elevations of base or foundation for other work are correct.

**24.2 DIVERSION CHANNELS**

- A. Windrow excavated material on low side of channel.
- B. Compact to 95 percent maximum density.
- C. On entire channel area, apply soil supplements and sow seed as specified in Section 32 92 19.
- D. Mulch seeded areas with hay as specified in Section 32 92 19.

**24.3 ROCK ENERGY DISSIPATOR**

- A. Excavate to indicated depth of rock lining or nominal placement thickness as follows. Remove loose, unsuitable material below bottom of rock lining, then replace with suitable material. Thoroughly compact and finish entire foundation area to firm, even surface.

NCSA Class	Nominal Placement Thickness inches
R8	48
R7	36
R6	30
R5	24



R4	18
R3	12

- B. Lay and overlay geotextile fabric over substrate. Lay fabric parallel to flow from upstream to downstream. Overlap edges upstream over downstream and upslope over downslope. Provide a minimum overlap of 3 feet. Offset adjacent roll ends a minimum of 5 feet when lapped. Cover fabric as soon as possible and in no case leave fabric exposed more than 14 calendar days.
- C. Carefully place rock on geotextile fabric to produce an even distribution of pieces, with minimum of voids and without tearing geotextile.
- D. Unless indicated otherwise, place full course thickness in one operation to prevent segregation and to avoid displacement of underlying material. Arrange individual rocks for uniform distribution.
  - 1. Saturate rock with water. Fill voids between pieces with grout, for at least top 6 inches. Sweep surface with stiff broom to remove excess grout.
  - 2. Moist cure grouted rock for at least 3 days after grouting, using water saturated burlap in accordance with Section 03 30 00.

**24.4 PAVED ENERGY DISSIPATOR**

- A. Excavate to required paving depth. Remove loose, unsuitable material below bottom of paving, then replace with suitable material. Thoroughly compact and finish entire foundation area to firm, even surface.
- B. Place forms and reinforcement in accordance with Section 32 13 13. Hold reinforcement firmly in position during placing of concrete.
- C. Mix, place, finish, and cure concrete, as specified in Section 32 13 13.
- D. Embed stones or blocks 3 inches in plastic concrete at indicated separation on slopes and channel bottom.
- E. Pave in uniform 10 foot lengths or sections.
- F. Pave in shorter sections as necessary for closures or curves.
- G. Place premolded expansion joint filler, 1/2 inch thick, cut to conform to paving cross sections, at ends of curved sections at intervals of not more than 100 feet, at end of day's work, and where paving is adjacent to rigid structure. Use joint filler with depth of 1/2 inch less than paving depth and press firmly against adjacent concrete.
- H. Form intermediate joints between sections, with two thicknesses of bituminous paper cut neatly to paving cross section.
- I. Seal joint top with joint sealer.

**24.5 ROCK DAM SEDIMENT BASIN**

- A. Construct generally in accordance with rock energy dissipator requirements to indicated shape and depth. Rock courses may be placed in several operations but minimum depth of initial course must be 3 feet or greater.

**24.6 ROCK BARRIER**

- A. Determine length required for ditch or depression slope and excavate, compact and foundation area to firm, even surface.
- B. Produce an even distribution of rock pieces, with minimum voids to the indicated shape, height and slope.
- C. Install in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

**24.7 SEDIMENTATION PONDS**

- A. This sub-part includes construction of the following:
  - 1. Sediment Basins
  - 2. Skimmer Sediment Basins
- B. Clear and grub storage area and embankment foundation area site as specified in Section 31 10 00.
- C. Excavate key trench for full length of dam. Excavate emergency spillway in natural ground.
- D. Install pipe spillway, with anti-seep collar attached, at location indicated.
- E. Place forms, and reinforcing for concrete footing at bottom of riser pipe with trash rack, anti-vortex device and skimmer device, per plan sheets, and as specified in Section 03 10 00 and Section 03 20 00. Construction of embankment and trench prior to placing pipe is not required.
- F. Mix, place, finish, and cure concrete, as specified in Section 03 30 00.
- G. Do not use coarse aggregate as backfill material around pipe. Backfill pipe with suitable embankment material to prevent dam leakage along pipe.
- H. Construct rock basin at outlet end of pipe, as specified in this Section. Place embankment material, as specified in Section 31 23 23. When required, obtain borrow excavation for formation of embankment, as specified in Section 31 23 23.
- I. On entire sedimentation pond area, apply soil supplements and sow seed as specified in Section 32 92 19.
- J. Mulch seeded areas with hay as specified in Section 32 92 19.

- K. Install in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

#### **24.8 SEDIMENT TRAPS**

- A. This sub-part includes construction of the following:
  - 1. Temporary Sediment Traps
- B. Clear site, as specified in Section 31 10 00.
- C. Construct trap by excavating and forming embankments as specified in Section 31 23 16, and Section 31 23 23.
- D. Place coarse aggregate or rock at outlet as indicated on Drawings.
- E. Place geotextile fabric, as specified for rock energy dissipator.
- F. When required, obtain borrow excavation for formation of embankment, as specified in Section 31 23 16.
- G. On entire sediment trap area, apply soil supplements and sow seed as specified in Section 32 92 19.
- H. Mulch seeded areas with hay as specified in Section 32 92 19.
- I. Install in accordance with Local government, NCDENR and NCDOT Standards, latest editions.

#### **24.9 SITE STABILIZATION**

- A. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time.
- B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.
- C. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 3:1 or flatter.
- D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.
  - 1. During non-germinating periods, apply mulch at recommended rates.
  - 2. Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Section 32 92 19.
  - 3. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with Section 32 92 19 permanent seeding specifications.
- E. Stabilize diversion channels, sediment basins & traps, and stockpiles immediately.

#### **24.10 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.
- C. Field test concrete in accordance with Section 03 30 00.
- D. Compaction Testing: As specified in Section 31 23 23.
- E. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- F. Frequency of Compaction Testing: One for each lift.

#### **24.11 CLEANING**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
- B. When sediment accumulation in sedimentation structures has reached a point one-half depth of sediment structure or device, remove and dispose of sediment.
- C. Do not damage structure or device during cleaning operations.
- D. Do not permit sediment to erode into construction or site areas or natural waterways.
- E. Clean channels when depth of sediment reaches approximately one half channel depth.

#### **24.12 PROTECTION**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Immediately after placement, protect paving from premature drying, excessive hot or cold temperatures, and mechanical injury.
- C. Do not permit construction traffic over asphalt paving for 7 days minimum after finishing. Do not permit construction traffic over concrete paving until 75 percent design strength of concrete has been achieved.
- D. Protect paving from elements, flowing water, or other disturbance until curing is completed.

#### **24.13 SCHEDULES**

- A. Erosion Control Schedule: Please refer to plan sheets to for sequencing of installing erosion control measures.

**END OF SECTION**

**SECTION 31 31 16  
TERMITE CONTROL****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Chemical soil treatment.

**1.02 REFERENCE STANDARDS**

- A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 2019.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.
- C. Test Reports: Indicate regulatory agency approval reports when required.
- D. Test Reports: Submit termite-resistant sheet manufacturer's summary of independent laboratory and field testing for effectiveness in subterranean termite exclusion.
- E. Manufacturer's Instructions: Indicate caution requirement.
- F. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing this type of work and:
  - 1. Having minimum of three (3) years documented experience.
  - 2. Approved by manufacturer of treatment materials.
  - 3. Licensed in the State in which the Project is located.

**1.05 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year installer's warranty against damage to building caused by termites.
  - 1. Include coverage for repairs to building and to contents damaged due to building damage. Repair damage and, if required, re-treat.

**PART 2 PRODUCTS****2.01 CHEMICAL SOIL TREATMENT**

- A. Toxicant Chemical: EPA Title 7, United States Code, 136 through 136y approved; synthetically color dyed to permit visual identification of treated soil.
- B. Manufacturers:
  - 1. Bayer Environmental Science Corp: [www.backedbybayer.com/pest-management/#sle](http://www.backedbybayer.com/pest-management/#sle). Bayer Environmental Science Corp: [www.backedbybayer.com/pest-management/#sle](http://www.backedbybayer.com/pest-management/#sle). Bayer Environmental Science Corp: [www.backedbybayer.com/pest-management/#sle](http://www.backedbybayer.com/pest-management/#sle).
  - 2. FMC Professional Solutions: [www.fmcprosolutions.com/#sle](http://www.fmcprosolutions.com/#sle).
  - 3. Syngenta Professional Products: [www.syngentaprofessionalproducts.com/#sle](http://www.syngentaprofessionalproducts.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.
- B. Verify final grading is complete.

**3.02 APPLICATION - CHEMICAL TREATMENT**

- A. Comply with requirements of U.S. EPA and applicable state and local codes.
- B. Spray apply toxicant in accordance with manufacturer's instructions.

- C. Apply toxicant at following locations:
  - 1. Under Slabs-on-Grade.
  - 2. At Both Sides of Foundation Surface.
- D. Under slabs, apply toxicant immediately prior to installation of vapor barrier.
- E. At foundation walls, apply toxicant immediately prior to finish grading work outside foundations.
- F. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.
- G. Re-treat disturbed treated soil with same toxicant as original treatment.
- H. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

**3.03 PROTECTION**

- A. Do not permit soil grading over treated work.

**END OF SECTION**

## **SECTION 31 37 00**

### **RIPRAP**

#### **PART 25 GENERAL**

##### **25.1 SUMMARY**

- A. Section Includes:
  - 1. Riprap placed loose.
  - 2. Riprap placed in bags.
  
- B. Related Sections:
  - 1. Section 31 05 16 - Aggregates for Earthwork.
  - 2. Section 31 22 13 - Rough Grading.
  - 3. Section 31 23 16 - Excavation: Excavating for riprap.
  - 4. Section 31 23 17 - Trenching
  - 5. Section 31 23 23 - Fill.
  - 6. Section 32 91 19 - Landscape Grading: Topsoil placement.
  - 7. Section 33 42 13 - Pipe Culverts.

##### **25.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Riprap:
  - 1. Basis of Measurement: By ton.
  - 2. Basis of Payment: Includes supply and placing riprap mix in sacks, moist cured.

##### **25.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for riprap bags, binder and geotextile fabric.
- C. Samples: Submit, in airtight containers, four, 20-lb sample of riprap materials to Engineer for testing.
- D. Manufacturer's Certificate: Certify that riprap products meet or exceed specified requirements.

##### **25.4 QUALITY ASSURANCE**

- A. Furnish each aggregate material from single source throughout the Work.
- B. Perform all Work in accordance with Local government and NCDOT Standards.

## **PART 26 PRODUCTS**

### **26.1 MATERIALS**

- A. Perform all Work in accordance with Local government and NCDOT standards.
- B. Riprap: Granite type; broken stone; solid and nonfriable; 3-inch minimum size, 6-inch maximum size.
- C. Geotextile Fabric: Non-biodegradable, woven.

## **PART 27 EXECUTION**

### **27.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

### **27.2 PLACEMENT**

- A. Place geotextile fabric over substrate, lap edges and ends.
- B. Place riprap at culvert pipe ends, at embankment slopes and as indicated on Drawings.
- C. Installed Thickness: As indicated on Drawings.
- D. Place rock evenly and carefully over geotextile to minimize voids; do not tear fabric. Place rock in one consistent operation to preclude disturbance or displacement of substrate.

**END OF SECTION**



**SECTION 31 62 19  
TIMBER PILES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Timber piles, preservative treated.
- B. Pile load testing.

**1.02 REFERENCE STANDARDS**

- A. ASTM D25 - Standard Specification for Round Timber Piles; 2012 (Reapproved 2022).
- B. ASTM D1143/D1143M - Standard Test Methods for Deep Foundation Elements Under Static Axial Compressive Load; 2020.
- C. ASTM D3689/D3689M - Standard Test Methods for Deep Foundation Elements Under Static Axial Tensile Load; 2022.
- D. ASTM D3966/D3966M - Standard Test Methods for Deep Foundation Elements Under Static Lateral Load; 2022.
- E. ASTM D4945 - Standard Test Method for High-Strain Dynamic Testing of Deep Foundations; 2017.
- F. AWPA M4 - Standard for the Handling, Storage, Field Fabrication and Field Treatment of Preservative-Treated Wood Products; 2023.
- G. AWPA U1 - Use Category System: User Specification for Treated Wood; 2024.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. Scheduling: Schedule pile driving to occur between the hours of 7am and 8pm.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide details
- C. Shop Drawings: Indicate details and schedule of pile installation sequence.
- D. Submit evidence of preservative treatment certification.
- E. Certificate of compliance from authority having jurisdiction indicating approval.
- F. Installer's qualification statement.
- G. Project record documents. Indicate actual:
  - 1. Sizes, lengths, and locations of piles.
  - 2. Sequence of driving.
  - 3. Number of blows per foot (meter) for entire length of piles and measured set for last 10 blows.
  - 4. Drilling: Hole diameters, start and tip elevations.
  - 5. Final tip and head elevations.
  - 6. Driving force of each hammer blow.
  - 7. Type and size of equipment.
  - 8. Alignment deviations.
- H. Pile Load Test Report, including:
  - 1. Location identification.
  - 2. Description of testing equipment.
  - 3. Calibration method and recordings.
  - 4. Installation records.
  - 5. Recorded data.
  - 6. Data analysis.
  - 7. Recommendation of design loads.

8. Description of subsurface/driving conditions.
9. Pile installation recommendations.

### 1.05 QUALITY ASSURANCE

- A. Installer: Company specializing in performing the work of this section with minimum 5 years documented experience.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Piles: In accordance with ASTM D25; Southern Pine, clean peeled, one piece, non-spliced, friction type.
  1. 50 feet long.
  2. Length: As indicated.
  3. Splices permitted only 15 feet below bottom of grade beam cap.
  4. Minimum Butt Diameter:
    - a. 10 inches.
  5. Minimum Tip Diameter:
    - a. 9 inches.
- B. Treatment: Preservative treated, pressure impregnated with creosote in accordance with AWPA U1 for land and fresh water piles, with minimum retention of 12.0 pcf (192 kg/cu m).
- C. Pile Tip: Formed and welded steel with full contact with end of wood pile, with formed and welded steel collar (not required).

### 2.02 SOURCE QUALITY CONTROL

- A. Provide shop testing and inspection of wood piles. See Section 01 40 00 - Quality Requirements for additional requirements.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Obtain prior approval of hammer type to be used.
- B. Perform a Wave Equation Analysis of Pile Driving (WEAP) to establish driving criteria.
- C. Use driving method that will not cause damage to nearby structures.
- D. Notify adjacent and affected land owners and building occupants with 90 days notice before proceeding with work.
- E. Protect structures near the work from damage.
- F. Prepare to place piles from existing site elevations.

### 3.02 DRILLING

- A. Drill holes to facilitate driving only if piling cannot be completed in specified manner. Drill only through strata that obstructs driving. Obtain engineer's approval prior to drilling.
- B. Hole Diameter: Maximum 1 inch (25 mm) smaller than tip dimension.

### 3.03 INSTALLATION

- A. Drive piles to the required penetration rate (blows per foot), as determined by a Wave Equation Analysis of Pile Driving (WEAP), to achieve the minimum driving resistance noted on plans.
- B. Protect pile head during driving. Use collar, with full bearing on pile butt, for even distribution of hammer blow.
- C. Deliver hammer blows to central axis of pile.
- D. Re-drive piles that have lifted due to driving adjacent piles, or by soil uplift.

- E. Do not damage piles during driving operations.
- F. Cut off tops of piles to elevations indicated and prepare pile top to receive pile cap.
- G. Prevent surface damage to treated piles.
- H. Apply preservative to exposed ends of cut-off piles in accordance with AWPA M4.

**3.04 TOLERANCES**

- A. Maximum Variation From Vertical For Plumb Piles: ¼ inch per foot.
- B. Maximum Variation From Design Cut-off Elevation: 4 inches.
- C. Maximum Out-of-Position: 3 inches.

**3.05 FIELD QUALITY CONTROL**

- A. Perform field inspection according to Section 01 40 00 - Quality Requirements.
- B. Use same equipment and methods for test piles as production piles.
- C. Load test the following:
  - 1. One pile in first 3 piles.
- D. Perform the following tests on each test pile:
  - 1. High-strain impact test in accordance with ASTM D4945.
- E. Perform additional testing of other piles when tested piles do not comply with requirements.
- F. Witnessed and recorded by Professional Engineer or qualified representative thereof.
- G. Compile testing information and submit pile load test report prepared by Professional Engineer.

**3.06 UNACCEPTABLE PILES**

- A. Unacceptable Piles: Piles that fail tests, are placed out of position, are below cut-off elevations, or are damaged.
- B. Provide additional piles or replace piles failing to comply with specified requirements.

**END OF SECTION**

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## SECTION 32 11 23

### AGGREGATE BASE COURSES

#### PART 28 GENERAL

##### 28.1 SUMMARY

- A. Section Includes:
  - 1. Aggregate subbase.
  - 2. Aggregate base course.
  
- B. Related Sections:
  - 1. Section 31 22 13 - Rough Grading: Preparation of site for base course.
  - 2. Section 31 23 17 - Trenching: Compacted fill under base course.
  - 3. Section 31 37 00 - Riprap.
  - 4. Section 32 12 16 - Asphalt Paving: Binder and finish asphalt courses.
  - 5. Section 32 13 13 - Concrete Paving: Finish concrete surface course.
  - 6. Section 32 91 19 - Landscape Grading: Topsoil fill at areas adjacent to aggregate base course.

##### 28.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Aggregate Subbase:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.
  
- B. Aggregate Base Course:
  - 1. Basis of Measurement: By the cubic yard.
  - 2. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.

##### 28.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
  - 2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
  
- B. ASTM International:
  - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3  - 2. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
  - 3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup></sup>

4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
5. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
6. ASTM D2940 - Standard Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports.
7. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

#### **28.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
  1. Submit data for geotextile fabric and herbicide.
- C. Samples: Submit, in airtight containers, four, 20-lb samples of each type of aggregate fill to testing laboratory.
- D. Materials Source: Submit name of aggregate materials suppliers.
- E. Manufacturer's Certificate: Certify that aggregate products meet or exceed specified requirements.

#### **28.5 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
- C. Materials Resources Certificates:
  - a. Certify recycled material content for recycled content products.
  - b. Certify source for local and regional materials and distance from Project site.
- D. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  1. Provide cost data for the following products:
    - a. Salvaged products.
    - b. Reused products.
    - c. Products with recycled material content.
    - d. Local and regional products.

#### **28.6 QUALITY ASSURANCE**

- A. Furnish each aggregate material from single source throughout the Work.
- B. Sustainable Design Requirements:

1. Recycled Content Materials: Furnish materials with recycled content.
  2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- C. Perform Work in accordance with Local government and NCDOT Standards, as applicable.

## **PART 29 PRODUCTS**

### **29.1 AGGREGATE MATERIALS**

- A. Subbase Aggregate: ASTM D2940; graded type.

Sieve Size	Percent Passing
2 inches	100
No. 4	30 to 60
No. 200	0 to 12

- B. Base Aggregate: ASTM D2940; graded type.

Sieve Size	Percent Passing
2 inches	100
1-1/2 inches	95 to 100
3/4 inches	70 to 92
3/8 inches	50 to 70
No. 4	35 to 55
No. 30	12 to 25
No. 200	0 to 8

### **29.2 ACCESSORIES**

- A. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.
- B. Herbicide: At Engineer's direction only.

## **PART 30 EXECUTION**

### **30.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted substrate is dry and ready to support paving and imposed loads.
  - 1. Proof roll substrate in minimum two perpendicular passes to identify soft spots.
  - 2. Remove soft substrate and replace with compacted fill as specified in Section 31 23 23.
- C. Verify substrate has been inspected, gradients and elevations are correct.

### **30.2 PREPARATION**

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place fill on soft, muddy, or frozen surfaces.

### **30.3 AGGREGATE PLACEMENT**

- A. Install geotextile fabric over subgrade in accordance with manufacturer's instructions.
  - 1. Lap ends and edges minimum 6 inches.
  - 2. Anchor fabric to subgrade when required to prevent displacement until aggregate is installed.
- B. Spread aggregate over prepared substrate to total compacted thickness indicated on Drawings.
- C. Place aggregate equal thickness layers to total compacted thickness indicated on Drawings.
  - 1. Maximum Layer Compacted Thickness: 8-inches.
  - 2. Minimum Layer Compacted Thickness: 4-inches.
- D. Roller compact aggregate to 95 percent maximum density.
- E. Level and contour surfaces to elevations, profiles, and gradients indicated.
- F. Add small quantities of fine aggregate to coarse aggregate when required to assist compaction.
- G. Maintain optimum moisture content of fill materials to attain specified compaction density.
- H. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

### **30.4 TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.



- B. Maximum Variation From Flat Surface: ½-inch measured with 10 foot straight edge.
- C. Maximum Variation From Thickness: ¼-inch.
- D. Maximum Variation From Elevation: ½-inch.

**30.5 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Compaction testing will be performed in accordance with AASHTO T180.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
  - 1. Frequency of Tests: One test for every 1000 square yards of each layer compacted aggregate.

**END OF SECTION**



## SECTION 32 12 16

### ASPHALT PAVING

#### PART 31 GENERAL

##### 31.1 SUMMARY

- A. Section Includes:
  - 1. Asphalt materials.
  - 2. Aggregate materials.
  - 3. Aggregate subbase.
  - 4. Asphalt paving base course, binder course, and wearing course.
  - 5. Asphalt paving overlay for existing paving.
  - 6. Surface slurry.
  
- B. Related Sections:
  - 1. Section 09 90 00 - Painting and Coating: Pavement markings.
  - 2. Section 31 22 13 - Rough Grading: P reparation of site for paving [and base].
  - 3. Section 31 23 23 - Fill: Compacted subbase for paving.
  - 4. Section 32 11 23 - Aggregate Base Courses: Compacted subbase for paving.
  - 5. Section 32 17 23 - Pavement Markings: Painted pavement markings, lines, and legends.
  - 6. Section 33 05 13 - Manholes and Structures.

##### 31.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Aggregate Subbase:
  - 1. Basis of Measurement: By ton.
  - 2. Basis of Payment: Includes supplying and stockpiling aggregate, scarifying substrate surface, placing, and compacting subbase.
  
- B. Asphalt Paving Base Course:
  - 1. Basis of Measurement: By ton.
  - 2. Basis of Payment: Includes priming surfaces, tack coating surfaces, furnishing, placing, compacting, and testing base course.
  
- C. Asphalt Paving Binder Course:
  - 1. Basis of Measurement: By ton.
  - 2. Basis of Payment: Includes priming surfaces, tack-coating surfaces, furnishing, placing, compacting, and testing binder course.
  
- D. Asphalt Paving Wearing Course:
  - 1. Basis of Measurement: By ton.
  - 2. Basis of Payment: Includes priming surfaces, tack-coating surfaces, furnishing, placing, compacting, and testing wearing course.
  
- E. Tack Coat:

1. Basis of Measurement: By square yard.
2. Basis of Payment: Includes preparing surfaces and applying.

### 31.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
1. AASHTO M17 - Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
  2. AASHTO M29 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
  3. AASHTO M140 - Standard Specification for Emulsified Asphalt.
  4. AASHTO M208 - Standard Specification for Cationic Emulsified Asphalt.
  5. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
  6. AASHTO M320 - Standard Specification for Performance-Graded Asphalt Binder.
  7. AASHTO M324 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
  8. AASHTO MP1a - Standard Specification for Performance-Graded Asphalt Binder.
- B. Asphalt Institute:
1. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot- Mix Types.
  2. AI MS-19 - Basic Asphalt Emulsion Manual.
  3. AI SP-2 - Superpave Mix Design.
- C. ASTM International:
1. ASTM D242 - Standard Specification for Mineral Filler For Bituminous Paving Mixtures.
  2. ASTM D692 - Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.
  3. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
  4. ASTM D977 - Standard Specification for Emulsified Asphalt.
  5. ASTM D1073 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
  6. ASTM D1188 - Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens.
  7. ASTM D2027 - Standard Specification for Cutback Asphalt (Medium-Curing Type).
  8. ASTM D2397 - Standard Specification for Cationic Emulsified Asphalt.
  9. ASTM D2726 - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.
  10. ASTM D2950 - Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.
  11. ASTM D3381 - Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction.
  12. ASTM D3515 - Standard Specification for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
  13. ASTM D3549 - Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.

14. ASTM D3910 - Standard Practices for Design, Testing, and Construction of Slurry Seal.
15. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

### **31.4 PERFORMANCE REQUIREMENTS**

- A. Paving: Superpave design based on 0.3 – 3.0 million equivalent single axle loads (ESAL) for 20 year paving design life.

### **31.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
  1. Submit product information for asphalt and aggregate materials.
  2. Submit mix design with laboratory test results supporting design.
- C. Manufacturer's Certificate: Certify Asphalt Paving Products meet or exceed specified requirements.

### **31.6 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  1. Sustainable Sites Certificates:
    - a. Certify paving materials solar reflectance index.
  2. Materials Resources Certificates:
    - a. Certify recycled material content for recycled content products.
    - b. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  1. Provide cost data for the following products:
    - a. Products with recycled material content.
    - b. Local and regional products.

### **31.7 QUALITY ASSURANCE**

- A. Perform Work in accordance with all Local government and NCDOT Standards.
- B. Mixing Plant: Conform to all Local government and NCDOT Standards.
- C. Obtain materials from same source throughout.
- D. Sustainable Design Requirements:

1. Recycled Content Materials: Furnish materials with recycled content, where available.
- E. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.

### **31.8 QUALIFICATIONS**

- A. Installer: Company specializing in performing work of this section with minimum 5 years documented experience.

## **PART 32 PRODUCTS**

### **32.1 ASPHALT MATERIALS**

- A. All asphalt pavements referred to on site drawings utilize the nomenclature established by the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions. All asphalt pavement components to be used shall conform to these standards and to any issued by the Local government, as applicable.

### **32.2 AGGREGATE MATERIALS**

- A. All gradations of aggregate materials associated with asphalt pavements specified on site drawings shall conform to the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions. All aggregate materials shall conform to all standards issued by the Local government, as applicable.

### **32.3 ACCESSORIES**

- A. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.

### **32.4 MIXES**

- A. Use dry material to avoid foaming. Mix uniformly.
- B. Asphalt Paving Mixtures: Designed in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.

### **32.5 SOURCE QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Submit proposed mix design of each class of mix for review prior to beginning of Work.

## **PART 33 EXECUTION**

### **33.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.
- C. Verify compacted subgrade subbase is dry and ready to support paving and imposed loads.
  - 1. Proof roll subbase with minimum two perpendicular passes to identify soft spots.
  - 2. Remove soft subbase and replace with compacted fill as specified in Section 31 23 23.
- D. Verify gradients and elevations of base are correct.
- E. Verify gutter drainage grilles & frames and manhole frames are installed in correct position and elevation.

### **33.2 SUBBASE**

- A. Aggregate Subbase: Install as specified in Section 32 11 23.

### **33.3 EXISTING WORK**

- A. Saw cut and notch existing paving [as indicted on Drawings].
- B. Clean existing paving to remove foreign material, excess joint sealant and crack filler from paving surface.
- C. Repair surface defects in existing paving to provide uniform surface to receive new paving.

### **33.4 PRIMER**

- A. Apply primer in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions. Apply primer on [aggregate] [\_\_\_\_\_] subbase at uniform rate of [1/3] [1/2] [\_\_\_\_\_] gal/sq yd.
- B. Use clean sand to blot excess primer.

### **33.5 TACK COAT**

- A. Apply tack coat in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.

### **33.6 SINGLE COURSE ASPHALT PAVING**

- A. Install Work in accordance with with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.
- B. Place asphalt wearing course to thickness indicated on Drawings.
- C. Compact paving by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
- D. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

### **33.7 DOUBLE COURSE ASPHALT PAVING**

- A. Place asphalt binder course within 24 hours of applying primer or tack coat.
- B. Place binder course to thickness indicated on Drawings.
- C. Place wearing course within 24 hours of placing and compacting binder course. When binder course is placed more than 24 hours before placing wearing course, clean surface and apply tack coat before placing wearing course.
- D. Place wearing course to thickness indicated on Drawings.
- E. Compact each course by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
- F. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

### **33.8 ASPHALT PAVING OVERLAY**

- A. Apply [asphalt cement] [tack coat] to existing paving surface at rate recommended by geotextile fabric manufacturer.
- B. Install geotextile fabric in accordance with manufacturer's instructions to permit asphalt saturation of fabric. Lap fabric edge and end joints 4 inches.
- C. Place wearing course to thickness indicated on Drawings.
- D. Compact overlay by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
- E. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

### **33.9 SURFACE SLURRY**

- A. Install uniform thickness surface slurry over existing paving in accordance with ASTM D3910.



- B. Allow slurry to cure.
- C. Roll paving to achieve uniform surface.

**33.10 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Flatness: Maximum variation of ¼-inch measured with 10 foot straight edge.
- C. Scheduled Compacted Thickness: Within ¼-inch.
- D. Variation from Indicated Elevation: Within ½-inch.

**33.11 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Take samples and perform tests including mat density tests in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.
- C. Asphalt Paving Mix Temperature: Measure temperature at time of placement.
- D. Asphalt Paving Thickness: ASTM D3549; test one core sample from every 1000 square yards compacted paving.
- E. Asphalt Paving Density: ASTM D1188 or ASTM D2726; test one core sample from every 1000 square yards compacted paving.

**33.12 PROTECTION OF FINISHED WORK**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

**END OF SECTION**



**SECTION 32 13 13**  
**CONCRETE PAVING**

**PART 34 GENERAL**

**34.1 SUMMARY**

- A. Section Includes:
  - 1. Concrete paving for:
    - a. Concrete sidewalks.
    - b. Concrete stair steps.
    - c. Concrete integral curbs and gutters.
    - d. Concrete median barriers.
    - e. Concrete parking areas and roads.
- B. Related Sections:
  - 1. Section 31 22 13 - Rough Grading: Preparation of site for paving.
  - 2. Section 31 23 23 - Fill: Compacted subbase for paving.
  - 3. Section 32 11 23 - Aggregate Base Courses: Base course.
  - 4. Section 32 12 16 - Asphalt Paving: Asphalt wearing course & curbs.
  - 5. Section 32 91 19 - Landscape Grading: Preparation of subsoil at pavement perimeter.

**34.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Aggregate:
  - 1. Basis of Measurement: By ton.
  - 2. Basis of Payment: Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.
- B. Concrete Paving:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes forms, reinforcing, concrete, accessories, placing, finishing, curing, and testing.

**34.3 REFERENCES**

- A. American Association of State Highway and Transportation Officials:
  - 1. AASHTO M324 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
- B. American Concrete Institute:
  - 1. ACI 301 - Specifications for Structural Concrete.
  - 2. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- C. ASTM International:
  - 1. ASTM A184/A184M - Standard Specification for Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.

2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
3. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
4. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
5. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
6. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
7. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
8. ASTM A775/A775M - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
9. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.
10. ASTM A934/A934M - Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars.
11. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
12. ASTM C33 - Standard Specification for Concrete Aggregates.
13. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
14. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
15. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
16. ASTM C150 - Standard Specification for Portland Cement.
17. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
18. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
19. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
20. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
21. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
22. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
23. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
24. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete.
25. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
26. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
27. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
28. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
29. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

30. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
31. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
32. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

#### **34.4 PERFORMANCE REQUIREMENTS**

- A. Paving: Designed for parking, light duty commercial vehicles, and movement of trucks up to 30,000 lbs. maximum.

#### **34.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
  1. Submit data on concrete materials.
- C. Design Data:
  1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
    - a. Hot and cold weather concrete work.
  2. Identify mix ingredients and proportions, including admixtures.
- D. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

#### **34.6 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  1. Sustainable Sites Certificates:
    - a. Certify paving materials solar reflectance index.
  2. Materials Resources Certificates:
    - a. Certify recycled material content for recycled content products.
    - b. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  1. Provide cost data for the following products:
    - a. Products with recycled material content.
    - b. Local and regional products.

### **34.7 QUALITY ASSURANCE**

- A. Perform Work in accordance with ACI 301.
- B. Sustainable Design Requirements:
  - 1. Recycled Content Materials: Furnish materials with recycled content.
  - 2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- C. Perform Work in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.
- D. Obtain cementitious materials from same source throughout.

### **34.8 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

### **34.9 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

### **34.10 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

## **PART 35 PRODUCTS**

### **35.1 FORM MATERIALS**

- A. Form Materials: Conform to ACI 301.
- B. Joint Filler: ASTM D1751; Asphalt impregnated fiberboard or felt, ¼-inch thick.

### **35.2 REINFORCING**

- A. Reinforcing Steel and Wire Fabric: As specified on site drawings.

### **35.3 CONCRETE MATERIALS**

- A. Concrete Materials: As specified in the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions

- B. Cement: ASTM C150, Portland type; as specified on site drawings.
- C. Fine and Coarse Aggregates: ASTM C33.
- D. Concrete Reinforcing Fibers: ASTM C1116, high strength industrial-grade fibers specifically engineered for secondary reinforcement of concrete.
- E. Water: ASTM C94/C94M; potable, without deleterious amounts of chloride ions.
- F. Air Entrainment: ASTM C260.

#### **35.4 CONCRETE MIX - BY PERFORMANCE CRITERIA**

- A. Mix and deliver concrete in accordance with ASTM C94/C94M.
- B. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94/C94M.
- C. Select proportions for normal weight concrete in accordance with ACI 301.
- D. Use accelerating admixtures in cold weather only when approved by the Architect/Engineer in writing. Use of admixtures will not relax cold weather placement requirements.
- E. Use calcium chloride only when approved by the Architect/Engineer in writing.
- F. Use set retarding admixtures during hot weather only when approved by the Architect/Engineer in writing.

#### **35.5 FABRICATION**

- A. Fabricate reinforcing in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.

#### **35.6 SOURCE QUALITY CONTROL AND TESTS**

- A. Section 01 40 00 - Quality Requirements: Testing and Inspection Services.
- B. Submit proposed mix design of each class of concrete to Engineer for review prior to commencement of Work.
- C. Tests on cement, aggregates, and mixes will be performed to ensure conformance with specified requirements.
- D. Test samples in accordance with ASTM C94/C94M and ACI 301.

## **PART 36 EXECUTION**

### **36.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted subbase is dry and ready to support paving and imposed loads.
  - 1. Proof roll subbase with minimum two perpendicular passes to identify soft spots.
  - 2. Remove soft subbase and replace with compacted fill as specified in Section 31 23 23.
- C. Verify gradients and elevations of base are correct.

### **36.2 PREPARATION**

- A. Moisten substrate to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manholes, catch basins and frames with oil to prevent bond with concrete paving.
- C. Notify Architect/Engineer minimum 24 hours prior to commencement of concreting operations.

### **36.3 FORMING**

- A. Place and secure forms and screeds to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

### **36.4 REINFORCING**

- A. Place reinforcing at top and bottom of paving.
- B. Interrupt reinforcing at contraction and expansion joints.

### **36.5 PLACING CONCRETE**

- A. Place concrete in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.
- B. Ensure reinforcing, inserts, embedded parts and formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.



### **36.6 JOINTS**

- A. Place expansion and contraction joints at 20-foot intervals. Align curb, gutter, and sidewalk joints.
- B. Place joint filler between paving components and building or other appurtenances. Recess top of filler ¼-inch for sealant installation.
- C. Provide scored joints at 5-foot intervals between sidewalks and curbs.
- D. Provide keyed joints as indicated.
- E. Saw cut contraction joints 3/16-inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

### **36.7 FINISHING**

- A. Finish concrete surfaces as directed in General Notes on Site Drawings.

### **36.8 CURING AND PROTECTION**

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Cure concrete floor surfaces as specified in Section 03 39 00.

### **36.9 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Surface Flatness: ¼-inch in 10-feet.
- C. Maximum Variation From True Position: ¼-inch.

### **36.10 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect reinforcing placement for size, spacing, location and support.
- C. Testing firm will take cylinders and perform slump and air entrainment tests in accordance with ACI 301.
- D. Strength Test Samples:
  - 1. Sampling Procedures: A STM C172.
  - 2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, standard cured.

3. Sample concrete and make one set of three cylinders for every 150 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area paving.
  4. Make one additional cylinder during cold weather concreting, and field cure.
- E. Field Testing:
1. Slump Test Method: ASTM C143/C143M.
  2. Air Content Test Method: ASTM C173/C173M.
  3. Temperature Test Method: ASTM C1064/C1064M.
  4. Measure slump and temperature for each compressive strength concrete sample.
  5. Measure air content in air entrained concrete for each compressive strength concrete sample.
- F. Cylinder Compressive Strength Testing:
1. Test Method: ASTM C39.
  2. Dispose remaining cylinders when testing is not required.
- G. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

### **36.11 PROTECTION**

- A. Immediately after placement, protect paving from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian or vehicular traffic over paving for [7] [\_\_\_\_\_] days minimum after finishing.

**END OF SECTION**

## SECTION 32 31 13

### CHAIN LINK FENCES AND GATES

#### PART 37 GENERAL

##### 37.1 SUMMARY

- A. Section Includes:
  - 1. Fence framework, fabric, and accessories.
  - 2. Excavation for post bases.
  - 3. Concrete foundation for posts.
  - 4. Manual gates and related hardware.
  - 5. Privacy slats.
  
- B. Related Sections:
  - 1. Section 33 79 00 - Site Grounding.

##### 37.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Fencing:
  - 1. Basis of Measurement: By linear foot to fence height specified, based on specified post spacing.
  - 2. Basis of Payment: Includes posts, rails, tension wire, fabric, accessories, and attachments.
  
- B. Post Footings:
  - 1. Basis of Measurement: Each unit footing, to depth specified.
  - 2. Basis of Payment: Includes excavation, concrete placed, finishing.
  
- C. Gates:
  - 1. Basis of Measurement: By square foot for each specified type.
  - 2. Basis of Payment: Includes frame posts, fabric, accessories, hardware.

##### 37.3 REFERENCES

- A. ASTM International:
  - 1. ASTM A121 - Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
  - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 4. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
  - 5. ASTM A491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
  - 6. ASTM A585 - Standard Specification for Aluminum-Coated Steel Barbed Wire.

7. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
8. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
9. ASTM B429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
10. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
11. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.
12. ASTM F668 - Standard Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain Link Fence Fabric.
13. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
14. ASTM F934 - Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.
15. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
16. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
17. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.

- B. Chain Link Fence Manufacturers Institute:  
1. CLFMI - Product Manual.

#### **37.4 SYSTEM DESCRIPTION**

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- A. Fence Height: as indicated on Drawings.
- B. Line Post Spacing: At intervals not exceeding 10 feet.
- C. Fence Post and Rail Strength: Conform to ASTM F1043 Light Industrial Fence quality.

#### **37.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
- C. Product Data: Submit data on fabric, posts, accessories, fittings and hardware.
- D. Manufacturer's Installation Instructions: Submit installation requirements.

#### **37.6 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.

- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.

\*\*\*\*\*

Edit material certifications list to suit products specified in this section and Project sustainable design requirements. Specific certificate submittal and supporting data requirements are specified in Section 01 81 13.

\*\*\*\*\*

- 1. Materials Resources Certificates:
  - a. Certify source and origin for [salvaged] [and] [reused] products.
  - b. Certify recycled material content for recycled content products.
  - c. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Salvaged products.
    - b. Reused products.
    - c. Products with recycled material content.
    - d. Local and regional products.

### 37.7 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.
- C. Operation and Maintenance Data: Procedures for submittals.

### 37.8 QUALITY ASSURANCE

- A. Supply material in accordance with CLFMI - Product Manual.
- B. Perform installation in accordance with ASTM F567.
- C. Sustainable Design Requirements:
  - 1. Recycled Content Materials: Furnish materials with recycled content, where possible.
  - 2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- D. Perform Work in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.

### 37.9 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum 3 years documented experience.

- B. Installer: Company specializing in performing work of this section with minimum 3 years documented experience.

### **37.10 DELIVERY, STORAGE AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.
- C. Identify each package with manufacturer's name.
- D. Store fence fabric and accessories in secure and dry place.

## **PART 38 PRODUCTS**

### **38.1 MATERIALS AND COMPONENTS**

- A. Materials and Components: Conform to CLFMI Product Manual.
- B. Fabric Size: CLFMI Standard Industrial and Tennis Court service.
- C. Intermediate Posts: Type I round, Type II round and TC rolled shape.
- D. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round, Type II round and TC rolled shape.

### **38.2 ACCESSORIES**

- A. Caps: Cast steel galvanized sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel.
- C. Extension Arms: Cast steel galvanized, to accommodate 6 strands of barbed wire, single arm, sloped to 45 degrees.
- D. Gate Hardware: Fork latch with gravity drop, center gate stop and drop rod, or mechanical keepers (per Architect); two 180-degree gate hinges for each leaf and hardware for padlock keyed to match hardware specified in Section 08 71 00.

### **38.3 GATES**

- A. General:
  - 1. Gate Types, Opening Widths and Directions of Operation: As indicated on Drawings.
  - 2. Factory will assemble gates.
  - 3. As applies, conform to requirements specified for PVC coated steel chain link fence except that PVC coated aluminum alloy framing conforming to ASTM B429 may be used.

4. Design gates for operation by one person.
- B. Swing Gates:
1. Fabricate gates to permit 180 degree swing.
  2. Gates Construction: ASTM F900 with welded corners. Use of corner fittings is not permitted.

#### **38.4 PRIVACY SLATS**

1. Privacy Slats: Vinyl strips, flat configuration, sized to fit fence fabric, color (as per Architect).

#### **38.5 FINISHES**

- A. Components and Fabric: Galvanized to ASTM A123/A123M for components; ASTM A153/A153M for hardware; ASTM A392 for fabric; 2.0 oz/sq ft coating.
- B. Hardware: Galvanized to ASTM A153/A153M, 2.0 oz/sq ft coating.
- C. Accessories: Same finish as framing.

### **PART 39 EXECUTION**

#### **39.1 INSTALLATION**

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567.
- B. Set intermediate, terminal and gate posts plumb, in concrete footings with top of footing 6 inches below finish grade. Slope top of concrete for water runoff.
- C. Line Post Footing Depth Below Finish Grade: ASTM F567.
- D. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.
- E. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- F. Install top rail through line post tops and splice with 6 inch long rail sleeves.
- G. Install center and bottom brace rail on corner gate leaves.
- H. Place fabric on outside of posts and rails.
- I. Do not stretch fabric until concrete foundation has cured 28 days.
- J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- K. Position bottom of fabric 2 inches above finished grade.
- L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

- 39.2** Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- A. Install bottom tension strap stretched taut between terminal posts.
  - B. Install support arms sloped outward and attach barbed wire; tension and secure.
  - C. Support gates from gate posts. Do not attach hinged side of gate from building wall.
  - D. Install gate with fabric and barbed wire overhang to match fence. Install three hinges on each gate leaf, latch, catches, drop bolt, foot bolts and sockets, torsion spring retainer and locking clamp.
  - E. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.
  - F. Connect to existing fence at new terminal post.
  - G. Install posts with 6 inches maximum clear opening from end posts to buildings, fences and other structures.
  - H. Reuse holes resulting from removal of existing post footings for installation of new posts.
  - I. Center and align posts. Place concrete around posts, and vibrate or tamp for consolidation. Verify vertical and top alignment of posts and make necessary corrections.
  - J. Extend concrete footings 1 inches above grade, and trowel, forming crown to shed water.
  - K. Allow footings to cure minimum 7 days before installing fabric and other materials attached to posts.

**39.3 PRIVACY SLATS**

- A. Install slat inserts in pattern woven through fence fabric as instructed by Architect.
- B. Fasten slats according to manufacturers instructions.

**39.4 ERECTION TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation From Plumb ¼-inch.
- C. Maximum Offset From Indicated Position: 1- inch.
- D. Minimum distance from property line: 6- inches.

**END OF SECTION**



**SECTION 32 31 19  
DECORATIVE METAL FENCES AND GATES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Decorative aluminum fences.
- B. Automatic gate operators.

**1.02 REFERENCE STANDARDS**

- A. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2024.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- C. ASTM F2200 - Standard Specification for Automated Vehicular Gate Construction; 2020.
- D. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets; 2016 (Reapproved 2023).
- E. CLFMI WLG 2445 - Wind Load Guide for the Selection of Line Post and Line Post Spacing; 2023.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section; require attendance by affected installers.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Design Calculations: For high wind load areas, provide calculations for fence panels and accessory selection as well as line post spacing and foundation details. See CLFMI WLG 2445 for line post and spacing guidance.
- D. Shop Drawings:
  - 1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Experienced with type of construction involved and materials and techniques specified and approved by fence manufacturer.

**1.06 DELIVERY, STORAGE AND HANDLING**

- A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Decorative Metal Fences and Gates:
  - 1. Alumi-Guard: [www.alumi-guard.com/#sle](http://www.alumi-guard.com/#sle).
  - 2. Ameristar Perimeter Security, USA: [www.ameristarperimeter.com/#sle](http://www.ameristarperimeter.com/#sle).
    - a. Aluminum Fencing: Basis of Design, Echelon II Gensis, or approved equal.
    - b. Cantilevered Gate: Basis of Design, TransPort Traverse II, or approved equal.
  - 3. Ultra Aluminum Manufacturing Inc: [www.ultrafence.com/#sle](http://www.ultrafence.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 FENCES**

- A. Fences: Complete factory-fabricated system of posts and panels, accessories, fittings, and fasteners; finished with electrodeposition coating, and having the following performance characteristics:
- B. Electro-Deposition Coating: Multistage pretreatment/wash with zinc phosphate, followed by epoxy primer and acrylic topcoat.
  - 1. Total Coating Thickness: 2 mils (0.058 mm), minimum.
  - 2. Color: As selected by Architect from manufacturer's standard range.
- C. Aluminum: ASTM B221.
  - 1. Tubular Pickets, Rails and Posts: 6005-T5 alloy.
  - 2. Extrusions for Posts and Rails (Outer Channel): 6005-T5 alloy.
  - 3. Extrusions for Pickets and Rail (Inner Slide Channels): 6063-T5 alloy.
- D. Fasteners: ASTM A276/A276M, Type 302 stainless steel; finished to match fence components.

**2.03 ALUMINUM FENCE**

- A. Decorative Aluminum Fence System: Provide fence meeting the Test Load and Coating Performance requirements of ASTM F2408 for Industrial class.
  - 1. Fence Panels: 8 feet (2.4 m) high by 6 feet (1.8 m) long.
    - a. Panel Style: Three rail.
    - b. Attach panels to posts with manufacturer's standard panel brackets and recommended fasteners.
    - c. Posts: Aluminum extrusions; 3 inches (76 mm) square.
    - d. Rails: Extruded aluminum channels.
      - 1) Double-walled aluminum U-channel; outside cross-section dimensions of 1-3/4 inch (44.5 mm) square; interior guide channel forms lower limit of raceway for retaining rod.
      - 2) Enclosed Retaining Rod: 1/8 inch (3.17 mm) diameter galvanized steel with variable pitch connection system for high angle racking and elimination of external fasteners.
      - 3) Picket-to-Rail Intersection Seals: PVC grommets.
      - 4) Picket Spacing, Standard: 4.715 inch (120 mm) on center.
    - e. Pickets: Extruded aluminum tubes.
      - 1) Style: Square top pickets extend above top rail.
    - f. Fasteners: Manufacturer's standard stainless steel bolts, screws, and washers; factory finish fasteners to match fence.

**2.04 AUTOMATIC GATE OPERATORS**

- A. Sliding Gates: Prewired, pedestal-mounted gate operator for horizontal sliding gates, per ASTM F2200 and UL 325.
  - 1. Operating type: Drive belt.
  - 2. Control Functions: Open, Pause, Close.
  - 3. Maximum Open/Close Time: 10 seconds.
  - 4. Access: Card.
  - 5. Maximum gate weight: 1,000 pounds (373 kilograms).
  - 6. Horsepower Rating: Suitable for connected load.

7. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
8. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
  - a. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
    - 1) Outdoor Locations: Type 3.
  - b. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.

## **2.05 ACCESSORIES**

- A. Keypad Mounting Supports: Where not factory installed, provide mounting supports for keypad installation.
  1. Products:
    - a. Basis of Design: StrongPoles, LLC; Architectural Keypad Pedestal: [www.strongpoles.com](http://www.strongpoles.com) or approved equal.
  2. Substitutions: See Section 01 60 00 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 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.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Set fence posts in accordance with the manufacturer recommended spacing.
- C. Space gate posts according to the manufacturers' drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.
  1. Base type and quantity of gate hinges on the application, weight, height, and number of gate cycles.
  2. Provide gate hardware by the manufacturer of the gate and install in compliance with manufacturer's recommendations.
- D. Install operator in accordance with manufacturer's instructions and in accordance with NFPA 70.

### **3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6.3 mm).
- B. Maximum Offset From Indicated Position: 1 inch (25.4 mm).
- C. Minimum Distance from Property Line: 6 inches (152 mm).

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Layout: Verify that fence installation markings are accurate to design, paying attention to gate locations, underground utilities, and property lines.

### **3.05 PROTECTION**

- A. Protect installed products until completion of project.

**END OF SECTION**



**SECTION 32 91 13**  
**SOIL PREPARATION**

**PART 40 GENERAL**

**40.1 SUMMARY**

- A. Section Includes:
  - 1. Preparation of subsoil.
  - 2. Soil tesing.
  - 3. Placing topsoil.
  
- B. Related Sections:
  - 1. Section 31 22 13 - Rough Grading: Rough grading of site.
  - 2. Section 31 23 17 - Trenching: Rough grading over cut.
  - 3. Section 32 05 13 - Soils for Exterior Improvements: Topsoil material.
  - 4. Section 32 84 00 - Planting Irrigation.
  - 5. Section 32 91 19 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this section.
  - 6. Section 32 92 19 - Seeding
  - 7. Section 32 92 23 - Sodding.
  - 8. Section 32 93 00 - Plants.

**40.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Grassed Areas:
  - 1. Basis of Measurement: By square foot.
  - 2. Basis of Payment: Includes preparation of topsoil or placement of topsoil.

**40.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
  
- B. Submit minimum 10oz sample of topsoil proposed. Forward sample to approved testing laboratory in sealed containers to prevent contamination.
  
- C. Test Reports: Indicate topsoil nutrient and pH levels with recommended soil supplements and application rates.
  
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

#### **40.4 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Local and regional products.

#### **40.5 QUALITY ASSURANCE**

- A. Sustainable Design Requirements:
  - 1. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- B. Perform Work in accordance with Local government and NCDOT Manual of Specifications, Latest Edition.
- C. Maintain one copy of each document on site.

#### **40.6 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate with installation of underground sprinkler system piping and watering heads.

### **PART 41 PRODUCTS**

#### **41.1 SOIL MATERIALS**

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; pH value of minimum 6.0 and maximum 7.0.

#### **41.2 ACCESSORIES**

- A. Edging: Galvanized steel.

### **41.3 SOURCE QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.
- B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- C. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.
- D. Testing is not required when recent tests and certificates are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

## **PART 42 EXECUTION**

### **42.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify prepared soil base is ready to receive the Work of this section.

### **42.2 PREPARATION OF SUBSOIL**

- A. Prepare sub-soil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated sub-soil.
- C. Scarify subsoil to depth of 4 inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.

### **42.3 PLACING TOPSOIL**

- A. Spread topsoil to minimum depth of 6 inches over area to be seeded. Rake until smooth.
- B. Place topsoil during dry weather and on dry unfrozen subgrade.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.
- E. Install edging at periphery of seeded areas in straight lines to consistent depth.

**END OF SECTION**





## **SECTION 32 91 19**

### **LANDSCAPE GRADING**

#### **PART 43 GENERAL**

##### **43.1 SUMMARY**

- A. Section Includes:
  - 1. Final grade topsoil for finish landscaping.
- B. Related Sections:
  - 1. Section 31 22 13 - Rough Grading: Site contouring.
  - 2. Section 31 23 17 - Trenching: Backfilling trenches.
  - 3. Section 31 23 23 - Fill: Backfilling at building areas.
  - 4. Section 32 05 13 - Soils for Exterior Improvements.
  - 5. Section [32 92 19 - Seeding and Soil Supplements] [02925 - Sodding]: Finish ground cover.
  - 6. Section 32 93 00 - Plants: Topsoil fill for trees, plants and ground cover.

##### **43.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Topsoil:
  - 1. Basis of Measurement: By cubic yard.
  - 2. Basis of Payment: Includes excavating existing topsoil, supplying topsoil materials, stockpiling, preparing and scarifying substrate surface, placing where required, and rolling.

##### **43.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures
- B. Samples: Submit, in air-tight containers, 10 lb sample of each type of fill to testing laboratory.
- C. Materials Source: Submit name of imported materials source.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

##### **43.4 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify source for local and regional materials and distance from Project site.

- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Local and regional products.

#### **43.5 QUALITY ASSURANCE**

- A. Furnish each topsoil material from single source throughout the Work.
- B. Sustainable Design Requirements:
  - 1. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- C. Perform Work in accordance with Local government and NCDOT Manual of Specifications, Latest Edition.
- D. Maintain one copy on site.

### **PART 44 PRODUCTS**

#### **44.1 MATERIAL**

- A. Topsoil: Fill as specified in Section 31 23 33.

### **PART 45 EXECUTION**

#### **45.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify building and trench backfilling have been inspected.
- C. Verify substrate base has been contoured and compacted.

#### **45.2 PREPARATION**

- A. Protect landscaping and other features remaining as final Work.
- B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

#### **45.3 SUBSTRATE PREPARATION**

- A. Eliminate uneven areas and low spots.

- B. Remove debris, roots, branches, stones, in excess of 1 inch in size. Remove contaminated subsoil.
- C. Scarify surface to depth of 4 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

#### **45.4 PLACING TOPSOIL**

- A. Place topsoil in areas where seeding, sodding, and planting is required to thickness as scheduled. to nominal depth of 6 inches. Place topsoil during dry weather.
- B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
- C. Remove roots, weeds, rocks, and foreign material while spreading.
- D. Manually spread topsoil close to plant material, and building to prevent damage.
- E. Lightly compact placed topsoil.
- F. Remove surplus subsoil and topsoil from site.
- G. Leave stockpile area and site clean and raked, ready to receive landscaping.

#### **45.5 TOLERANCES**

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Top of Topsoil: Plus or minus 1/2 inch.

#### **45.6 PROTECTION OF INSTALLED WORK**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Prohibit construction traffic over topsoil.

#### **45.7 SCHEDULES**

- A. Compacted topsoil thicknesses:
  - 1. Seeded Grass: 6 inches.
  - 2. Sod: 4 inches.
  - 3. Shrub Beds: 18 inches.
  - 4. Flower Beds: 12 inches.
  - 5. Planter Boxes: To within 3 inches of box rim.

**END OF SECTION**



## **SECTION 32 92 19**

### **SEEDING**

#### **PART 46 GENERAL**

##### **46.1 SUMMARY**

- A. Section Includes:
  - 1. Fertilizing.
  - 2. Seeding.
  - 3. Hydroseeding.
  - 4. Mulching.
  - 5. Maintenance.
  
- B. Related Sections:
  - 1. Section 31 22 13 - Rough Grading: Rough grading of site.
  - 2. Section 31 23 17 - Trenching: Rough grading over cut.
  - 3. Section 32 05 13 - Soils for Exterior Improvements: Topsoil material.
  - 4. Section 32 84 00 - Planting Irrigation.
  - 5. Section 32 91 13 - Soil Preparation
  - 6. Section 32 91 19 - Landscape Grading: P reparation of subsoil and placement of topsoil in preparation for the Work of this section.
  - 7. Section 32 92 23 - Sodding.
  - 8. Section 32 93 00 - Plants.

##### **46.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Grassed Areas:
  - 1. Basis of Measurement: By square foot.
  - 2. Basis of Payment: Includes seeding, watering and maintenance for a period of one year.

##### **46.3 REFERENCES**

- A. ASTM International:
  - 1. ASTM C602 - Standard Specification for Agricultural Liming Materials.

##### **46.4 DEFINITIONS**

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

#### **46.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit data for seed mix, fertilizer, mulch, and other accessories.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

#### **46.6 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Local and regional products.

#### **46.7 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

#### **46.8 QUALITY ASSURANCE**

- A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.
- B. Sustainable Design Requirements:
  - 1. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.

- C. Perform Work in accordance with Local government and NCDOT Manual of Specifications, Latest Edition
- D. Maintain one copy of each document on site.

**46.9 QUALIFICATIONS**

- A. Seed Supplier: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

**46.10 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

**46.11 MAINTENANCE SERVICE**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance service.
- B. Maintain seeded areas for 12 months from Date of Final Completion.

**PART 47 PRODUCTS**

**47.1 SEED MIXTURE**

- A. Furnish materials in accordance with Local government and NCDOT Manual of Specifications, Latest Edition.
- B. Seed Mixture:

Merion Blue Grass	10 percent
Kentucky Blue Grass	10 percent
Creeping Red Fescue Grass	20 percent
Streambark Wheat	30 percent
Red Top	10 percent
Norlea Perennial Rye	20 percent

Clover	0 percent
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**47.2 ACCESSORIES**

A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

\*\*\*\*\* [OR] \*\*\*\*\*

B. Mulching Material: Hemlock species wood cellulose fiber, free of growth or germination inhibiting ingredients.

C. Fertilizer: Commercial grade; recommended for grass; of proportion necessary to eliminate deficiencies of topsoil ,as indicated in analysis to the following proportions:  
Nitrogen: 8 percent, phosphoric acid 8 percent, soluble potash 8 percent.

D. Lime: ASTM C602, Class T agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.

E. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.

F. Erosion Fabric: Jute matting, open weave.

G. Herbicide: As needed.

H. Stakes: Softwood lumber, chisel pointed.

I. String: Inorganic fiber.

**47.3 SOURCE QUALITY CONTROL**

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

C. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.

D. Testing is not required when recent tests and certificates are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.



## **PART 48 EXECUTION**

### **48.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify prepared soil base is ready to receive the Work of this section.

### **48.2 FERTILIZING**

- A. Apply lime at application rate recommended by soil analysis. Work lime into top 6 inches of soil.
- B. Apply fertilizer at application rate recommended by soil analysis.
- C. Apply after smooth raking of topsoil and prior to roller compaction.
- D. Do not apply fertilizer at same time or with same machine used to apply seed.
- E. Mix fertilizer thoroughly into upper 2 inches of topsoil.
- F. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

### **48.3 SEEDING**

- A. Apply seed at rate of 10 lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Planting Season: Per grass seed.
- D. Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.
- E. Roll seeded area with roller not exceeding 112 lbs/linear foot.
- F. Immediately following seeding and compacting, apply mulch to thickness of 1/8 inches. Maintain clear of shrubs and trees.
- G. Apply water with fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

### **48.4 HYDROSEEDING**

- A. Apply fertilizer, mulch and seeded slurry with hydraulic seeder at rate of 10 lbs per 1000 sq ft evenly in one pass.
- B. After application, apply water with fine spray immediately after each area has been hydroseeded. Saturate to 4 inches of soil and maintain moisture levels two to four inches.

#### **48.5 SEED PROTECTION**

- A. Identify seeded areas with stakes and string around area periphery. Set string height to 24 inches. Space stakes at 20 feet.
- B. Cover seeded slopes where grade is 2:1 or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.
- C. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.
- D. Secure outside edges and overlaps at 36 inch intervals with stakes.
- E. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.
- F. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

#### **48.6 MAINTENANCE**

- A. Mow grass at regular intervals to maintain at maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at each mowing. Perform first mowing when seedlings are 40 percent higher than desired height.
- B. Neatly trim edges and hand clip where necessary.
- C. Immediately remove clippings after mowing and trimming. Do not let clippings lay in clumps.
- D. Water to prevent grass and soil from drying out.
- E. Roll surface to remove minor depressions or irregularities.
- F. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.
- G. Immediately reseed areas showing bare spots.
- H. Repair washouts or gullies.
- I. Protect seeded areas with warning signs during maintenance period.

#### **48.7 SCHEDULE**

- A. Front Seeded Area: Grass seed mixture specified, 4 inches top soil.
- B. Rear Seeded Area: Grass seed mixture specified except substitute Clover for Kentucky Blue Grass, 4 inches top soil.

**END OF SECTION**



## SECTION 32 93 00

### PLANTS

#### GENERAL

#### SUMMARY

Section Includes:

- Preparation of subsoil and topsoil.
- Topsoil bedding.
- Trees, plants, and ground cover.
- Mulch.
- Fertilizer.
- Pruning.
- Maintenance.

Related Sections:

- Section 31 23 17 - Trenching: Rough grading over trench cut.
  
- Section 31 23 23 - Fill: Rough grading of site.
- Section 32 05 13 - Soils for Exterior Improvements: Topsoil material.
- Section 32 84 00 - Planting Irrigation.
- Section 32 91 19 - Landscape Grading: Preparation of subsoil and placement of topsoil in preparation for the Work of this section.
- Section 32 92 19 - Seeding and Soil Supplements.
- Section 32 92 23 - Sodding.

Allowances: Include under provisions of Section 01 20 00 - Price and Payment Procedures.

Allowance includes [furnishing of trees, plants and ground cover. Installation is included in this section and is part of Contract Sum/Price] [furnishing and installing of trees, plants and ground cover].

#### UNIT PRICE - MEASUREMENT AND PAYMENT

Plants:

Basis of Measurement: By each.

Basis of Payment: Includes [preparation of [subsoil] [topsoil],] [placing topsoil,] planting, watering and maintenance to specified time period.

#### REFERENCES

American National Standards Institute:

ANSI A300 - Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices.

ANSI Z60.1 - Nursery Stock.

Forest Stewardship Council:  
FSC Guidelines - Forest Stewardship Council Guidelines.

## **DEFINITIONS**

Weeds: Vegetative species other than specified species to be established in given area.

Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

## **SUBMITTALS**

Section 01 33 00 - Submittal Procedures: Requirements for submittals.

Product Data: Submit list of plant material sources, data for fertilizer and other accessories.

Submit minimum 10 oz sample of topsoil proposed. Forward sample to testing laboratory in sealed containers to prevent contamination.

## **SUSTAINABLE DESIGN SUBMITTALS**

Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.

Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.

Materials Resources Certificates:

Certify source and origin for salvaged and reused products.

Certify source for local and regional materials and distance from Project site.

Certify lumber is harvested from Forest Stewardship Council Certified well managed forest.

Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.

Provide cost data for the following products:

Salvaged products.

Reused products.

Local and regional products.

Certified wood products.

## **CLOSEOUT SUBMITTALS**

Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

Operation and Maintenance Data: Include pruning objectives, types and methods; types, application frequency, and recommended coverage of fertilizer.

## **QUALITY ASSURANCE**

Tree Pruning: ANSI A300 Pruning Standards for Woody Plants.

Sustainable Design Requirements:

Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.

Certified Wood Materials: Furnish wood materials certified in accordance with FSC Guidelines.

Perform Work in accordance with City of Rocky Mount and NCDOT Manual of Specifications, Latest Edition.

Maintain one copy of each document on site.

## **QUALIFICATIONS**

Nursery: Company specializing in growing and cultivating plants with three years documented experience.

Installer: Company specializing in installing and planting plants with three years documented experience.

Tree Pruner: Company specializing in performing work of this section with minimum three years documented experience.

Maintenance Services: Performed by installer.

## **PRE-INSTALLATION MEETINGS**

Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

Convene minimum one week prior to commencing work of this section.

## **DELIVERY, STORAGE, AND HANDLING**

Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

Protect and maintain plant life until planted.

Deliver plant life materials immediately prior to placement. Keep plants moist.

Plant material damaged as a result of delivery, storage or handling will be rejected.

## **ENVIRONMENTAL REQUIREMENTS**

Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.

Do not install plant life when wind velocity exceeds 30 mph.

## **COORDINATION**

Section 01 30 00 - Administrative Requirements: Requirements for coordination.

Install plant life after and coordinate with installation of underground irrigation system piping and watering heads specified in Section 32 84 00.

## **WARRANTY**

Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

Furnish one year manufacturer warranty for trees, plants, and ground cover.

## **MAINTENANCE SERVICE**

Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance service.

Maintain plant life for twelve months after Date of Substantial Completion.

Maintenance includes:

- Cultivation and weeding plant beds and tree pits.

- Applying herbicides for weed control. Remedy damage resulting from use of herbicides.

- Remedy damage from use of insecticides.

- Irrigating sufficient to saturate root system.

- Pruning, including removal of dead or broken branches.

- Disease control.

- Maintaining wrapping, guys, [turnbuckles,] and stakes. [Adjust turnbuckles to keep guy wires tight.] Repair or replace accessories when required.

- Replacement of mulch.

## **PRODUCTS**

### **TREES, PLANTS, AND GROUND COVER**

Planting Stock:

Species: In accordance with Standardized Plant Names, official code of American Joint Committee on Horticulture Nomenclature.



Identification: Label individual plants or each bundle of plants when tied in bundles.

Plants: No. 1 Grade conforming to “American Standard for Nursery Stock” of American Association of Nurserymen (AAN); well-branched, vigorous and balanced root and top growth; free from disease, injurious insects, mechanical wounds, broken branches, decay and other defects.

Trees: Furnish with reasonably straight trunks, well balanced tops, and single leader.

Deciduous plants: Furnish in dormant state, except those specified as container grown.

Trees, Plants and Ground Cover: Species and size identifiable in plant schedule, grown in climatic conditions similar to those in locality of the Work.

## **SOIL MATERIALS**

Topsoil: As specified in Section 32 05 13

## **SOIL AMENDMENT MATERIALS**

When soil tests indicate soil amendment, apply soil conditioners or fertilizers to amend soil to specified conditions.

Tree Fertilizer: Containing fifty percent of elements derived from organic sources; of proportion necessary to eliminate deficiencies of topsoil as indicated in analysis.

Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight, pH range of 4 to 5 ; moisture content of 30 percent.

Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.

Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

Water: Clean, fresh, and free of substances or matter capable of inhibiting vigorous growth of plants.

Herbicide: As Needed.

Pesticide: As Needed.

## **MULCH MATERIALS**

Mulching Material: Composted, shredded hardwood bark, dark brown in color.

## **ACCESSORIES**

Wrapping Materials: Burlap.

Stakes: Softwood lumber, pointed end.

Cable, Wire, Eye Bolts: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches.

Decorative Cover: Smooth gravel] 1 inch minimum and 3 inch maximum size.

Membrane: 20 mil thick, black polyethylene.

Wrapping: Waterproof fabric

Tree Protectors: Plastic with galvanized rings.

## **PLANT SOIL MIX**

Plant Soil Mix: Uniform mixture of 1 part peat and 3 parts topsoil by volume.

## **SOURCE QUALITY CONTROL**

Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

Test and analyze [imported] [existing] topsoil.

Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt and organic matter;  
and pH value.

Provide recommendation for fertilizer and soil amendment application rates for specified planting  
as result of testing.

Testing is not required when recent tests are available for imported topsoil. Submit these test  
results to testing laboratory. Indicate, by test results, information necessary to determine  
suitability.

## **EXECUTION**

### **EXAMINATION**

Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting  
work.

Verify prepared subsoil and planters are ready to receive work.

Saturate soil with water to test drainage.

Verify required underground utilities are available, in proper location, and ready for use.

### **PREPARATION OF SUBSOIL**

Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade  
gradual. Blend slopes into level areas.

Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

Scarify subsoil to depth of 4 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

Dig pits and beds three times wider than plant root system.

### **PLACING TOPSOIL**

Spread topsoil to minimum depth of 6 inches over area to be planted. Rake smooth.

Place topsoil during dry weather and on dry unfrozen subgrade.

Remove vegetable matter and foreign non-organic material from topsoil while spreading.

Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

Install topsoil into pits and beds intended for plant root balls, to minimum thickness of 6.

### **FERTILIZING**

Apply starter fertilizer.

Apply after initial raking of topsoil.

Mix thoroughly into upper 2 inches of topsoil.

Lightly water soil to aid dissipation of fertilizer.

### **PLANTING**

Place plants for best appearance for review and final orientation by Architect/Engineer.

Set plants vertical.

Remove non-biodegradable root containers.

Set plants in pits or beds, partly filled with prepared plant mix, at minimum depth of 6 inches under each plant. Remove burlap, ropes, and wires, from top half of root ball.

Place bare root plant materials so roots lie in natural position. Backfill soil mixture in 6 inch layers. Maintain plant life in vertical position.

Saturate soil with water when pit or bed is half full of topsoil and again when full.

### **PLANT RELOCATION AND RE-PLANTING**

Relocate plants as directed by Architect/Engineer.

Ball or pot removed plants when temporary relocation is required.

Replant plants in pits or beds, partly filled with prepared topsoil mixture, at minimum depth of 6 inches under each plant. Remove burlap, ropes, and wires, from top half of root ball.

Place bare root plant materials so roots lie in natural position. Backfill soil mixture in 6 inch layers. Maintain plant materials in vertical position.

Saturate soil with water when pit or bed is half full of topsoil and again when full.

### **INSTALLATION OF ACCESSORIES**

Place stone here indicated on Drawings

Wrap deciduous shade and flowering tree trunks and place tree protectors.

### **PLANT SUPPORT**

Brace plants vertically with plant protector wrapped guy wires and stakes to the following:

Tree Caliper	Tree Support Method
1 inch	1 stake with one tie
1 - 2 inches	2 stakes with two ties
2 - 4 inches	3 guy wires
Over 4 inches	4 guy wires

### **TREE PRUNING**

When pruning trees is required, lightly prune trees in accordance with ANSI A300 Maintenance Pruning Type: Crown Cleaning.

### **FIELD QUALITY CONTROL**

Section 01 40 00 - Quality Requirement 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

Plants will be rejected when ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

### **SCHEDULE**

Plant Schedule:

See Civil Drawings for Plant Schedule.

**END OF SECTION**

## SECTION 33 05 17

### PRECAST CONCRETE VALVE VAULTS AND METER BOXES

#### PART 49 GENERAL

##### 49.1 SUMMARY

- A. Section Includes:
  - 1. Precast concrete valve vaults.
  - 2. Precast concrete meter boxes.
- B. Related Sections:
  - 1. Section 31 05 16 - Aggregates for Earthwork.
  - 2. Section 33 11 16 - Site Water Utility Distribution Piping.

##### 49.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Precast Concrete Valve Vaults:
  - 1. Basis of Measurement: Each.
  - 2. Basis of Payment: Includes excavation, valve vault, accessories, tests, and backfill.
- B. Precast Concrete Meter Boxes:
  - 1. Basis of Measurement: Each.
  - 2. Basis of Payment: Includes excavation, meter box, accessories, test and backfill.

##### 49.3 REFERENCES

- A. ASTM International:
  - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
  - 2. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
  - 3. ASTM A536 - Standard Specification for Ductile Iron Castings.
  - 4. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - 5. ASTM C33 - Standard Specification for Concrete Aggregates.
  - 6. ASTM C150 - Standard Specification for Portland Cement.
  - 7. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
  - 8. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 9. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
  - 10. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
  - 11. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
  - 12. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.

13. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joints Sealants.
14. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
15. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
16. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
17. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
18. ASTM D4104 - Standard Test Method (Analytical Procedure) for Determining Transmissivity of Nonleaky Confined Aquifers by Overdamped Well Response to Instantaneous Change in Head (Slug Test)

#### **49.4 DESIGN REQUIREMENTS**

- A. Design Criteria:
  1. Watertight precast reinforced air-entrained concrete structures designed to ASTM C890 live loading and installation conditions, and manufactured to conform to ASTM C913.
  2. Minimum 28-day Compressive Strength: 5,000 psi.
  3. Honeycombed or retempered concrete is not permitted.

#### **49.5 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawing: Indicate plan, location and inverts of connecting piping.
- C. Product Data: Submit data on valve vaults and meter boxes.
- D. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from materials suppliers attesting that precast concrete valve vaults and meter boxes provided meet or exceed ASTM Standards and specification requirements.
- E. Manufacturer's Installation Instructions: Submit special procedures for precast concrete valve vaults and meter boxes installation.

#### **49.6 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  1. Materials Resources Certificates:
    - a. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.

1. Provide cost data for the following products:
  - a. Local and regional products

#### **49.7 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Accurately record actual locations and inverts of buried pipe, components and connections.

#### **49.8 QUALITY ASSURANCE**

- A. Sustainable Design Requirements:
  1. Recycled Content Materials: Furnish materials with recycled content.
    - a. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
  - B. Perform Work in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications and Roadway English Standard Drawings*, latest editions.

#### **49.9 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation Meeting.
- B. Convene minimum one week prior to commencing work of this section.

#### **49.10 DELIVERY, STORAGE AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Transport and handle precast concrete units with equipment designed to protect units from damage.
- C. Do not place concrete units in position to cause overstress, warp or twist.

#### **49.11 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

#### **49.12 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with Local government's utilities within construction area.

## **PART 50 PRODUCTS**

### **50.1 PRECAST CONCRETE VALVES AND METER BOXES**

- A. Furnish materials in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications* and *Roadway English Standard Drawings*, latest editions.
- B. Materials:
  - 1. Portland Cement: ASTM C150, Type II.
  - 2. Coarse Aggregates: ASTM C33; Graded 1 inch to No. 4 Sieve.
  - 3. Sand: ASTM C33; 2.35 fineness modulus.
  - 4. Water: Potable; clean and free of injurious amounts of acids, alkalis, salts, organic materials, and substances incompatible with concrete or steel.
  - 5. Air-Entraining Admixtures: ASTM C260.
  - 6. Reinforcing Steel:
    - a. Deformed Bars: ASTM A615/A615M, Grade 40.
    - b. Welded Wire Fabric: ASTM A185.
  - 7. Joint Sealant:
    - a. ASTM C990.
- C. Mixes:
  - 1. Design concrete mix to produce required concrete strength, air-entrainment, watertight properties, and loading requirements.
- D. Valve Vault and Meter Box Frames and Covers:
  - 1. Cast Iron Castings: ASTM A48/A48M, Class 30 or better; free of bubbles, sand and air holes, and other imperfections.
  - 2. Ductile Iron Castings: ASTM A536.
  - 3. Contact surfaces machined and matched.
  - 4. Cast cover inscription with pipeline service [and Owner's name].
- E. Access Steps:
  - 1. Steel reinforced copolymer polypropylene meeting the following specifications:
    - a. ASTM C478, Section 13.
    - b. ASTM C497, Method of test.
    - c. ASTM D4104, PP0344B33534Z02 copolymer polypropylene.
    - d. ASTM A615/A615M, Grade 60, 1/2" reinforced rod.
  - 2. Aluminum: ASTM B221, Alloy 6061-T6.

### **50.2 BEDDING MATERIALS**

- A. Aggregate Bedding Material: As specified in Section 31 05 16.

### **50.3 FABRICATION AND MANUFACTURE**

- A. Fabricate precast reinforced concrete structures in accordance with ASTM C913, to dimensions indicated on Drawings, and to specified design criteria.



## **PART 51 EXECUTION**

### **51.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping connection, size, location and inverts are as indicated on Drawings.

### **51.2 PREPARATION**

- A. Ream pipe ends and remove burrs.
- B. Remove scale and dirt from components before assembly.
- C. Establish invert elevations for each component in system.
- D. Hand trim excavation to suit valve vaults and meter boxes. Remove stones, roots or other obstructions.

### **51.3 TANK AND TANK BEDDING**

- A. Install Work in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications and Roadway English Standard Drawings*, latest editions.

### **51.4 CONNECTING PIPING**

- A. Connect piping.

### **51.5 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Request inspection by Engineer prior to placing aggregate cover over piping.
- C. Compaction Testing: In accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications and Roadway English Standard Drawings*, latest editions.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

### **51.6 PROTECTION OF FINISHED WORK**

- A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.

**END OF SECTION**



**SECTION 33 11 16:**  
**SITE WATER UTILITY DISTRIBUTION PIPING**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. ASME/ANSI B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes
- B. ASTM A 139 - Standard Specification for Electric Fusion (ARC) Welded Steel Pipe (NPS 4 & over)
- C. ASTM B 62 - Composition Bronze or Ounce Metal Castings
- D. ASTM C 94 - Ready-Mixed Concrete
- E. ASTM D 1785 - PolyVinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120
- F. ASTM D 2241 - PolyVinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)
- G. ASTM D 2466 - PolyVinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40
- H. ASTM D 2564 - Solvent Cements for PolyVinyl Chloride (PVC) Plastic Piping Systems
- I. ASTM D 2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping
- J. ASTM D 2855 - Practice for Making Solvent Cemented Joints with PVC Pipe & Fittings
- K. ASTM D 3139 - Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
- L. ASTM D 3261 – Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- M. ASTM F 714 – Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- N. ASTM F 402 - Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings
- O. ASTM F 477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- P. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
- Q. AWWA C110/A21.10 - Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in. (75 mm Through 1200 mm), for Water and Other Liquids
- R. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- S. AWWA C153/A21.53 - Ductile-Iron Compact Fittings, 3 in. through 24 in. (76 mm through 610 mm) and 54 in. Through 64 in. (1,000 mm Through 1,600 mm), for Water Service
- T. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service
- U. AWWA C502 - Dry-Barrel Fire Hydrants

- V. AWWA C503 - Wet-Barrel Fire Hydrants
- W. AWWA C509 - Resilient-Seated Gate Valves for Water and Sewerage Systems
- X. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
- Y. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
- Z. AWWA C651 - Disinfecting Water Mains
  
- AA. AWWA C800 - Underground Service Line Valves and Fittings
- BB. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. Through 12 in., for Water Distribution
- CC. AWWA C901 - Standard for Polyethylene Pressure Pipe and Tubing, ½ in. Through 3 in., for Water Service
- DD. AWWA M23 - PVC Pipe - Design and Installation
- EE. MIL-HDBK 1008C – Fire Protection for Facilities Engineering, Design, and Construction
- FF. UBPPA UNI-B-8 - Direct Tapping of Polyvinyl Chloride (PVC) Pressure Water Pipe
- GG. UL 246 - Hydrants for Fire-Protection Service
- HH. UL 262 - Gate Valves for Fire-Protection Service

#### **1.02 WATER DISTRIBUTION MAINS**

- A. Provide water distribution mains indicated of AWWA C900 polyvinyl chloride (PVC) plastic pipe with detector wire. Provide water main accessories, gate valves as specified and where indicated.

#### **1.03 WATER SERVICE LINES**

- A. Provide water service lines indicated from water distribution main to building service at a point approximately 5 feet from building or as otherwise indicated on drawings. Water service lines shall conform to Section 2.02A. Ductile iron pipe appurtenances and valves as specified for water mains may also be used for service lines. Provide PVC water service line appurtenances as specified and where indicated.

#### **1.04 SUBMITTALS FOR REVIEW**

- A. Submit the following in accordance with Section 01 33 00, "Submittals."
  - 1. Water distribution main piping, fittings, joints, valves, and coupling
  - 2. Water service line piping, fittings, joints, valves, and coupling
  - 3. Hydrants
  - 4. Indicator posts
  - 5. Corporation stops
  - 6. Valve boxes
  - 7. Submit manufacturer's standard drawings or catalog cuts, except submit both drawings and cuts for push- on joints. Include information concerning gaskets with submittal for joints and couplings.
  - 8. Installation procedures for water piping
    - a. For fusible PVC used in HDD applications include:
      - (1) Manufacturer's recommended minimum bending radius.
      - (2) Manufacturer's recommended maximum safe pull force
      - (3) Fusion technician qualification indicating conformance with this specification.
  - 9. Pressure and leakage tests
  - 10. Disinfection/bacteriological tests

#### **1.05 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit the following in accordance with Section 01 33 00, "Submittals."
  - 1. Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.
  - 2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
  - 3. For fusible PVC used in HDD applications include the approved data logger service reports.

#### **1.06 CERTIFICATES**

- A. Water distribution main piping, fittings, joints, valves, and coupling
- B. Water service line piping, fittings, joints, valves, and coupling
- C. Fire hydrants
- D. Certificates shall attest that tests set forth in each applicable referenced publication have been performed, whether specified in that publication to be mandatory or otherwise and

that production control tests have been performed at the intervals or frequency specified in the publication. Other tests shall have been performed within 3 years of the date of submittal of certificates on the same type, class, grade, and size of material as is being provided for the project.

#### **1.07 DELIVERY AND STORAGE**

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00. Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, jointing materials and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes, fittings, valves and hydrants free of dirt and debris.

#### **1.08 HANDLING**

A. Handle pipes, fittings, valves, hydrants, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry, do not drag pipe to the trench. Store plastic piping, jointing materials and rubber gaskets that are not to be installed immediately, under cover out of direct sunlight.

### **PART 2 PRODUCTS**

#### **2.01 WATER DISTRIBUTION MAIN MATERIALS**

##### **A. Piping Materials**

##### **1. Polyvinyl Chloride (PVC) Plastic Piping**

- a. Pipe and Fittings: Pipe, AWWA C900, shall be plain end or gasket bell end, Pressure Class 150 (DR 18) with cast-iron-pipe-equivalent OD. Fittings shall be gray iron or ductile iron, AWWA C110/A21.10 or AWWA C153/A21.53, and have cement-mortar lining, AWWA C104/A21.4, standard thickness. Fittings with push-on joint ends shall conform to the same requirements as fittings with mechanical- joint ends, except that bell design shall be modified, as approved, for push-on joint suitable for use

with PVC plastic pipe specified in this paragraph. Pipe color is to be blue or white.

- b. Joints and Jointing Material: Joints for pipe shall be push-on joints, ASTM D 3139. Joints between pipe and metal fittings, valves, and other accessories shall be compression-type joints/mechanical joints, ASTM D 3139 and AWWA A21.11. Provide each joint connection with an elastomeric gasket suitable for the bell or coupling with which it is to be used. Gaskets for push-on joints for pipe, ASTM F 477. Gaskets for compression-type joints/mechanical joints for joint connections between pipe and metal fittings, valves, and other accessories, AWWA A21.11, for mechanical joints. Mechanically coupled joints using a sleeve-type mechanical coupling, as specified in paragraph entitled "Sleeve- Type Mechanical Couplings," may be used as an optional jointing method in lieu of push-on joints on plain-end PVC plastic pipe, subject to the limitations specified for mechanically coupled joints using a sleeve-type mechanical coupling and to the use of internal stiffeners as specified for compression-type joints in ASTM D 3139.

2. Fusible Polyvinyl Chloride (PVC) Plastic Piping

- a. Fusible polyvinylchloride pipe conforming to AWWA C900, plain end, minimum Pressure Class 150

(DR 18). Heavier wall pipe shall be provided if required to accommodate maximum calculated tensile force expected in pipe pull-back. Fused joints shall be in strict accordance with manufacturer's recommendations. Other joints and jointing material shall be as defined in 2.01.A.1.B "Joints and Jointing Material".

3. High Density Polyethylene (HDPE) Plastic Pipe

- a. ASTM F-714-Pipe Std.; ASTM D3261 – Fittings Std.; AWWA C-901; 3" – 8" SDR 11.0, 160 psi. HDPE

inside diameter shall equal or exceed PVC inside diameter.

B. Valves, Hydrants, and Other Water Main Accessories

1. Gate Valves on Buried Piping: AWWA C500, AWWA C509, or UL 262. Unless otherwise specified,

valves conforming to: (1) AWWA C500 shall be nonrising stem type with double-disc gates and mechanical-joint ends, (2) AWWA C509 shall be nonrising stem type with mechanical-joint ends, and (3) UL 262 shall be inside-screw type with

operating nut, double-disc or split-wedge type gate, designed for a hydraulic working pressure of 150 psi, and shall have mechanical-joint ends. Materials for UL 262 valves shall conform to the reference standards specified in AWWA C500. Valves shall open by counterclockwise rotation of the valve stem. Stuffing boxes shall have O-ring stem seals. Stuffing boxes shall be bolted and constructed so as to permit easy removal of parts for repair. In lieu of mechanical-joint ends and push-on joint ends, valves may have special ends for connection to sleeve-type mechanical coupling. Valve ends and gaskets for connection to sleeve-type mechanical coupling shall conform to the applicable requirements specified for the coupling. Provide 6-inch size valves with gearing, AWWA C500. Valves shall be of one manufacturer.

#### C. Fire Hydrants

1. Hydrant: AWWA C502, UL 246, dry barrel type, inside dimension of 6 inches (153 mm) minimum,
  - with minimum 5 inches (125 mm) diameter valve seat opening; minimum net water area of barrel not less than 190 percent of valve opening; 6 inch (153 mm) bell or mechanical joint inlet connection with accessories, gland bolts, and gaskets. Hydrant outlets shall have 0.90 discharge coefficients.
2. Hydrant Extensions: Fabricate in multiples of 6 inches (150 mm) with rod and coupling to increase barrel length.
3. Hose and Streamer Connection: Match sizes with utility company, two hose nozzles, and one pumper nozzle. Install a Hydra Storz connection with Cap (Hydra Shield Mfg. Co.) in place of the 4- 1/2" steamer connection.
4. Finish: Primer and two coats of enamel in color to be selected by base.

#### D. Casing (under roadways)

1. Casing under all paved roads shall meet, at a minimum, the following:
  - a. Wall Thickness: (Steel Casing) All casings shall be 0.188", ASTM A139, Grade B.
  - b. Steel casing shall be coated inside and out with approved primer plus one coat of asphaltum paint on outside.
  - c. All casing as a minimum shall extend 3 feet beyond the edge of roadway surfaces, as indicated on the Drawings.

#### E. Casing/Pipe Spacers



1. The Contractor shall provide casing spacers for all piping routed through steel casing. The spacers shall be stainless steel construction with UHMW polymer runners and shall be in two (2) halves. The nuts and bolts used shall be stainless steel. A total of no less than two (2) spacers per joint of pipe shall also be used plus one (1) near the openings (ends) of the casing. The spacers shall be Model CCS by Cascade Water Works Manufacturing Co., or equal.
2. The Contractor shall provide casing end seals on all casings. The end seals shall wrap around the casing and carrier pipes after installation to provide a barrier to backfill debris and seepage. Stainless steel bands shall be used to secure the end seals. The casing end seals shall be Model CCES by Cascade Waterworks Mfg. Company, Advance Products and Systems or equal.

## **2.02 WATER SERVICE LINE MATERIALS**

- A. Plastic Piping - Plastic pipe and fittings shall bear the seal of the National Sanitation Foundation for potable water service. Plastic pipe and fittings shall be supplied from the same manufacturer.
  1. Polyvinyl Chloride (PVC) Plastic Piping: ASTM D 1785, Schedule 40; or ASTM D 2241, with SDR as necessary to provide 150 psi minimum pressure rating. Fittings, ASTM D 2466. Pipe and fittings shall be of the same PVC plastic material and shall be one of the following pipe/fitting combinations, as marked on the pipe and fitting, respectively: [PVC 1120/PVC I; PVC 1220/PVC 12;] PVC 2120/PVC II; PVC 2116/PVC II. Solvent cement for jointing, ASTM D 2564.
- B. Insulating Joints - Joints between pipes of dissimilar metals shall have a rubber-gasketed or other suitable approved type of insulating joint or dielectric coupling, which will effectively prevent metal-to-metal contact between adjacent sections of piping.
- C. Corporation Stops - Ground key type; bronze, ASTM B 61 or ASTM B 62; and suitable for the working pressure of the system. Threaded ends for inlet and outlet of corporation stops, AWWA C800.
- D. Curb Boxes - Provide a curb box for each curb or service stop. Curb boxes shall be of cast iron of a size suitable for the stop on which it is to be used. Provide a round head. Cast the word "WATER" on the lid. Each box shall have a heavy coat of bituminous paint.

## **PART 3 EXECUTION**

### **3.01 GENERAL REQUIREMENTS FOR INSTALLATION OF PIPELINES**

A. These requirements shall apply to all pipeline installation except where specific exception is made in the "Special Requirements..." paragraphs.

### **3.02 LOCATION OF WATER LINES**

A. Terminate the work covered by this section at a point approximately 5 feet from the building, unless otherwise indicated. Do not lay water lines in the same trench with gas lines or electric wiring.

#### **1. Water Piping Installation Parallel with Sewer Piping**

a. Normal Conditions: Lay water piping at least 10 feet horizontally from a sewer or sewer manhole whenever possible. Measure the distance edge-to-edge.

b. Unusual Conditions: When local conditions prevent a horizontal separation of 10 feet, the water piping may be laid closer to a sewer or sewer manhole provided that:

(1) The bottom (invert) of the water piping shall be at least 18 inches above the top (crown) of the sewer piping.

(2) Where this vertical separation cannot be obtained, the sewer piping shall be constructed of AWWA-approved water pipe and pressure tested in place without leakage prior to backfilling.

(3) The sewer manhole shall be of watertight construction and tested in place.

#### **2. Installation of Water Piping Crossing Sewer Piping**

a. Normal Conditions: Water piping crossing above sewer piping shall be laid to provide a separation of at least 18 inches between the bottom of the water piping and the top of the sewer piping.

b. Unusual Conditions: When local conditions prevent a vertical separation described above, use the following construction:

(1) Sewer piping passing over or under water piping shall be constructed of AWWA-approved ductile iron water piping, pressure tested in place without leakage prior to backfilling.

(2) Water piping passing under sewer piping shall, in addition, be protected by providing a vertical separation of at least 18 inches between the bottom of the sewer piping and the top of the water piping; adequate structural support

for the sewer piping to prevent excessive deflection of the joints and the settling on and breaking of the water piping; and that the length, minimum 20 feet, of the water piping be centered at the point of the crossing so that joints shall be equidistant and as far as possible from the sewer piping.

3. Sewer Piping or Sewer Manholes: No water piping shall pass through or come in contact with any part of a sewer manhole.

### **3.03 EARTHWORK**

- A. Perform earthwork operations in accordance with Specification Section 31 23 16.

### **3.04 PIPE LAYING AND JOINTING**

- A. Remove fins and burrs from pipe and fittings. Before placing in position, clean pipe, fittings, valves, and accessories, and maintain in a clean condition. Provide proper facilities for lowering sections of pipe into trenches. Do not under any circumstances drop or dump pipe, fittings, valves, or any other water line material into trenches. Cut pipe accurately to length established at the site and work into place without springing or forcing. Replace by one of the proper length any pipe or fitting that does not allow sufficient space for proper installation of jointing material. Blocking or wedging between bells and spigots will not be permitted. Lay bell- and-spigot pipe with the bell end pointing in the direction of laying. Grade the pipeline in straight lines; avoid the formation of dips and low points. Support pipe at proper elevation and grade. Secure firm, uniform support. Wood support blocking will not be permitted. Lay pipe so that the full length of each section of pipe and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints, and couplings. Provide anchors and supports where indicated and where necessary for fastening work into place. Make proper provision for expansion and contraction of pipelines. Keep trenches free of water until joints have been properly made. At the end of each workday, close open ends of pipe temporarily with wood blocks or bulkheads. Do not lay pipe when conditions of trench or weather prevent installation. Depth of cover over top of pipe shall not be less than 2 1/2 feet. Install access fittings to permit disinfection of water system.

### **3.05 CONNECTIONS TO EXISTING WATER LINES**

- A. Make connections to existing water lines after approval is obtained and with a minimum interruption of service on the existing line. Scheduling of any outage requires a minimum of one-week prior notice for the user of the facility. Make connections to existing lines under

pressure in accordance with the recommended procedures of the manufacturer of the pipe being tapped.

### **3.06 SPECIAL REQUIREMENTS FOR INSTALLATION OF WATER MAINS**

A. Installation of PVC Plastic Water Main Pipe and Associated Fittings: Unless otherwise specified, install pipe and fittings in accordance with paragraph entitled "General Requirements for Installation of Pipelines"; with the requirements of AWWA C605 for laying of pipe, joining PVC pipe to fittings and accessories, and setting of hydrants, valves, and fittings; and with the recommendations for pipe joint assembly and appurtenance installation in AWWA M23, Chapter 7, "Installation."

1. Jointing: Make push-on joints with the elastomeric gaskets specified for this type joint, using either elastomeric-gasket bell-end pipe or elastomeric-gasket couplings. For pipe-to-pipe push-on joint connections, use only pipe with push-on joint ends having factory-made bevel; for push-on joint connections to metal fittings, valves, and other accessories, cut spigot end of pipe off square and re-bevel pipe end to a bevel approximately the same as that on ductile-iron pipe used for the same type of joint. Use an approved lubricant recommended by the pipe manufacturer for push-on joints. Assemble push-on joints for pipe-to-pipe joint connections in accordance with the requirements of AWWA C605 for laying the pipe and the recommendations in AWWA M23, Chapter 7, "Installation," for pipe joint assembly. Make compression-type joints/mechanical joints with the gaskets, glands, bolts, nuts, and internal stiffeners previously specified for this type joint; assemble in accordance with the requirements of AWWA C605 for joining PVC pipe to fittings and accessories, with the applicable requirements of AWWA C600 for joint assembly, and with the recommendations of Appendix A to AWWA C111/A21.11. Cut off spigot end of pipe for compression-type joint/mechanical-joint connections and do not re-bevel. Assemble joints made with sleeve-type mechanical couplings in accordance with the recommendations of the coupling manufacturer using internal stiffeners as previously specified for compression-type joints.
2. Pipe Anchorage: Provide concrete thrust blocks. Thrust blocks shall be in accordance with the requirements of AWWA C605 for reaction or thrust blocking and plugging of dead ends, except that size and positioning of thrust blocks shall be

as indicated. Use concrete, ASTM C 94, having a minimum compressive strength of 4,000 psi at 28 days.

3. Install a # 10 gage copper trace wire at top of and buried with PVC pipe to facilitate location with an electronic detector. Wrap around valve box and terminate 3-4" below grade. Do not wrap wire around pipe. Trace wire shall have bright blue insulation. Install magnetic detectable conductor 12 inches below finish grade. The magnetic detectable conductor shall also be bright blue.

**B. Installation of fusible polyvinylchloride water main**

1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:

- a. HEAT PLATE - Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

- b. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi.

- Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

- c. GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

- d. DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier's recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be

with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

5. Other equipment specifically required for the fusion process shall include the following:
  - a. Pipe rollers shall be used for support of pipe to either side of the machine.
  - b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and /or windy weather, per the pipe supplier's recommendations.
  - c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.
  - d. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.
  - e. Facing blades specifically designed for cutting fusible polyvinylchloride pipe shall be used.

#### C. Installation of Valves and Hydrants

1. Installation of Valves: Install gate valves on PVC water mains in accordance with the recommendations for appurtenance installation in AWWA M23, Chapter 7, "Installation." Make and assemble joints to gate valves as specified for making and assembling the same type joints between pipe and fittings.
2. Installation of Hydrants: Install hydrants in accordance with AWWA C600 for hydrant installation and as indicated. Make and assemble joints as specified for making and assembling the same type joints between pipe and fittings. Install hydrants with the 4 1/2 inch connections facing the adjacent paved surface. If there are two paved adjacent surfaces, contact the Contracting Officer for further instructions.

#### D. Installation of Water Service Piping

1. Location - Connect service piping to the building service 5 feet from the building line unless otherwise specified or indicated.
2. Service Line Connections to Water Mains - Connect service lines 2 inch size to the main with a rigid connection or a corporation stop and gooseneck and install a gate valve on service line below the frostline as indicated. All service line valves should included galvanized nipples (6" minimum) extending beyond valve box. Connect service lines to PVC plastic water mains in accordance with UBPPA UNI-B- 8 and the recommendations of AWWA M23, Chapter 9, "Service Connections."

E. Special Requirements for Installation of Water Service Piping

1. Installation of Plastic Piping - Install pipe and fittings in accordance with paragraph entitled "General

Requirements for Installation of Pipelines" and with the applicable requirements of ASTM D 2774 and ASTM D 2855, unless otherwise specified. Handle solvent cements used to join plastic piping in accordance with ASTM F 402.

a. Jointing: Make solvent-cemented joints for PVC plastic piping using the solvent cement previously specified for this material; assemble joints in accordance with ASTM D 2855. Make solvent-

cemented joints for ABS plastic piping using the solvent cement previously specified for this material; assemble joints in accordance with the recommendations of the pipe manufacturer, as approved. Make plastic pipe joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.

b. Plastic Pipe Connections to Appurtenances: Connect plastic pipe service lines to galvanized nipples of corporation stops and gate valves in accordance with the recommendations of the plastic pipe manufacturer.

c. For connection to PVC service tubing, corporation stops shall be installed with galvanized nipple (minimum 6" long) on each end and coupling prior to transition to PVC.

F. Disinfection - Disinfect new water piping and existing water piping affected by Contractor's operations in accordance with AWWA C651 and as required by State permit. Prior to placing main in service contractor shall submit bacteriological results and pressure test results to the Government for the purpose of requesting State clearance. The Government will notify the contractor when the main has been approved and ready to be placed in service. Bacteriological samples shall be taken on two consecutive days at the connection to the existing system, the end point of the new addition, on each new line branching off main, and every 1,200 feet on straight runs of pipe. Contractor shall submit a drawing showing the sampling point locations and clearly indicate the chlorine residuals.

1. Prior to starting work, verify system is complete, flushed and clean.

2. Ensure PH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

3. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
4. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
5. Maintain disinfectant in system for 24 hours.
6. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
7. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
8. Take samples no sooner than 24 hours after flushing, from locations indicated above, and analyze in accordance with AWWA C651.
9. The total residual chlorine and total coliform analyses shall be completed, at the Contractor's expense, per the requirements of Florida Department of Environmental Protection (FDEP) rule 62-555.340(2). Analyses shall be performed by a laboratory of the Department of Health (DOH) or a laboratory certified by the DOH to perform bacteriological analyses of drinking water and shall be performed using an appropriate method referenced in subsection 62-550.550(1), F.A.C.

### **3.07 DIRECTIONAL DRILLING**

- A. Where indicated on the drawings, the Contractor shall use directional drilling (trenchless excavation). The directional drilling shall be done using experienced personnel as well as properly sized equipment rated for both the size and length of pipe to be installed. The equipment shall incorporate the use of a radio detection- locating device. The locating device shall be capable of determining the position of the drill head plus or minus two (2) inches.
- B. The actual drilling process shall be one of displacement and compaction. The drill head shall cut its own hole and then compact the displaced material against the walls of the drilled hole. Bentonite shall be used to help hold the walls of the hole in place and ultimately fill the voids between the pipe and the walls of the hole.
- C. The pipe to be installed in all directional drilling shall be fusible polyvinyl chloride (PVC) plastic piping as detailed in Section 2.01.A.2 above, or high-density polyethylene, as detailed in Section 2.01.A.3 above. All piping shall be fitted with flanged fittings at both ends. The length shall be sufficient length to allow for at least a minimum of 5 feet below the bottom of the obstacle being drilled under.



- D. All normal precautions shall be utilized to protect any existing utilities within the drilling area.
- E. Coordinate with ISOCES/CEAN when drilling under jurisdictional wetlands; a request for exemption from the Florida Department of Environmental Protection (FDEP) may be necessary.

### **3.08 FIELD QUALITY CONTROL**

A. Field Tests and Inspections - The Government will conduct field inspections and witness field tests specified in

this section. The Contractor shall perform field tests, and provide labor, equipment, and incidentals required for testing, except that water and electric power needed for field tests. The Contractor shall produce evidence, when required, that any item of work has been constructed in accordance with the drawings and specifications. Do not begin testing on any section of a pipeline where concrete thrust blocks have been provided until at least 5 days after placing of the concrete.

B. Testing Procedure - Test water mains and water service lines in accordance with the applicable specified standard, except for the special testing requirements given in paragraph entitled "Special Testing Requirements." Test PVC plastic water mains and water service lines made with PVC plastic water main pipe in accordance with the requirements of AWWA C605 for pressure and leakage tests. The amount of leakage on pipelines made of PVC plastic water main pipe shall not exceed the amounts given in AWWA 605, except that at joints made with sleeve-type mechanical couplings, no leakage will be allowed. Test water service lines in accordance with applicable requirements of AWWA C605 for hydrostatic testing. No leakage will be allowed at plastic pipe joints.

C. Special Testing Requirements - For pressure test, use a hydrostatic pressure 50 psi greater than the maximum working pressure of the system, except that for those portions of the system having pipe size larger than 2 inches in diameter, hydrostatic test pressure shall be not less than 200 psi. Hold this pressure for not less than 2 hours. Prior to the pressure test, fill that portion of the pipeline being tested with water for a soaking period of not less than 24 hours. For leakage test, use a hydrostatic pressure not less than the maximum working pressure of the system. Leakage test may be performed at the same time and at the same test pressure as the pressure test.

**END OF SECTION**  
**SECTION 33 11 16**

## SECTION 33 12 00

### WATER UTILITY DISTRIBUTION EQUIPMENT

#### PART 52 GENERAL

##### 52.1 SUMMARY

- A. Section Includes:
1. Reduced pressure backflow preventer assemblies.
  2. Double check valve backflow preventer assemblies.
  3. Valve vaults.
  4. Buried piping [within 5 feet of backflow preventer valve vault].
  5. Interior piping.
  6. Valves.
  7. Pipe supports.
  8. Bedding and cover materials.
- B. Related Sections:
1. Section 09 90 00 - Painting and Coating: Painting pipes, valves, and associated items.
  2. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
  3. Section 31 05 13 - Soils for Earthwork: Subsoil for backfill.
  4. Section 31 05 16 - Aggregates for Earthwork: Aggregate for backfill.
  5. Section 31 23 16 - Excavation: Excavating for backflow preventer assemblies.
  6. Section 31 23 17 - Trenching: Trenching for buried pipe installation.
  7. Section 31 23 23 - Fill: Backfilling after backflow preventer assembly installation.
  8. Section 33 05 17 - Precast Concrete Valve Vaults and Meter Boxes: Backflow preventer precast concrete valve vault.
  9. Section 33 11 13 - Public Water Utility Distribution Piping: Potable water piping beyond backflow preventer valve vault.
  10. Section 33 11 16 - Site Water Utility Distribution Piping: Domestic water piping beyond backflow preventer valve vault.
  11. Section 33 13 00 - Disinfecting of Water Utility Distribution: Disinfection of domestic water piping beyond backflow preventer valve vault.

##### 52.2 REFERENCES

- A. American Society of Mechanical Engineers:
1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
  2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  3. ASME B31.9 - Building Services Piping.
- B. American Society of Sanitary Engineering:
1. ASSE 1013 - Reduced Pressure Principle Backflow Preventers.
  2. ASSE 1015 - Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies.

3. ASSE 1047 - Reduced Pressure Detector Fire Protection Backflow Prevention Assemblies.
  4. ASSE 1048 - Double Check Detector Fire Protection Backflow Prevention Assemblies.
- C. ASTM International:
1. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
  2. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
  3. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
  4. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
  5. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
  6. ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
  7. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
- D. American Water Works Association:
1. AWWA C104 - American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
  2. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  3. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
  4. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
  5. AWWA C509 - Resilient-Seated Gate Valves for Water-Supply Service.
  6. AWWA C510 - Double Check Valve Backflow Prevention Assembly.
  7. AWWA C511 - Reduced-Pressure Principle Backflow Prevention Assembly.
  8. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., for Water Distribution.
  9. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in., for Water Service.
- E. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
- F. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

### **52.3 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
1. Submit data on backflow preventer assemblies.
  2. Piping: Submit data on pipe materials, fittings, and accessories.
  3. Valves: Submit manufacturers catalog information with valve data and ratings for each service.

4. Supports: Submit manufacturers catalog information including load capacity.
- C. Manufacturer's Installation Instructions: Submit installation instructions for backflow preventer assemblies, valves, and accessories.
- D. Manufacturer's Certificate: Certify [products] [\_\_\_\_\_] meet or exceed [specified requirements] [\_\_\_\_\_].

#### **52.4 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  1. Materials Resources Certificates:
    - a. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  1. Provide cost data for the following products:
    - a. Salvaged products.
    - b. Reused products.
    - c. Products with recycled material content.
    - d. Local and regional products.

#### **52.5 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of backflow preventer assemblies.
- C. Operation and Maintenance Data: Submit spare parts list, exploded assembly views, and recommended maintenance intervals.

#### **52.6 QUALITY ASSURANCE**

- A. Sustainable Design Requirements:
  1. Recycled Content Materials: Furnish materials with recycled content.
  2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- B. Perform Work in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications and Roadway English Standard Drawings*, latest editions..

#### **52.7 QUALIFICATIONS**

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

- B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

#### **52.8 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

#### **52.9 DELIVERY, STORAGE, AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept backflow preventer assemblies, valves, and equipment on site in shipping containers with labeling in place. Inspect for damage.
- C. Furnish cast iron and steel valves with temporary protective coating.
- D. Furnish pipe and fittings with temporary end caps and closures. Maintain caps and closure in place until installation.
- E. Protect backflow preventer assemblies from entry of foreign materials by temporary covers.
  - 1. Protect openings in sections of completed piping systems.
  - 2. Protect openings in piping systems when Work is not in progress.

#### **52.10 FIELD MEASUREMENTS**

- A. Verify field measurements prior to fabrication.

#### **52.11 WARRANTY**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.
- B. Furnish five year manufacturer's warranty for backflow preventer assemblies.

#### **52.12 EXTRA MATERIALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for extra materials.
- B. Furnish two sets of seals for each backflow preventer assembly.

### **PART 53 PRODUCTS**

#### **53.1 BACKFLOW PREVENTERS (BFP)**

- A. Furnish materials in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications and Roadway English Standard Drawings*, latest editions. Any of the following may be

required per Drawings. Reference Construction Drawings or contact Engineer if type of BFP is not specified.

B. Reduced Pressure Backflow Preventers:

1. Size: 3/4 inch to 2 inches.
2. Comply with ASSE 1013 and AWWA C511.
3. Bronze body, with bronze internal parts and stainless steel springs.
4. Two independently operating, spring loaded check valves.
5. Diaphragm type differential pressure relief valve located between check valves.
6. Third check valve opening under back pressure in case of diaphragm failure.
7. Furnish with two quarter-turn, full port resilient seated bronze, ball valves, strainer, and test cocks.

\*\*\*\*\* [OR] \*\*\*\*\*

C. Reduced Pressure Backflow Preventers with Detector Assembly:

1. Size: 3/4 inch to 2 inches.
2. Comply with ASSE 1047 and AWWA C511.
3. Bronze body, with bronze internal parts and stainless steel springs.
4. Two independently operating, spring loaded check valves.
5. Diaphragm type differential pressure relief valve located between check valves.
6. Third check valve opening under back pressure in case of diaphragm failure.
7. Furnish with two quarter-turn, full port resilient seated bronze, ball valves, strainer, and test cocks.

\*\*\*\*\* [OR] \*\*\*\*\*

D. Reduced Pressure Backflow Preventers:

1. Size: 3 inches to 10 inches.
2. Comply with ASSE 1013 and AWWA C511.
3. Heavy duty cast iron construction with fusion epoxy coat inside and outside.
4. Two independently operating, spring loaded check valves.
5. Diaphragm type differential pressure relief valve located between check valves.
6. Third check valve opening under back pressure in case of diaphragm failure.
7. Furnish with two resilient seated gate valves [NRS or OS&Y], strainer, and four resilient seated, ball valve test cocks.

\*\*\*\*\* [OR] \*\*\*\*\*

E. Reduced Pressure Backflow Preventers with Detector Assembly:

1. Size: 3 inches to 10 inches.
2. Comply with ASSE 1047 and AWWA C511.
3. Heavy duty cast iron construction with fusion epoxy coat inside and outside.
4. Two independently operating, spring loaded check valves.
5. Diaphragm type differential pressure relief valve located between check valves.
6. Third check valve opening under back pressure in case of diaphragm failure.
7. Furnish with two resilient seated gate valves [NRS or OS&Y], strainer, and four resilient seated, ball valve test cocks.

\*\*\*\*\* [OR] \*\*\*\*\*

- F. Double Check Valve Backflow Preventer Assemblies:
1. Size: 1/2 inch to three inches.
  2. Comply with ASSE 1015 and AWWA C510.
  3. Bronze body with corrosion resistant internal parts.
  4. Stainless steel springs.
  5. Two independently operating check valves with intermediate atmospheric vent.
  6. Furnish with two quarter-turn, full port resilient seated, bronze ball valves, strainer, and test cocks.

\*\*\*\*\* [OR] \*\*\*\*\*

- G. Double Check Valve Backflow Preventer with Detector Assembly:
1. Size: 1/2 inch to three inches.
  2. Comply with ASSE 1048 and AWWA C510.
  3. Bronze body with corrosion resistant internal parts.
  4. Stainless steel springs.
  5. Two independently operating check valves with intermediate atmospheric vent.
  6. Furnish with two quarter-turn, full port resilient seated, bronze ball valves, strainer, and test cocks.

\*\*\*\*\* [OR] \*\*\*\*\*

- H. Double Check Valve Backflow Preventer Assemblies:
1. Size: 2-1/2 inches to 10 inches.
  2. Comply with ASSE 1015 and AWWA C510.
  3. Heavy duty cast iron construction with fusion epoxy coat inside and outside.
  4. Stainless steel springs.
  5. Two independently operating check valves.
  6. Furnish with two resilient seated, flanged, gate valves [NRS or OS&Y], and strainer.

\*\*\*\*\* [OR] \*\*\*\*\*

- I. Double Check Valve Backflow Preventer with Detector Assembly:
1. Size: 2-1/2 inches to 10 inches.
  2. Comply with ASSE 1048 and AWWA C510.
  3. Heavy duty cast iron construction with fusion epoxy coat inside and outside.
  4. Stainless steel springs.
  5. Two independently operating check valves.
  6. Furnish with two resilient seated, flanged, gate valves [NRS or OS&Y], and strainer.

\*\*\*\*\* [OR] \*\*\*\*\*

- J. Double Check Valve Backflow Preventer Assemblies:
1. Size: 4 inches to 12 inches.
  2. Comply with ASSE 1015 and AWWA C510.
  3. Main valve body and internal metal parts stainless steel series 300.
  4. Two independently operating stainless steel check valves.
  5. Furnish with two resilient seated, flanged, stainless steel gate valves [NRS or OS&Y], and cast iron strainer.



\*\*\*\*\* [OR] \*\*\*\*\*

- K. Double Check Valve Backflow Preventer with Detector Assembly:
  - 1. Size: 4 inches to 12 inches.
  - 2. Comply with ASSE 1048 and AWWA C510.
  - 3. Main valve body and internal metal parts stainless steel series 300.
  - 4. Two independently operating stainless steel check valves.
  - 5. Furnish with two resilient seated, flanged, stainless steel gate valves [NRS or OS&Y], and cast iron strainer.

### **53.2 VALVE VAULT**

- A. Valve Vault: Precast concrete, as specified in Section 33 05 17.

### **53.3 PIPING**

- A. Ductile Iron Pipe: [AWWA C151.] [AWWA C104.] [\_\_\_\_\_].
  - 1. Fittings: [Ductile] [Gray] iron, standard thickness.
  - 2. Joints: AWWA C111, rubber gasket with rods.
- B. PVC Pipe: [ASTM D1785, Schedule 40] [ASTM D1785, Schedule 80] [ASTM D2241, [SDR-26 for 160 psig pressure rating] [SDR-41 for 100 psig rating] [SDR-21 for 200 psig rating]]:
  - 1. Fittings: ASTM D2466, PVC.
  - 2. Joints: ASTM D2855, solvent weld.
- C. PVC Pipe: AWWA C900 Class [100] [150]:
  - 1. Fittings: AWWA C111, cast iron.
  - 2. Joints: ASTM D3139 compression gasket ring.

### **53.4 PIPE SUPPORTS**

- A. Furnish materials in accordance with the Standards of the Local government and that of the AWWA.
- B. Floor Support for Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- C. Copper Pipe Support : Carbon steel ring, adjustable, copper plate.

### **53.5 BEDDING AND COVER MATERIALS**

- A. Bedding: As specified in Section 31 05 16.
- B. Cover: As specified in Section 31 05 16.
- C. Soil Backfill from Above Pipe to Finish Grade: As specified in Section 31 05 13. Subsoil must contain no rocks over 6 inches in diameter, frozen earth or foreign matter.

### **53.6 FLANGES, UNIONS, AND COUPLINGS**

- A. Pipe Size 3 inches and Smaller:

1. Ferrous pipe: Class 150 malleable iron threaded unions.
  2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Pipe Size 1 inch and Larger:
1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
  2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C. Grooved and Shouldered Pipe End Couplings:
1. Housing: Malleable iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; steel bolts, nuts, and washers; galvanized for galvanized pipe.
  2. Sealing gasket: "C" shape composition sealing- gasket.
- D. PVC Pipe:
1. For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or Schedule 80 threaded PVC pipe.
- E. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

### **53.7 ACCESSORIES**

- A. Underground Pipe Markers: Trace wire.

## **PART 54 EXECUTION**

### **54.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify excavations are to required grade, dry, and not over-excavate.
- C. Verify piping connection, size, location and inverts are as indicated on Drawings.

### **54.2 PREPARATION**

- A. Remove scale and dirt, on inside and outside, before assembly.

### **54.3 INSTALLATION - VALVE VAULT**

- A. Refer to Section 33 05 17.

### **54.4 INSTALLATION - PIPE SUPPORTS**

- A. Pipe Supports:
1. Install pipe supports in accordance with MSS SP 89.
  2. Prime coat exposed supports. [Refer to Section 09 90 00.]

#### **54.5 INSTALLATION - BURIED PIPING SYSTEMS**

- A. Verify connection to existing piping system (size, location, and invert) is as indicated on Drawings.
- B. Establish elevations of buried piping with not less than 3-feet of cover.
- C. Establish minimum 1.5-foot separation from other piping in accordance with NC and Local government code.
- D. Remove scale and dirt on inside of piping before assembly.
- E. Excavate pipe trench in accordance with Section 31 23 17.
- F. Install pipe to appropriate elevation relative to existing ground, existing tap elevation and depth & location of other service piping.
- G. Place bedding material at trench bottom to provide uniform bedding for piping, level bedding materials in one continuous layer not exceeding 4-inches depth; compact to 95 percent maximum density.
- H. Install pipe on prepared bedding.
- I. Route pipe in straight line, allowing for expansion and contraction without stress.
- J. Install shutoff and drain valves at locations indicated on Drawings in accordance with this Section.
- K. Install trace wire continuous over top of pipe. buried 6 inches below finish grade, above pipe line; coordinate with Section 31 23 23 and Section 31 23 17. Refer to Section 22 05 53.
- L. Pipe Cover and Backfilling:
  - 1. Backfill trench in accordance with Section 31 23 23.
  - 2. Maintain optimum moisture content of fill material to attain required compaction density.
  - 3. After hydrostatic test, evenly backfill entire trench width by hand placing backfill material and hand tamping in 4- inches compacted layers to 12-inches minimum cover over top of pipe. Compact to 95 percent maximum density.
  - 4. Evenly and continuously backfill remaining trench depth in uniform layers.
- M. Do not use wheeled or tracked vehicles for tamping.

#### **54.6 INSTALLATION - INTERIOR PIPING SYSTEMS**

- A. Install Work in accordance with Local government Standards.

#### **54.7 INSTALLATION - BACKFLOW PREVENTER ASSEMBLIES**

- A. Install Work in accordance with Local government Standards.

**54.8 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform pressure test on backflow pressure assemblies installation with Section 33 11 16.

**54.9 CLEANING**

- A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.
- B. Disinfect backflow preventer assemblies installation in accordance with Section 33 13 00.

**END OF SECTION**

## SECTION 33 12 13

### WATER SERVICE CONNECTIONS

#### PART 55 GENERAL

##### 55.1 SUMMARY

- A. Section Includes:
  - 1. Pipe and fittings for domestic water service connections to buildings.
  - 2. Corporation stop assembly.
  - 3. Curb stop assembly.
  - 4. Meter setting equipment.
  - 5. Water meters.
  - 6. Backflow preventers.
  - 7. Underground pipe markers.
  - 8. Precast concrete vault.
  - 9. Bedding and cover materials.
  
- B. Related Sections:
  - 1. Section 03 30 00 - Cast-In-Place Concrete.
  - 2. Section 22 05 23 - General-Duty Valves for Plumbing Piping.
  - 3. Section 22 11 00 - Facility Water Distribution.
  - 4. Section 31 05 13 - Soils for Earthwork.
  - 5. Section 31 05 16 - Aggregates for Earthwork.
  - 6. Section 31 23 16 - Excavation.
  - 7. Section 31 23 17 - Trenching.
  - 8. Section 31 23 23 - Fill.
  - 9. Section 33 05 13 - Manholes and Structures.
  - 10. Section 33 13 00 - Disinfecting of Water Utility Distribution

##### 55.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Pipe and Fittings:
  - 1. Basis of Measurement: By linear foot. Basis of Payment: Includes hand trimming excavation, pipe and fittings, bedding, concrete thrust restraints, connection to building service piping, and to municipal utility water source.
  
- B. Corporation Stop Assembly:
  - 1. Basis of Measurement: By the unit.
  - 2. Basis of Payment: Includes corporation stop, fittings and accessories.
  
- C. Curb Stop Assembly:
  - 1. Basis of Measurement: By the unit.
  - 2. Basis of Payment: Includes curb stop, curb box and cover, fittings, and accessories.

- D. Water Meters:
  - 1. Basis of Measurement: By the unit.
  - 2. Basis of Payment: Includes meter, meter setting equipment, fittings and accessories.
  
- E. Backflow Preventers:
  - 1. Basis of Measurement: By the unit.
  - 2. Basis of Payment: Includes backflow preventer, fittings and accessories.

### 55.3 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
  
- B. American Society of Mechanical Engineers:
  - 1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
  - 2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  
- C. American Society of Sanitary Engineering:
  - 1. ASSE 1012 - Backflow Preventer with Intermediate Atmospheric Vent.
  - 2. ASSE 1013 - Reduced Pressure Principle Backflow Preventers.
  
- D. ASTM International:
  - 1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
  - 2. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
  - 3. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
  - 4. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures.
  - 5. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 6. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  - 7. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
  - 8. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
  - 9. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
  - 10. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
  - 11. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
  - 12. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
  
- E. American Welding Society:
  - 1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

- F. American Water Works Association:
  - 1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
  - 2. AWWA C700 - Cold-Water Meters - Displacement Type, Bronze Main Case.
  - 3. AWWA C701 - Cold-Water Meters - Turbine Type, for Customer Service.
  - 4. AWWA C702 - Cold-Water Meters - Compound Type.
  - 5. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold-Water Meters.
  - 6. AWWA C800 - Underground Service Line Valves and Fittings.
  - 7. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in., for Water Service.
  - 8. AWWA M6 - Water Meters - Selection, Installation, Testing, and Maintenance.

#### **55.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Provide shop drawings for precast concrete vaults to include detail drawings showing the vault and accessories.
- C. Product Data: Submit data on pipe materials, pipe fittings, corporation stop assemblies, curb stop assemblies, meters, meter setting equipment, service saddles, backflow preventer, and accessories.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

#### **55.5 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Salvaged products.
    - b. Reused products.
    - c. Products with recycled material content.
    - d. Local and regional products.

#### **55.6 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of piping mains, curb stops, connections, thrust restraints, and invert elevations.

- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

## 55.7 QUALITY ASSURANCE

- A. Sustainable Design Requirements:
  - 1. Recycled Content Materials: Furnish materials with recycled content [including:] [.]
    - a. Regional Materials: Furnish materials extracted, processed, and manufactured within 500
- B. Perform Work in accordance with Local government Standards, latest edition.

## 55.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. During loading, transporting, and unloading of materials and products, exercise care to prevent any damage.
- C. Store products and materials off ground and under protective coverings and custody, away from walls and in manner to keep these clean and in good condition until used.
- D. Exercise care in handling precast concrete products to avoid chipping, cracking, and breakage.

## PART 56 PRODUCTS

### 56.1 WATER PIPING AND FITTINGS

- A. Copper Tubing: ASTM B88, Type [K,] [L,] annealed:
  - 1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
  - 2. Joints: Compression connection or AWS A5.8, BCuP silver braze.

\*\*\*\*\* [OR] \*\*\*\*\*
- B. PVC Pipe: [ASTM D1785, Schedule 40] [ASTM D1785, Schedule 80] [ASTM D2241, [SDR-26 for 160 psig pressure rating] [SDR-41 for 100 psig rating] [SDR-21 for 200 psig rating]]:
  - 1. Fittings: ASTM D2466, PVC.
  - 2. Joints: ASTM D2855, solvent weld.

\*\*\*\*\* [OR] \*\*\*\*\*
- C. Polyethylene Pipe: [AWWA C901] [ASTM D3035, for [45] [60] [80] [100] [130] [145] [160] psig pressure rating]:
  - 1. Fittings: AWWA C901, molded [or fabricated].
  - 2. Joints: [Compression] [Butt fusion].



## **56.2 CORPORATION STOP ASSEMBLY**

- A. Furnish materials in accordance with Local government Standards.
- B. Corporation Stops:
  - 1. Brass or red brass alloy body conforming to ASTM B62.
  - 2. Inlet end threaded for tapping according to AWWA C800.
  - 3. Outlet end suitable for service pipe specified.
- C. Service Saddles:
  - 1. Double strap type, designed to hold pressures in excess pipe working pressure.

## **56.3 CURB STOP ASSEMBLY**

- A. Furnish materials in accordance with Local government Standards.
- B. Curb Stops:
  - 1. Brass or red brass alloy body conforming to ASTM B62.
  - 2. Plug type valve.
  - 3. Positive pressure sealing.
- C. Curb Boxes and Covers:
  - 1. Cast iron body, Extension Type or Buffalo Type.
  - 2. Minneapolis or Arch Pattern Base.
  - 3. Lid with inscription WATER, with Pentagon Plug.

## **56.4 METER SETTING EQUIPMENT**

- A. Furnish materials in accordance with Local government Standards.
- B. Outside Meter Setting:
  - 1. Meter Yokes: Copper or iron, riser type assembly with bronze inlet inverted key angle valve expansion type outlet connection and Ell fitting; flared copper tubing connections both ends.
  - 2. Meter Yokes: Copper or iron, inlet and outlet horizontal or vertical setting with matching couplings, fittings and stops.

## **56.5 WATER METERS**

- A. Furnish materials in accordance with Local government Standards.
- B. AWWA C700, AWWA C701 & AWWA C702, positive displacement disc type suitable for fluid with bronze case and cast iron [frost-proof, breakaway] bottom cap, hermetically sealed register (remote reading to AWWA C706).
- C. Meter: Brass body turbine meter with magnetic drive register.

## **56.6 BACKFLOW PREVENTERS**

- A. Furnish materials in accordance with Local government Standards.
- B. Reduced Pressure Backflow Preventers:

1. Comply with ASSE 1013.
  2. Bronze body, with bronze internal parts and stainless steel springs.
  3. Two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve opening under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.
- C. Double Check Valve Assemblies: Comply with ASSE 1012; Bronze body with corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

#### **56.7 UNDERGROUND PIPE MARKERS**

- A. Furnish materials in accordance with Local government Standards.
- B. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Water".

#### **56.8 PRECAST CONCRETE VAULT**

- A. Furnish materials in accordance with Local government Standards.
- B. Product Description: Precast vault designed in accordance with ASTM C858, comprising modular, interlocking sections complete with accessories.

#### **56.9 BEDDING AND COVER MATERIALS**

- A. Bedding: As specified in Section 31 05 16.
- B. Cover: As specified in Section [31 05 16] [\_\_\_\_\_].
- C. Soil Backfill from Above Pipe to Finish Grade: As specified in Section 31 05 13. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

#### **56.10 ACCESSORIES**

- A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00.
- B. Manhole and Cover: Refer to Section 33 05 13.

### **PART 57 EXECUTION**

#### **57.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.

**57.2 PREPARATION**

- A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

**57.3 INSTALLATION - CORPORATION STOP ASSEMBLY**

- A. Make connection for each different kind of water main using suitable materials, equipment and methods approved by the Architect/Engineer.
- B. Provide service clamps for mains other than of cast iron or ductile iron mains.
- C. Screw corporation stops directly into tapped and threaded iron main at 10 and 2 o'clock position on main's circumference; locate corporation stops at least 12 inches apart longitudinally and staggered.
- D. For plastic pipe water mains, provide full support for service clamp for full circumference of pipe, with minimum 2 inches width of bearing area; exercise care against crushing or causing other damage to water mains at time of tapping or installing service clamp or corporation stop.
- E. Use proper seals or other devices so no leaks are left in water mains at points of tapping; do not backfill and cover service connection until approved by the Architect/Engineer.

**57.4 BEDDING**

- A. Excavate pipe trench in accordance with Section 31 23 17 for Work of this Section.
- B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6- inches compacted depth; compact to 95 percent.
- C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact to 95 percent.
- D. Maintain optimum moisture content of fill material to attain required compaction density.

**57.5 INSTALLATION - PIPE AND FITTINGS**

- A. Maintain separation of water main from sewer piping in accordance with NC and Local government code.
- B. Group piping with other site piping work whenever practical.
- C. Install pipe to indicated elevation to within tolerance of 5/8 inches.
- D. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- E. Install access fittings to permit disinfection of water system performed under Section 33 13 00.

- F. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.
- G. Establish elevations of buried piping with not less than 3 ft of cover.
- H. Install trace wire continuous over top of pipe buried 6 inches below finish grade, above pipe line; coordinate with Section 31 23 23.
- I. Backfill trench in accordance with Section 31 23 23.
- J. Install Work in accordance with Local government Standards.

**57.6 INSTALLATION - CURB STOP ASSEMBLY**

- A. Set curb stops on compacted soil.
- B. Install Work in accordance with Local government Standards.

**57.7 INSTALLATION - WATER METERS**

- A. Install Work in accordance with Local government Standards.

**57.8 INSTALLATION - BACKFLOW PREVENTERS**

- A. Install backflow preventer where indicated on the Contract Drawings and in accordance with manufacturer's instructions.
- B. Comply with local water company requirements and plumbing codes in regards to testing and installation requirements.

**57.9 SERVICE CONNECTIONS**

- A. Install Work in accordance with Local government Standards.

**57.10 PRECAST CONCRETE VAULT**

- A. Construct valve vaults of precast concrete.
- B. Seal vault joints watertight with preformed plastic joint sealant compound. Apply asphalt waterproofing to exterior walls.
- C. Seal annular space between pipe and wall sleeves as indicated on the Contract Drawings.
- D. Install vault covers and frames; adjust to finished grade elevation.

**57.11 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM**

- A. Flush and disinfect system in accordance with Section 33 13 00.

**57.12 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform pressure test on domestic site water distribution system in accordance with AWWA C600.
- C. Compaction Testing for Bedding: In accordance with ASTM D1557.
- D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

**END OF SECTION**



## SECTION 33 12 16

### WATER UTILITY DISTRIBUTION VALVES

#### PART 58 GENERAL

##### 58.1 SUMMARY

- A. Section Includes:
  - 1. Valves.
  - 2. Valve boxes.
  
- B. Related Sections:
  - 1. Section 03 30 00 - Cast-In-Place Concrete.
  - 2. Section 31 05 16 - Aggregates for Earthwork.
  - 3. Section 31 23 16 - Excavation.
  - 4. Section 31 23 23 - Fill.
  - 5. Section 33 11 16 - Site Water Utility Distribution Piping.
  - 6. Section 33 12 13 - Water Service Connections.
  - 7. Section 33 12 19 - Water Utility Distribution Fire Hydrants.
  - 8. Section 33 13 00 - Disinfecting of Water Utility Distribution.

##### 58.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Valves:
  - 1. Basis of Measurement: Each.
  - 2. Basis of Payment: Includes excavation, valve, valve box, accessories, tests, and backfill.

##### 58.3 REFERENCES

- A. American Water Works Association:
  - 1. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service.
  - 2. AWWA C509 - Resilient-Seated Gate Valves for Water-Supply Service.
  - 3. AWWA C550 - Protecting Epoxy Interior Coating for Valves and Hydrants.
  - 4. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
  
- B. National Sanitation Foundation:
  - 1. NSF 61 - Drinking Water System Components - Health Effects

##### 58.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
  
- B. Shop Drawing:
  - 1. Installation Plan: Submit description of proposed installation.

- C. Design Data: Submit manufacturer's latest published literature include illustrations, installation instructions, maintenance instructions and parts lists.
- D. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from material suppliers attesting that valves and accessories provided meet or exceed AWWA Standards and specification requirements.

#### **58.5 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Local and regional products.

#### **58.6 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of valves.
- C. Provide Operation and Maintenance Data for valves.

#### **58.7 QUALITY ASSURANCE**

- A. Sustainable Design Requirements:
  - 1. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- B. Perform work in accordance with North Carolina Public Water Supply and the Local Government Standards.

#### **58.8 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum 3 years documented experience approved by manufacturer.

#### **58.9 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation Meeting.



- B. Convene minimum one week prior to commencing work of this section.

#### **58.10 DELIVERY, STORAGE AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Prepare valves and accessories for shipment according to AWWA Standards and seal valve and ends to prevent entry of foreign matter into product body.
- C. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

#### **58.11 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

#### **58.12 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with the Local Government.
- C.

#### **58.13 MAINTENANCE MATERIALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance materials.
- B. Furnish one tee wrench to Owner; required length.

### **PART 59 PRODUCTS**

#### **59.1 DOUBLE-DISC GATE VALVES**

- A. Manufacturers:
  - 1. Mueller Company
  - 2. Clow Eddy - Iowa
  - 3. American Flow Control
  - 4. Substitutions: Per Local Government

\*\*\*\*\* [OR] \*\*\*\*\*

- B. Furnish materials in accordance with Public Water Supply and Local Government Standards.
- C. Double-Disc Gate Valves: AWWA C500, NSF 61; iron body, bronze trim.
  - 1. Gate: Double disc parallel seat gate.
  - 2. Stem: Non-rising stem.
  - 3. Seals: O-ring stem seals.
  - 4. Operating Nut: Square; open counterclockwise unless otherwise indicated.
  - 5. Ends: Flanged, mechanical joint or bell end connections.
  - 6. Coating: AWWA C550; interior and exterior.
  - 7. Provide valves 16 inch diameter and larger with bypass valves and gear operators.
  - 8. Sizes 12 inches diameter and smaller: 200 psig.
  - 9. Sizes 14 inches diameter and larger: 150 psig.

## **59.2 RESILIENT WEDGE GATE VALVES**

- A. Manufacturers:
  - 1. Mueller Company
  - 2. Clow Eddy - Iowa
  - 3. American Flow Control
  - 4. Substitutions: Per Local Government.

\*\*\*\*\* [OR] \*\*\*\*\*

- B. Furnish materials in accordance with Public Water Supply and Local Government Standards.
- C. Resilient Wedge Gate Valves: AWWA C509; iron body, bronze or ductile iron.
  - 1. Resilient seats.
  - 2. Stem: Non-rising bronze stem.
  - 3. Operating Nut: Square; open counterclockwise unless otherwise indicated.
  - 4. Ends: Flanged, mechanical joint or bell end connections.
  - 5. Coating: AWWA C550; interior/exterior.
  - 6. Sizes 12 inch diameter and smaller: 200 psig.
  - 7. Sizes 16 inch diameter and larger: 150 psig.

## **59.3 VALVE BOXES**

- A. 12 inch diameter Valves and Smaller: Domestic cast iron, two-piece, screw type.
- B. Valves Larger than 12 inch diameter: Domestic cast iron, three-piece, screw type; round base.
- C. Cast iron lid, marked "Water".

## **59.4 ACCESSORIES**

- A. Concrete for Thrust Restraints: 3,000 PSI Concrete @ 28 Days

## **PART 60 EXECUTION**

### **60.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Determine exact location and size of valves from Drawings; obtain clarification and directions from Architect/Engineer prior to execution of work.
- C. Verify invert elevations of existing work prior to excavation and installation of valves.

### **60.2 PREPARATION**

- A. Identify required lines, levels, contours and datum locations.
- B. Locate, identify, and protect utilities to remain from damage.
- C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
  - 1. Notify Architect/Engineer not less than 5 days in advance of proposed utility interruption.
  - 2. Do not proceed without written permission from the Architect/Engineer.
- D. Perform trench excavation, backfilling and compaction in accordance with Section 31 23 17.

### **60.3 INSTALLATION**

- A. Install valves in conjunction with pipe laying; set valves plumb.
- B. Provide buried valves with valve boxes installed flush with finished grade.

\*\*\*\*\* [OR] \*\*\*\*\*

- C. Install Work in accordance with North Carolina Public Water Supply and Local Government Standards.

### **60.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM**

- A. Flush and disinfect system in accordance with Section 33 13 00.

### **60.5 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Perform pressure test on domestic site water distribution system in accordance with AWWA C600.

\*\*\*\*\* [OR] \*\*\*\*\*

- C. Pressure test system to 200 psi. Repair leaks and re-test.
1. After completion of pipeline installation, including backfill, but prior to final connection to existing system, conduct, in presence of Architect/Engineer, concurrent hydrostatic pressure and leakage tests in accordance with AWWA C600.
  2. Provide equipment required to perform leakage and hydrostatic pressure tests.
  3. Test Pressure: Not less than 200 psi or 50 psi in excess of maximum static pressure, whichever is greater.
  4. Conduct hydrostatic test for at least two-hour duration.
  5. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, apply test pressure. At conclusion of tests, close resulting piping openings.
  6. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.
  7. Examine exposed piping, fittings, valves and joints carefully during hydrostatic pressure test. Repair or replace damage or defective pipe, fittings, valves or joints discovered, following pressure test.
  8. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$L = (SD\sqrt{P})/C$
L = allowable, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
p = average test pressure during leakage test, in pounds per square inch gauge
C = 133,200

9. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.

**END OF SECTION**

## SECTION 33 12 19

### WATER UTILITY DISTRIBUTION FIRE HYDRANTS

#### PART 61 GENERAL

##### 61.1 SUMMARY

- A. Section Includes:
  - 1. Fire hydrants.
- B. Related Sections:
  - 1. Section 03 30 00 - Cast-In-Place Concrete.
  - 2. Section 33 11 16 - Site Water Utility Distribution Piping.
  - 3. Section 33 12 13 - Water Service Connections.
  - 4. Section 33 12 16 - Water Utility Distribution Valves.
  - 5. Section 33 13 00 - Disinfecting of Water Utility Distribution.

##### 61.2 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Fire Hydrants:
  - 1. Basis of Measurement: Each.
  - 2. Basis of Payment: Includes excavation, fire hydrant, accessories, test and backfill.

##### 61.3 REFERENCES

- A. American Water Works Association:
  - 1. AWWA C502 - Dry-Barrel Fire Hydrants.
  - 2. AWWA C503 - Wet-Barrel Fire Hydrants.
  - 3. AWWA C550 - Protecting Epoxy Interior Coating for Valves and Hydrants.
  - 4. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
- B. National Sanitation Foundation:
  - 1. NSF 61 - Drinking Water System Components - Health Effects
- C. National Fire Protection Association:
  - 1. NFPA 281 - Recommended Practice for Fire Flow Testing and Marking of Hydrants

##### 61.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawing:
  - 1. Installation Plan: Submit description of proposed installation.

- C. Design Data: Submit manufacturer's latest published literature including illustrations, installation instructions, maintenance instructions and parts lists.
- D. Manufacturer's Certificates: Submit Statement of Compliance, supporting data, from material suppliers attesting that hydrants and accessories provided meet or exceed AWWA Standards and specification requirements.

#### **61.5 SUSTAINABLE DESIGN SUBMITTALS**

- A. Section 01 81 13 - Sustainable Design Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
  - 1. Materials Resources Certificates:
    - a. Certify source for local and regional materials and distance from Project site.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
  - 1. Provide cost data for the following products:
    - a. Local and regional products.

#### **61.6 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of fire hydrants.
- C. Provide Operation and Maintenance Data for fire hydrants.

#### **61.7 QUALITY ASSURANCE**

- A. Sustainable Design Requirements:
  - 1. Recycled Content Materials: Furnish materials with recycled content.
  - 2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.
- B. Perform Work in accordance with Local government Standards.
- C. Provide uniform color scheme for fire hydrants in accordance with NFPA 281 and Local government Standards.

#### **61.8 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

## **61.9 PRE-INSTALLATION MEETINGS**

- A. Section 01 30 00 - Administrative Requirements: Pre-installation Meeting.
- B. Convene minimum one week prior to commencing work of this section.

## **61.10 DELIVERY, STORAGE AND HANDLING**

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing and protecting products.
- B. Prepare hydrants and accessories for shipment according to AWWA Standards and seal hydrant and ends to prevent entry of foreign matter into product body.
- C. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

## **61.11 ENVIRONMENTAL REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

## **61.12 COORDINATION**

- A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.
- B. Coordinate work with Local government and all entities owning utilities within construction area.

## **PART 62 PRODUCTS**

### **62.1 FIRE HYDRANTS**

- A. Furnish materials in accordance with Local government Standards.
- B. Dry-barrel Break-away Type: AWWA C502; cast-iron body, compression type valve.
  - 1. Bury Depth: As indicated on the Drawings.
  - 2. Inlet Connection: 6 inches.
  - 3. Valve Opening: 5-1/4 inches diameter.
  - 4. Ends: Mechanical Joint or Bell End.
  - 5. Bolts and Nuts: Corrosion resistant.
  - 6. Coating: AWWA C550; interior.
  - 7. Direction of Opening: Counterclockwise unless otherwise indicated.
- C. Wet-Barrel Type: AWWA C503; cast-iron body.
  - 1. Valve Openings: Individual for pumper and hose nozzles.

2. Ends: Mechanical joint or bell end.
  3. Bolts and Nuts: Corrosion resistant.
  4. Coating: AWWA C550; interior.
- D. One pumper, two hose nozzles.
1. Obtain thread type and size from local fire department.
  2. Attach nozzle caps by separate chains.
- E. Finish: Primer and two coats of enamel and/or Special coating color in accordance with Local government and NFPA 281 requirements.

## **62.2 ACCESSORIES**

- A. Concrete for Thrust Restraints: Concrete type specified in Section 03 30 00.
- B. Aggregate: Aggregate for hydrant drainage specified in Section 31 05 16.

## **PART 63 EXECUTION**

### **63.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Determine exact location and size of hydrants from Drawings; obtain clarification and directions from Architect/Engineer prior to execution of work.
- C. Verify invert elevations [of existing work] prior to excavation and installation of fire hydrants.

### **63.2 PREPARATION**

- A. Identify required lines, levels, contours and datum locations.
- B. Locate, identify, and protect utilities to remain from damage.
- C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.
1. Notify Architect & Engineer not less than two days in advance of proposed utility interruption.
  2. Do not proceed without written permission from the Architect.
- D. Perform trench excavation, backfilling and compaction in accordance with Section 31 23 17.

### **63.3 INSTALLATION**

- A. Install fire hydrants; provide support blocking and drainage gravel; do not block drain hole.



- B. Set hydrants plumb with pumper nozzle facing roadway; set hydrants with centerline of pumper nozzle 18 inches above finished grade and safety flange not more than 6 inches nor less than 2 inches above grade.
- C. Paint hydrants in accordance with local color scheme.
- D. After hydrostatic testing, flush hydrants and check for proper drainage.

**63.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM**

- A. Flush and disinfect system in accordance with Section 33 13 00.

**63.5 FIELD QUALITY CONTROL**

- A. Section [01 40 00 - Quality Requirements] [01 70 00 - Execution and Closeout Requirements]: Field inspecting, testing, adjusting, and balancing.
- B. Perform pressure test on domestic site water distribution system in accordance with AWWA C600.
- C. Perform pressure test on domestic site water distribution system in accordance with Local government Standards.

**END OF SECTION**



## **SECTION 33 13 00**

### **DISINFECTING OF WATER UTILITY DISTRIBUTION**

#### **PART 64 GENERAL**

##### **64.1 SUMMARY**

- A. Section includes disinfection of potable water distribution [and transmission] system; and testing and reporting results.
- B. Related Sections:
  - 1. Section 22 40 00 - Plumbing Fixtures: Disinfection of building domestic water piping system.
  - 2. Section 33 11 16 - Site Water Utility Distribution Piping: Product and Execution requirements for installation, testing, of site domestic water distribution piping.
  - 3. Section 33 21 00 - Water Supply Wells: Product and Execution requirements for installation, testing, and disinfection of water wells.

##### **64.2 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Disinfection:
  - 1. Basis of Measurement: By the linear foot.
  - 2. Basis of Payment: Includes preparing, disinfecting, testing, and reporting.

##### **64.3 REFERENCES**

- A. American Water Works Association:
  - 1. AWWA B300 - Hypochlorites.
  - 2. AWWA B301 - Liquid Chlorine.
  - 3. AWWA B302 - Ammonium Sulfate.
  - 4. AWWA B303 - Sodium Chlorite.
  - 5. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
  - 6. AWWA C651 - Disinfecting Water Mains.

##### **64.4 SUBMITTALS**

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit procedures, proposed chemicals, and treatment levels for review.
- C. Test Reports: Indicate results comparative to specified requirements.
- D. Certificate: Certify cleanliness of water distribution system meets or exceeds specified requirements.

## **64.5 CLOSEOUT SUBMITTALS**

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Disinfection Report:
  - 1. Type and form of disinfectant used.
  - 2. Date and time of disinfectant injection start and time of completion.
  - 3. Test locations.
  - 4. Name of person collecting samples.
  - 5. Initial and 24 hour disinfectant residuals in treated water in ppm for each outlet tested.
  - 6. Date and time of flushing start and completion.
  - 7. Disinfectant residual after flushing in ppm for each outlet tested.
- C. Bacteriological Report:
  - 1. Date issued, project name, and testing laboratory name, address, and telephone number.
  - 2. Time and date of water sample collection.
  - 3. Name of person collecting samples.
  - 4. Test locations.
  - 5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
  - 6. Coliform bacteria test results for each outlet tested.
  - 7. Certify water conforms, or fails to conform, to bacterial standards of NC Public Water Supply Section and Local government.
- D. Water Quality Certificate: Certify water conforms to quality standards of Local government, suitable for human consumption.

## **64.6 QUALITY ASSURANCE**

- A. Perform Work in accordance with AWWA C651 and in accordance with Local government Standards.

## **64.7 QUALIFICATIONS**

- A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this section with minimum three years documented experience.
- B. Testing Firm: Company specializing in testing potable water systems, certified and approved by State of North Carolina.
- C. Submit bacteriologist's signature and authority associated with testing.

## **PART 65 PRODUCTS**

### **65.1 DISINFECTION CHEMICALS**

- A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

## **PART 66 EXECUTION**

### **66.1 EXAMINATION**

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify piping system has been cleaned, inspected, and pressure tested.
- C. Perform scheduling and disinfecting activity with start-up, water pressure testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

### **66.2 INSTALLATION**

- A. Provide and attach required equipment to perform the Work of this section.
- B. Perform disinfection of water distribution system and installation of system and pressure testing. Refer to Section 33 11 16.
- C. [Inject treatment disinfectant] [Introduce treatment] into piping system.
- D. Maintain disinfectant in system for 24 hours.
- E. Flush, circulate, and clean until required cleanliness is achieved - use domestic water.
- F. Replace permanent system devices removed for disinfection.

### **66.3 FIELD QUALITY CONTROL**

- A. Section 01 40 00 - Quality Requirements and Section 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Disinfection, Flushing, and Sampling:
  - 1. Disinfect pipeline installation in accordance with AWWA C651. Use of liquid chlorine is not permitted
  - 2. Upon completion of retention period required for disinfection, flush pipeline until chlorine concentration in water leaving pipeline is no higher than that generally prevailing in existing system or is acceptable for domestic use.
  - 3. Legally dispose of chlorinated water. When chlorinated discharge may cause damage to environment, apply neutralizing chemical to chlorinated water to neutralize chlorine residual remaining in water.
  - 4. After final flushing and before pipeline is connected to existing system, or placed in service, employ an approved independent testing laboratory to sample, test and certify water quality suitable for human consumption.

**END OF SECTION**

