Project Manual

New EMS North Substation

Vance County

122 Young Street, Suite B
Henderson, NC 27537



PRE-BID DATE:	**November 9, 2026**
PRE-BID TIME:	**10:00 AM**
PRE-BID LOCATION:	**Vance County Conference Room** **305 Young Street, Suite B** **Henderson, NC 27537**

BID DATE:	**December 8, 2026**
BID TIME:	**2:00 PM**
BID LOCATION:	**Vance County Conference Room** **305 Young Street, Suite B** **Henderson, NC 27537**



BID SET

November 2026
Architect's Project Number: 26024

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 EMS North Substation Vance County 122 Young Street, Suite B Henderson, NC 27537
PROJECT NO:	26024
DATE:	November 2026
OWNER:	Vance County 122 Young Street, Suite B Henderson, NC 27537
ARCHITECT:	Oakley Collier Architects, P.A. 109 Candlewood Road Rocky Mount, NC 27804
CIVIL ENGINEER:	Stocks Engineering 801 E. Washington St. Nashville, NC 27856
STRUCTURAL ENGINEER:	Scalene Design 421 N. Harrington St. Raleigh, NC 27603
PME ENGINEER:	IMEG Corp. 3221 Blue Ridge Road, Suite 113 Raleigh, NC 27612

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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.

Specification Section	Specification Title
31 05 13	Soils for Earthwork
31 05 16	Aggregates for Earthwork
31 10 00	Site Clearing
31 22 13	Rough Grading
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33 13 00	Disinfection of Water Utility Distribution
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33 41 00	Storm Utility Drainage Piping
33 42 13	Pipe Culverts
33 46 00	Subdrainage

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Full Name	Discipline	Seal

Firm Name: Stocks Engineering, PA
Engineering Discipline: Civil
Firm License #: C-1874

Engineers Name: J. Michael Stocks
PE License #: 19843
Street Address: 801 E Washington Street
City, State zip code: Nashville, NC 27856
Phone: 252-459-8196
Project Contact: Kevin Varnell
E-mail: kvarnell@stocksengineering.com



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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.

Specification Section	Specification Title
26 00 00	Electrical Requirements

Full Name	Discipline	Seal
IMEG Corp. Firm License F-1507	Electrical Engineer	11/02/2026 

Matthew C. Briley, PE
PE License #048828
3221 Blue Ridge Rd. Suite 113
Raleigh, NC 27612
Phone: 919-855-2022
E-mail: matthew.c.briley@imegcorp.com

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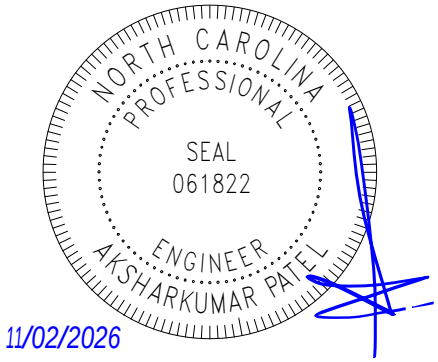
CERTIFICATION OF TECHNICAL SPECIFICATIONS

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

Specification Section	Specification Title
21 00 00	Fire Protection Requirements

Full Name	Discipline	Seal
IMEG Consultants Corp. Firm License # F-1507	Fire Protection Engineer	

Aksharkumar Patel, PE
PE License # 061822
3221 Blue Ridge Rd. Suite 113
Raleigh, NC 2761
Phone: 919-571-1111
E-mail: Aksharkumar.G.Patel@imegcorp.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.

Specification Section	Specification Title
23 00 00	Mechanical Requirements

Full Name	Discipline	Seal
IMEG Corp. Firm License F-1507	Mechanical Engineer	

Patrick McCabe, PE
PE License #051195
3221 Blue Ridge Rd. Suite 113
Raleigh, NC 27612
Phone: 919-571-1111
E-mail: patrick.j.mccabe@imegcorp.com

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CERTIFICATION OF TECHNICAL SPECIFICATIONS

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Specification Section	Specification Title
22 00 00	Plumbing Requirements

Full Name	Discipline	Seal
IMEG Consultants Corp. Firm License # F-1507	Plumbing Engineer	NORTH CAROLINA PROFESSIONAL SEAL 049754 ENGINEER J. HARRISON HOLT 11/02/2026

J. Harrison Holt, PE
PE License # 049754
3221 Blue Ridge Rd. Suite 113
Raleigh, NC 2761
Phone: 919-571-1111
E-mail: Harrison.holt@imegcorp.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.

Specification Section	Specification Title
03 30 00	Cast-in-Place Concrete

Full Name	Discipline	Seal
Scalene Design Firm License #P-1591	Structural Engineer	

Sarah M. Musser, PE
PE License #031551
421 N Harrington St., Suite 440
Raleigh, NC 27603
Phone: 919-825-0295
E-mail: smusser@scalene-design.com



11/02/2026
THIS DOCUMENT WAS ELECTRONICALLY SIGNED BY SARAH M. MUSSER

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NOTICE TO BIDDERS

Sealed proposals will be received from approved **Pre-qualified General Contractors (only)** until **2:00 PM on December 8, 2026**, in the Conference Room of Vance County, located at 305 Young Street, Suite B, Henderson, NC 27537 and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment entering into the construction of the

New EMS North Substation
Vance County

The Project includes the construction of a new 5,000 SF single story EMS substation and includes site development, plumbing, mechanical and electrical systems. The building includes two (2) apparatus bays, decon, lockers, radio/work room, one (1) administrative office, four (4) sleeping rooms, dayroom/kitchen, laundry, and support areas. Construction includes structural slab on grade, pre-engineered structure wood trusses, metal siding, brick veneer base, metal roofing 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 **10:00 AM on November 9, 2026**, in the Conference Room of Vance County, located at 305 Young Street, Suite B, Henderson, NC 27537. The meeting will address project specific questions, issues, bidding procedures and bid forms. Site visit to immediately follow the pre-bid.

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) beginning November 3, 2026, or by emailing Ashley Seaman (aseaman@oakleycollier.com) 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.

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”.

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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: Vance County
122 Young Street, Suite B
Henderson, NC 27537

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

AIA® Document A701™ – 2018

Instructions to Bidders

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

New EMS North Substation

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

VANCE COUNTY
122 YOUNG STREET, SUITE B
HENDERSON, NC 27537

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

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

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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.

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™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

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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

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§ 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.

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§ 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 5% 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.

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§ 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.

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§ 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.

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§ 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

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~~Number~~ ~~Title~~ ~~Date~~

.6 Specifications

~~Section~~ ~~Title~~ ~~Date~~ ~~Pages~~

.7 Addenda:

~~Number~~ ~~Date~~ ~~Pages~~

.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:~~

~~Title~~ ~~Date~~ ~~Pages~~

~~[ ] Supplementary and other Conditions of the Contract:~~

~~Document~~ ~~Title~~ ~~Date~~ ~~Pages~~

.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

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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

AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)
New EMS North Substation

THE OWNER:
(Name, legal status and address)

VANCE COUNTY
122 YOUNG STREET, SUITE B
HENDERSON, NC 27537

THE ARCHITECT:
(Name, legal status and address)

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

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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.

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§ 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

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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.

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§ 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.

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§ 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.

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§ 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.

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§ 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

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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.

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§ 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.

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§ 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.

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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:

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.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.

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§ 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.

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§ 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

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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

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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.

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§ 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

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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.

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§ 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.

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§ 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;

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.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.

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§ 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.

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§ 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.

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§ 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.

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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" includes the bidding requirements, Conditions of the Contract and the Specifications.

1.1.9 GENERAL CONTRACTOR

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

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 3.12.11.3 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 Architect or his designated project representative. Observations made by official representatives of the Owner shall be conveyed to the Architect for review and coordination prior to issuance to the Contractor.

4.2.1.2 - All work shall be inspected by the Architect and/or special inspector (as defined by the 2018 North Carolina State Building Code) 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 Architect, specifications or codes, the Contractor shall give adequate notice to the Architect of the time set for such inspection or test, if the inspection or test will be conducted by a party other than the Architect. Such special tests or inspections will be made in the presence of the Architect, 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 Architect and/or special inspector such work shall be uncovered or exposed for inspection, if so requested by the Architect 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 - Subcontractors 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, Architect, 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 is 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; 1st tier, 2nd tier, 3rd tier, etc. Contractors shall be allowed a maximum of 2.5% on the contracted work of their subs; 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 Architect to request proposals for the change order work in writing. The Contractor will provide such proposal and supporting data in suitable format. The Architect 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 Architect***,*** the Architect 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 Architect 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:

365 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 Architect'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 Architect caused delays in the case of concurrent delays.

8.3.1.2 - Request for extension of time shall be made in writing to the Architect, copies to the Owner, within twenty (20) days following cause of delay. In case of continuing cause for delay, the Contractor shall notify the Architect, 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 Architect 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 to the end of Subparagraph 9.3.1:

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

Add the following Subparagraph:

9.3.1.3 - The Owner shall not retain more than five percent (5%) of any periodic payment due a prime contractor. When the project is fifty percent (50%) complete, the Owner, with written consent of the surety, shall not retain any further retainage from periodic payments due the Contractor if the Contractor continues to perform satisfactorily and any nonconforming work identified in writing prior to that time by the Architect, engineer, or Owner has been corrected by the Contractor and accepted by the Architect, engineer, or Owner. If the Owner determines the Contractor's performance is unsatisfactory, the Owner may reinstate retainage for each subsequent periodic payment application as authorized in this subsection up to the maximum amount of five percent (5%). The project shall be deemed fifty percent (50%) complete when the Contractor's gross project invoices, excluding the value of materials stored off-site, equal or exceed fifty percent (50%) of the value of the Contract, except the value of materials stored on-site shall not exceed twenty percent (20%) of the Contractor's gross project invoices for the purpose of determining whether the project is fifty percent (50%) complete.

ARTICLE 11 INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE:

Add the following:

11.1.1.1 - 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
Owned, non-owned and hired motor vehicles.
Broad form coverage for property damage.

11.1.1.2 - Provide the following insurance limits:

Workers Compensation

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

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	$1,000,000.00
General Aggregate	$2,000,000.00
Product Liability Completed Operations Aggregate	$2,000,000.00
(2) PROPERTY DAMAGE - including completed operations broad form and X,C,U	
Each Occurrence	$1,000,000.00
Aggregate	$2,000,000.00
(3) PERSONAL INJURY	
Each Persons Aggregate	$ 500,000.00
General Aggregate	$1,000,000.00
Catastrophic Liability	$1,000,000.00
(4) AUTOMOBILE LIABILITY - owned, non-owned and hired	
Bodily Injury each person	$2,000.000.00
Bodily Injury each accident	$2,000.000.00
Property Damaged each occurrence	$ 500.000.00

(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	$2,000,000.00
Retention	$ 10,000.00

11.1.1.3 - 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.

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

11.1.1.3.2 - 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.

11.1.1.3.3 - 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.

11.1.1.3.4 - The insurance required by Paragraph 11.3 is not intended to cover machinery, tolls 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.

11.1.2.1. - Add the following subparagraph:

"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

15.1.5 CLAIMS FOR ADDITIONAL COST

Add the following paragraphs:

15.1.5.1 - Should the Contractor consider that as a result of instructions given by the Architect, he is entitled to extra cost above that stated in the Contract, he shall give written notice thereof to the Architect 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 Architect shall render a written decision within seven (7) days of receipt of claim.
15.1.5.2 - The Contractor shall not act on instructions received by him from persons other than the Architect, and any claims for extra compensation or extension of time on account of such instruction will not be honored. The Architect 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. 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 by 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 materials or workmanship 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

FORM OF SINGLE PRIME GENERAL CONTRACTOR PROPOSAL

New EMS North Substation
Vance County
Architect's Project # 26024

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 Vance 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 New EMS North Substation in full accordance with the plans, specifications, and contract documents, to the full and entire satisfaction of Vance 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($) _____

Subcontractors:	**License No.**	**Dollars($)**
Site:		
Plumbing:		
Mechanical:		
Electrical:		

The Bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in the written order of the Architect and shall fully complete all work within **365** 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 Section 15 of the General Conditions.

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. C-1: Delete Curb & Gutter
(Add)(Deduct) Dollars ($)_____

Alternate No. C-2: Delete Underground Roof Drain Piping
(Add)(Deduct) Dollars ($)_____

Alternate No. C-3: Delete HDPP Pipe & Catch Basin
(Add)(Deduct) Dollars ($)_____

Alternate No. A-1: Extruded Aluminum Fencing
(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 in all accordance with the contract documents.

Unit Price No. 1: Undercut/Fill in Trench Excavations: (*Unit*) cu yd Unit Price ($)_____

Cost for additional 50 cu yds included in Base Bid Price ($) _____

Unit Price No. 2: Undercut/Fill in Open Excavations: (*Unit*) cu yd Unit Price ($)_____

Cost for additional 100 cu yds included in Base Bid Price ($) _____

Unit Price No. 3: Transformer Feeder: *(Unit*) per ln ft Unit Price ($)_____

Cost for additional 50 ln ft included in base bid Price ($)_____

Unit Price No. 4: Data Outlet and Conduit: per 1 Occurrence Unit Price ($) _____

Cost for additional 10 occurrences Price ($)_____

Unit Price No. 5: Duplex Receptacle and Circuit: per 1 Occurrence Unit Price ($)_____

Cost for additional 10 occurrences Price ($)_____

Unit Price No. 6: Pre-Engineered Building Coordination- Concrete Footings: *(Unit)* cu yd Unit Price ($)____

Cost for additional 10 cu yds included in base bid Price ($)_____

Unit Price No. 7: Pre-Engineered Building Coordination-Reinforcing Steel: *(Unit)* per ton Unit Price ($)____

Cost for additional ½ ton included in base bid Price ($)_____

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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:

_____
Proprietorship or Partnership

By: _____

Title: _____
(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:_____

SEAL

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: _____

SEAL

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:_____

SEAL

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 Name)

Project ID#_____ 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:_____

SEAL

State of _____, County of _____

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

Notary Public_____

My commission expires _____

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)

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

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

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

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

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

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

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User Notes: (944732791)

Signed and sealed this day of ,

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

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AIA® Document A101™ – 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™–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™–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.

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TABLE OF ARTICLES

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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.)

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[ ] 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.)

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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.)

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§ 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.)

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§ 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)

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§ 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

.7 Addenda, if any:

Number	Date	Pages

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.)

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[ ] 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

.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)*

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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

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

ADDITIONS AND DELETIONS:
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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.

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§ 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

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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.

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§ 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 Title:		Name and 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.

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§ 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.

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§ 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.

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§ 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:	

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AIA® Document G704™ – 2017

Certificate of Substantial Completion

PROJECT: *(name and address)*	**CONTRACT INFORMATION:**	**CERTIFICATE INFORMATION:**
0000	Contract For: General Construction Date:	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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GeoTechnologies, Inc.
Geotechnical and Construction Materials Testing Services

October 9, 2026

Stocks Engineering
PO Box 1108
Nashville, NC 27856

Attn: Mr. J. Kevin Varnell

Re: Preliminary Subsurface Investigation Report
Vance County EMS Building
Vance County, North Carolina
GeoTechnologies Project No. 126-0744-EA

Dear Mr. Varnell,

GeoTechnologies, Inc. has completed the authorized investigation to evaluate subsurface soil conditions for the above referenced project in Vance County, North Carolina. Subsurface conditions at the site were investigated by completing seven soil test borings at the approximate locations shown on the attached Figure 1. The borings were advanced to a depth of 15 feet below the existing ground surface. The boring locations were established in the field using a handheld Trimble GPS and should be considered approximate. The borings were completed using a drill rig utilizing standard penetration testing (SPT) procedures with a manual hammer at selected intervals to evaluate the consistency and density of the subsurface soils. This report presents the findings of our investigation and our recommendations concerning site grading and foundation support.

SITE & PROJECT INFORMATION

The project area consists of three adjoining parcels at 7433 NC Hwy 39 in Vance County, North Carolina. The site is currently partly open areas and wooded. The proposed development will include construction of a EMS building with paved areas. A grading plan and structural loads have not been provided at this time, however, we anticipate minor grading to establish design subgrade elevations.

AREA GEOLOGY

The site is located in the Piedmont Physiographic and Geologic Province of North Carolina. The Piedmont Province is characterized by a gently to steeply sloping topography, rolling hills and ridge lines, dissected by moderate to well-developed (mature) dendritic type drainage system and drainage swales, hollows, tributaries, creeks, streams, and rivers. More specifically, the site is located within the Carolina Slate belt with bedrock materials consisting of metamorphic granitic rock. These materials were deposited during the late Proterozoic to late Cambrian Period approximately 520 to 650 million years ago. The bedrock materials have weathered in place to form the residual soils which are typically found near the ground surface in the vicinity of the site.

SUBSURFACE CONDITIONS

A generalized subsurface profile was prepared from the test boring data as Figure 2 to graphically illustrate subsurface conditions encountered during the investigation. More detailed descriptions of the conditions encountered at the boring locations are presented on the attached boring records.

Topsoil was encountered in the borings at the ground surface and extending to a depth of about 3 to 8 inches below the existing ground surface. Soils consisting of clays, silts and silty sands were encountered underlying the topsoil and extended to the termination depth of 15 feet below grade. The soils exhibited SPT resistances ranging from 9 to 47 blows per foot (bpf) with a manual hammer.

Groundwater was not encountered in the borings upon completion. Also, it should be noted that the near surface soils are fine grain materials which are conducive to the development of a temporarily higher perched groundwater condition. Regional groundwater levels can also fluctuate with seasonal and climatic changes and may be different at other times.

PRELIMINARY RECOMMENDATIONS

The following preliminary recommendations are made based upon a review of the attached test boring data, our understanding of the proposed construction, and past experience with similar projects and subsurface conditions. Once site grading plans and structural loads are developed, we would appreciate being provided with that information so that additional borings can be performed and these recommendations can be confirmed, extended, or modified as necessary. Additionally, should subsurface conditions adverse to those indicated by this report be encountered during construction, those differences should be reported to us for review and comment.

Site Grading Considerations: Site grading should begin with clearing and stripping of all topsoil and vegetation within the limits of the proposed construction. Topsoil thicknesses may vary from those noted in the boring logs. Following stripping and clearing, all areas at grade or which are designated to receive fill should be proof rolled for stability with a partially loaded tandem axel dump truck in the presence of a geotechnical engineer to identify areas necessitating repairs. Repairs options will need to be determined at the time of construction and will vary depending upon if the area is within the building pad or paved areas. Repairs should be performed as recommended by the on-site geotechnical engineer.

The near surface soils in the test borings consist of stiff to very stiff clays and medium dense silty sands, however, conditions can vary immediate of the borings performed and for this reason, unstable surface soils may be encountered that will require repair. If the site is graded during a period of warm and dry weather, the depth of near surface repairs should be significantly reduced. Conditions in this geology deteriorate during wetter periods of the year, resulting in significant seasonal differences in the quantity of surface repairs necessary for site development.

Repair options will need to be determined at the time of construction and will depend upon if the area is within the building pad or in paved areas. It is expected that near surface instability can be mitigated with limited undercut provided that the contractor is prepared to disc and dry wet soils prior to recompaction. In our experience, the most effective way to dry any wet on-site soils is with a farm disc turning the soils every 60 to 90 minutes

under favorable (warm/dry) conditions. In this area, these conditions are most prevalent from about April through October. If the contractor is not prepared to dry soils, or if the site is graded during a wet or cool period of the year, drying will be ineffective and undercut quantities may increase. It may be beneficial to include some additional undercut allowance especially if the site is to be graded during cooler months.

Fill Materials & Compaction Considerations: The on-site soils, excluding topsoil, should be suitable for reuse as structural fill. If off-site borrow is required, low plasticity clays, sands, or silts with Unified Soil Classification of SP, SW, SM, SC, CL and ML may be used for structural fill. Quarry material such as processed fill may also be used.

A standard backfill compaction recommendation for soils placed in structural areas is to compact the material to at least 95% of the standard Proctor maximum dry density, except at subgrade elevations where the compaction should be at least 98% of the standard Proctor maximum dry density. In order to achieve proper density and stability, soil moisture contents should be maintained within 2% of the optimum moisture content, which may require some drying or the addition of moisture. Non-structural areas should have some compaction effort when filling. We recommend that fill in non-structural areas be compacted to at least 85% of the standard Proctor maximum dry density, if some post-construction settlement is acceptable.

Temporary Excavation Considerations: Temporary excavations are the responsibility of the contractor and should be designed in accordance with OSHA guidelines. Excavations exceeding 20 feet in depth must be designed by an engineer. Once open, all excavations should be observed on a daily basis by qualified personnel.

Dewatering Considerations: Groundwater was not encountered, however, groundwater depths will fluctuate and perched water may be encountered. We anticipate any water encountered should be minor such that a sump pump can be used to effectively remove any water. Dewatering methods are ultimately the responsibility of the contractor.

Permanent Slope Considerations: In this geology, dry and well compacted unreinforced fill slopes built at 3H:1V are stable without exception. Steeper fill slopes can be used with properly designed and installed geosynthetic reinforcement. Cut slopes should also be about 3H:1V or flatter. Any water encountered on the face of slopes should be brought to the attention of the geotechnical engineer so that necessary provisions can be made.

Foundation Design Considerations: The results of our test borings indicate that, following the repair of any unsuitable near surface soils, the subsurface conditions on the site are suitable for the use of shallow spread footing foundations. Assuming that the site is prepared as directed, foundations may be designed for an allowable bearing pressure of 3,000 psf subject to the restriction that column and wall footings have least dimensions of not less than 24 and 16 inches, respectively. These foundations may bear at nominal depth below finished exterior grade in residual soils or in properly compacted fill except that a minimum embedment depth of not less than 18 inches for exterior footings is recommended for frost protection.

GeoTechnologies recommends that all foundations excavations be carefully evaluated by a geotechnical engineer to verify that suitable bearing materials have been encountered. Should foundations need to be extended

to provide adequate bearing, we recommend that over-excavated footings be backfilled to design bearing elevation utilizing uniformly graded #57 or #67 washed stone.

The attached Figures 3 and 4 depict initial estimated settlements and do not account for fill induced settlements. Differential settlements are typically half of total estimated settlements. Once a grading plan and structural loads are available, GeoTechnologies should be provided with that information so that additional estimated settlement analyses can be performed.

Slab-on-Grade Considerations: We recommend that slabs-on-grade for the structure are designed for an assumed subgrade modulus of 100 pci (for a 1 foot by 1 foot area). This assumes that subgrades will be compacted to a minimum of 98% of the standard proctor maximum dry density. We recommend that slabs be supported on a minimum of a 4 inch thick layer of compacted CABC or washed stone. CABC stone is preferred over washed stone for slabs subject to vehicle/forklift traffic. All slabs should be constructed per current ACI guidelines, including proper jointing to help control shrinkage cracking.

Below Grade Wall Considerations: Below grade walls may be designed using the soil parameters indicated in the table below for on-site soils. The values assume level grade behind or in front of the wall and should be modified for sloping grades. A buoyant unit weight should be used below the water table.

At-rest EP Coeff.	Active EP Coeff.	Passive EP Coeff.	Friction Angle	Base Sliding Friction	Unit Weight (pcf)
0.56	0.39	2.56	26°	0.35	120

At-rest EFP psf/ft	Active EFP psf/ft	Passive EFP psf/ft
65	45	300

EFP = Equivalent Fluid Pressure

Hydrostatic conditions should be considered for any walls extending below the water table (not expected). Below grade walls must include an effective drainage medium which intercepts water moving towards the wall such that hydrostatic conditions do not develop above the static water level. A drainage pipe, waterproofing and drainage boards/washed stone should be considered. Appropriate safety factors should be used in conjunction with these design values.

Any fill material placed adjacent to below grade walls should be compacted to a minimum of 95% of the standard Proctor maximum dry density at +/- 2% optimum moisture, except where 98% is required at subgrade. Additionally, any soils placed within 3 to 4 feet of below grade walls should be compacted with light handheld equipment to prevent overstressing of the walls. This will necessitate that backfill be placed in 4 to 6 inch lifts.

Seismic Design Consideration: This site is a seismic site class “D” under the building code based on the test boring data and past experience in the area of the site.

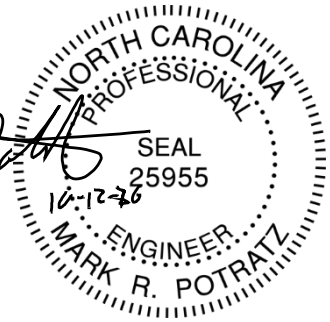
Pavement Support Considerations: The on-site soils are considered suitable for pavement support. Proper preparation of the subgrade soils will be very important for the performance of the pavements. Based upon our experience with the local geology and variability across the site we recommend using a design value of 5 percent.

The most important factors affecting pavement life in the area of the site are the condition of the subgrade immediately prior to base course stone placement and post construction drainage. We recommend that the subgrade of all pavement areas be proofrolled and that any unstable, yielding areas be identified and repaired prior to placement of the base coarse stone. All subgrade soils should be recompacted to a minimum of 98% of the standard Proctor maximum dry density immediately prior to base course stone placement where appropriate. We recommend that all pavement areas be properly graded to promote run-off of water and to prevent ponding of water on the pavement surface which can lead to eventual saturation of subgrade soils and the loss of pavement support.

CLOSING

GeoTechnologies, Inc. appreciates the opportunity to be of service on the phase of the project. Please contact us if you have any questions concerning this letter or if we may be of additional service on this or other projects.

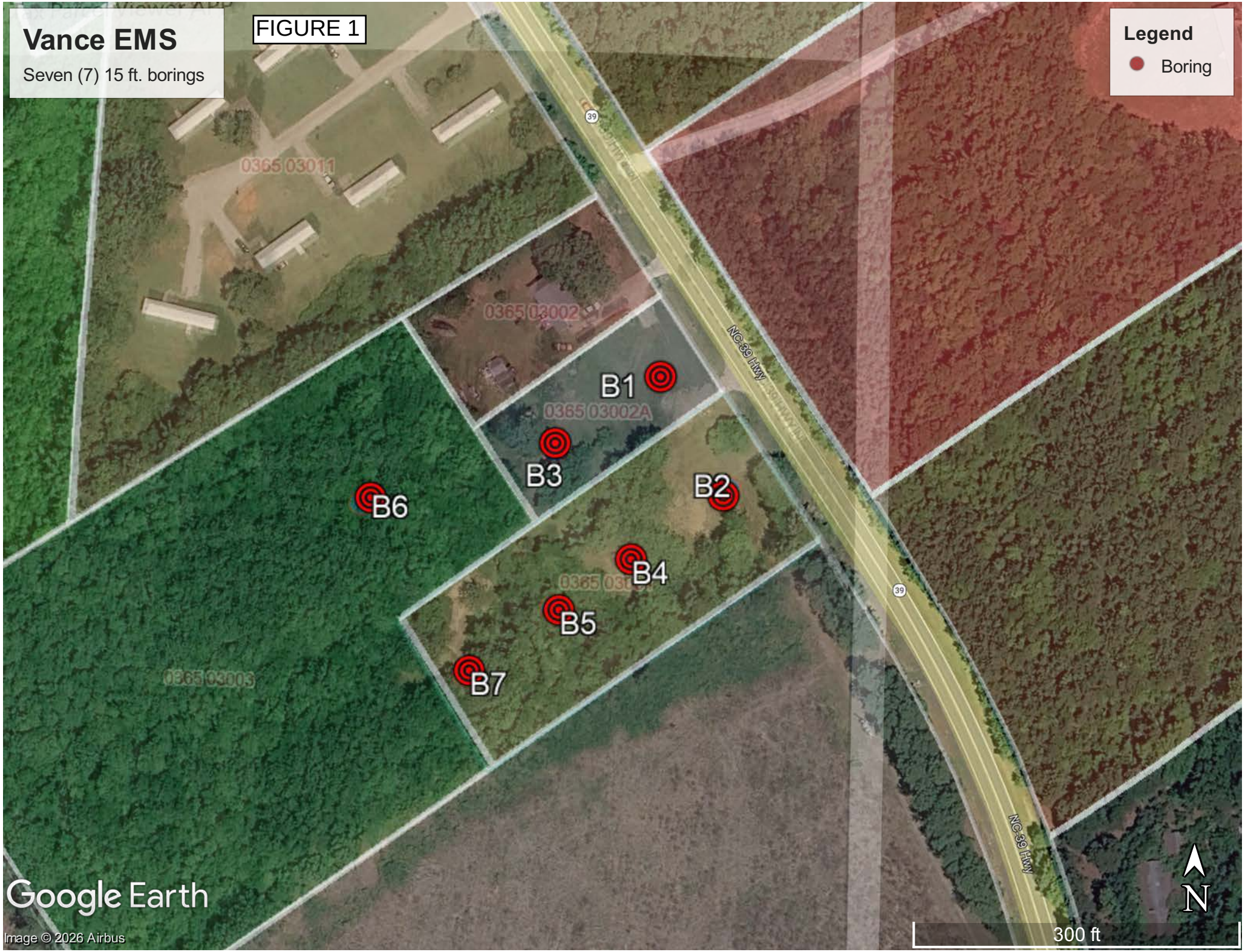
Sincerely,
GeoTechnologies, Inc.

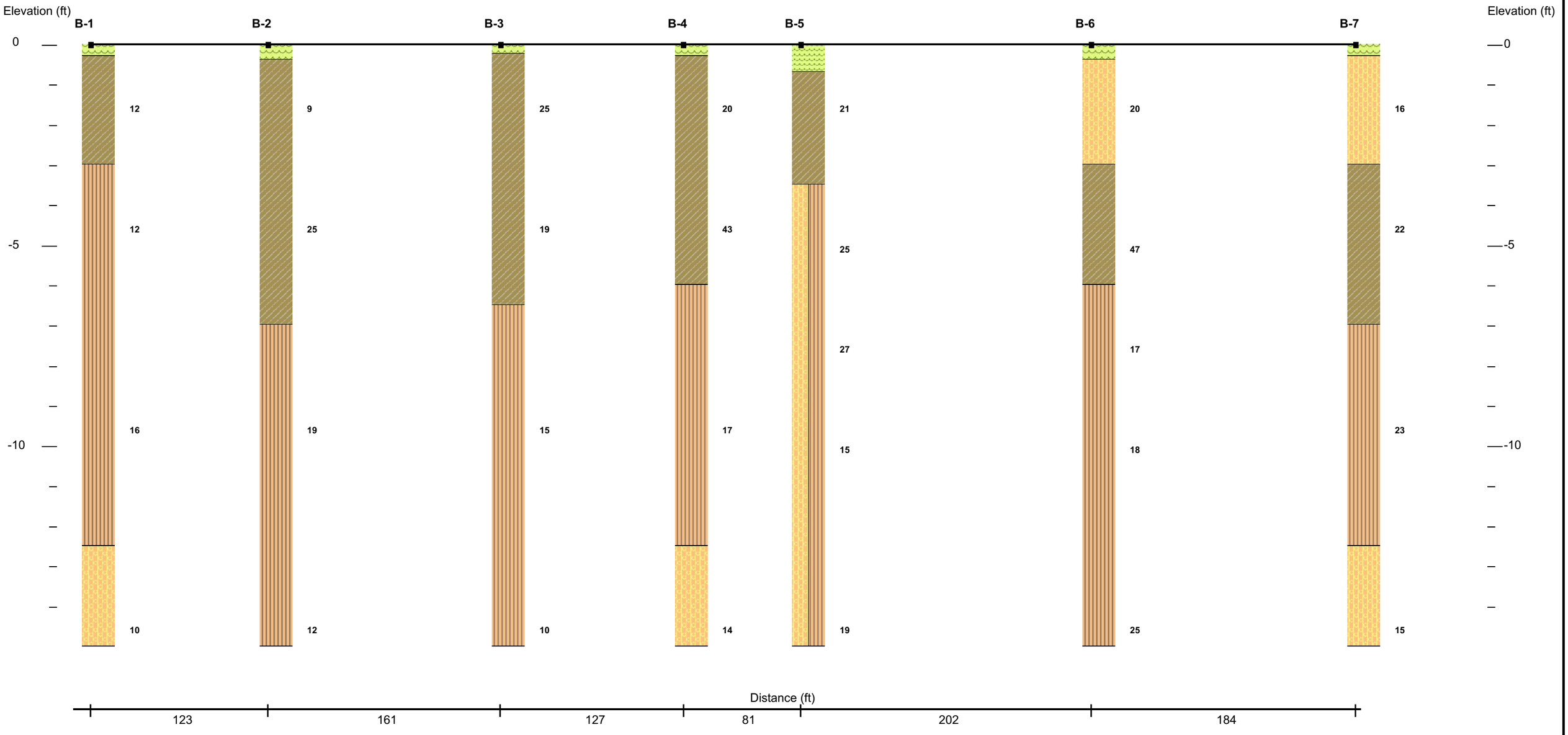


Mark R. Potratz, PE
NC License No. 25955

Attachments

MRP/pr-dli


Vance EMS
Seven (7) 15 ft. borings
FIGURE 1
Legend
Boring
B1
B2
B3
B4
B5
B6
B7
0365 03011
0365 03002
0365 03002A
0365 03003
NC-39 Hwy
NC-39 Hwy
39
39
Google Earth
Image © 2026 Airbus
N
300 ft

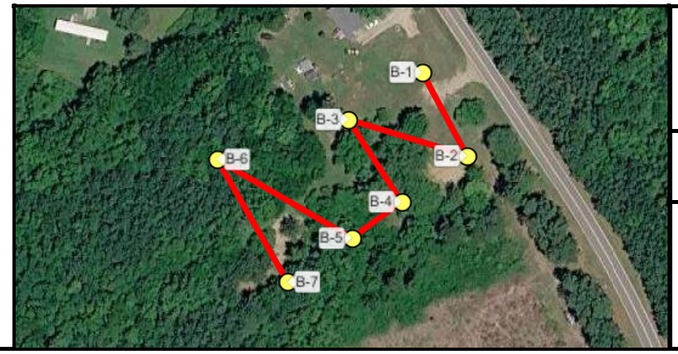


Legend

- Topsoil
- Lean CLAY (CL)
- SILT (ML)
- Silty SAND (SM)
- Silty Sand to Low Plasticity Silt (SM/ML)

Water Level During Drilling
Water Level at End of Drilling
16 Penetration (Blow Counts / ft)

Built with Google Maps



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FIGURE 2
GEOLOGIC CROSS SECTION

STOCKS ENGINEERING
126-0744-EA
Vance County EMS
7433 NC-39
Henderson, North Carolina

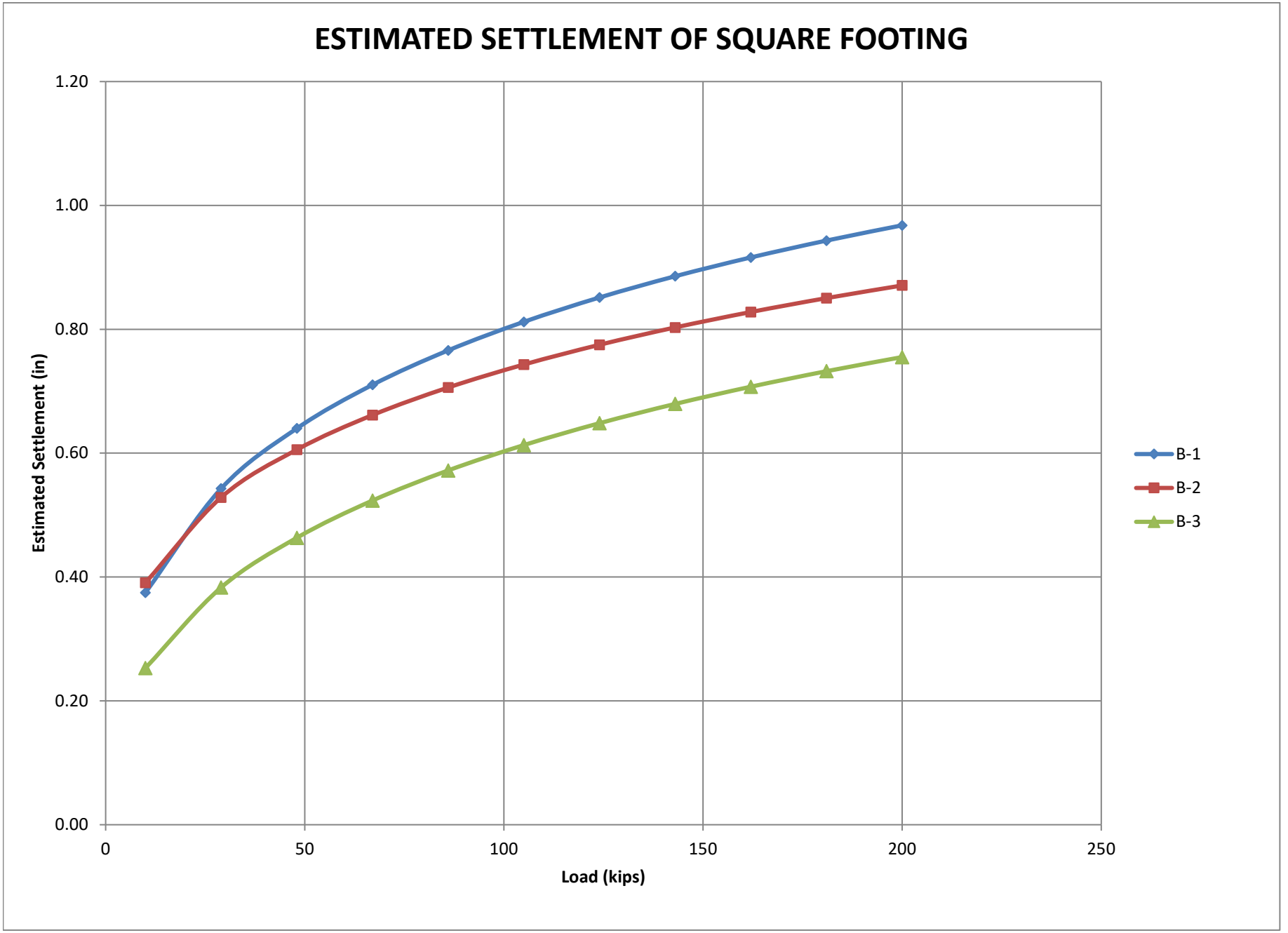
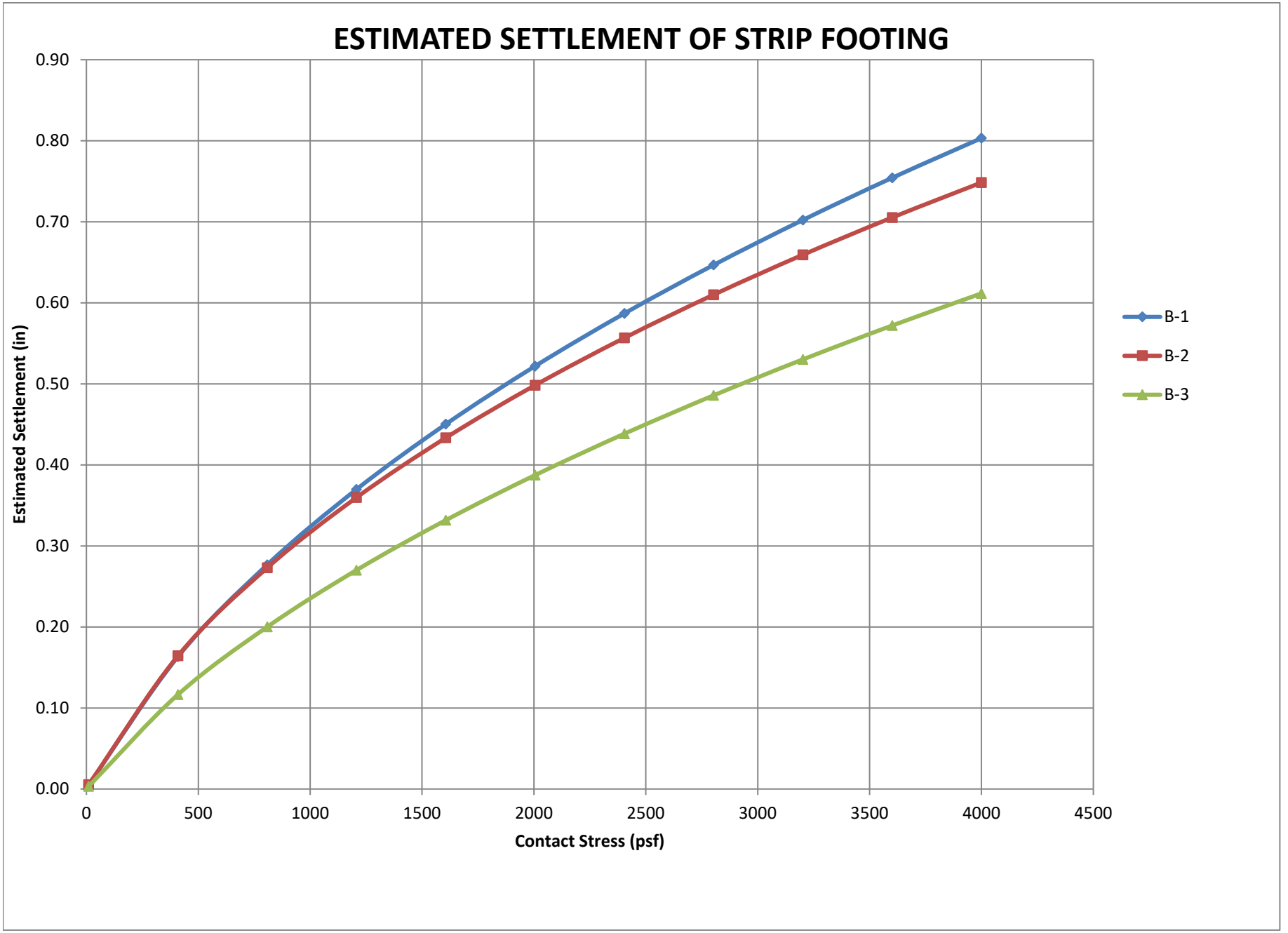


Chart is based on a stress of 3000 psf

FIGURE 3



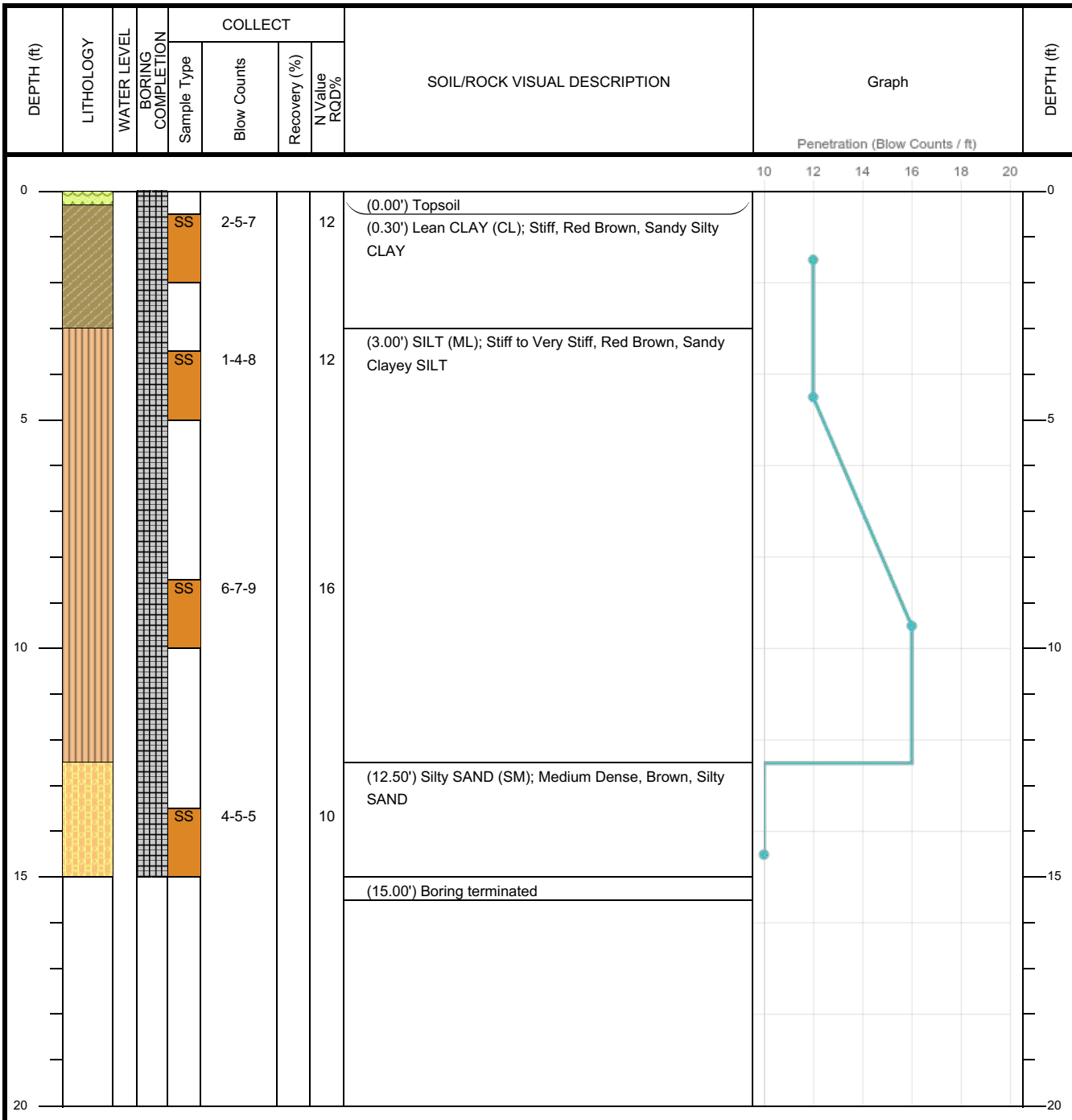
Length=50ft, Width=2ft

FIGURE 4

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Client:	**STOCKS ENGINEERING**	**BORING LOG**	
Project:	**126-0744-EA, Vance County EMS**	**Boring No.**	**B-1**
Address:	**7433 NC-39, Henderson, NC**	**Page:**	**1 of 1**

Drilling Start Date:	**9/22/26**	Boring Depth (ft):	**15**
Drilling End Date:	**9/22/26**	Cave Depth (ft):	**N/A**
Drilling Company:	**GeoTechnolgies**	Sampling Method(s):	**Split Spoon**
Drilling Method:	**Hollow Stem Auger**	DTW During Drilling (ft):	**N/A**
Drilling Equipment:	**Trailer**	DTW After Drilling (ft):	**N/A**
Driller:	**CR**	Ground Surface Elev. (ft):	**N/A**
Logged By:	**CR**	Location (Lat, Long):	**36.427199, -78.429499**



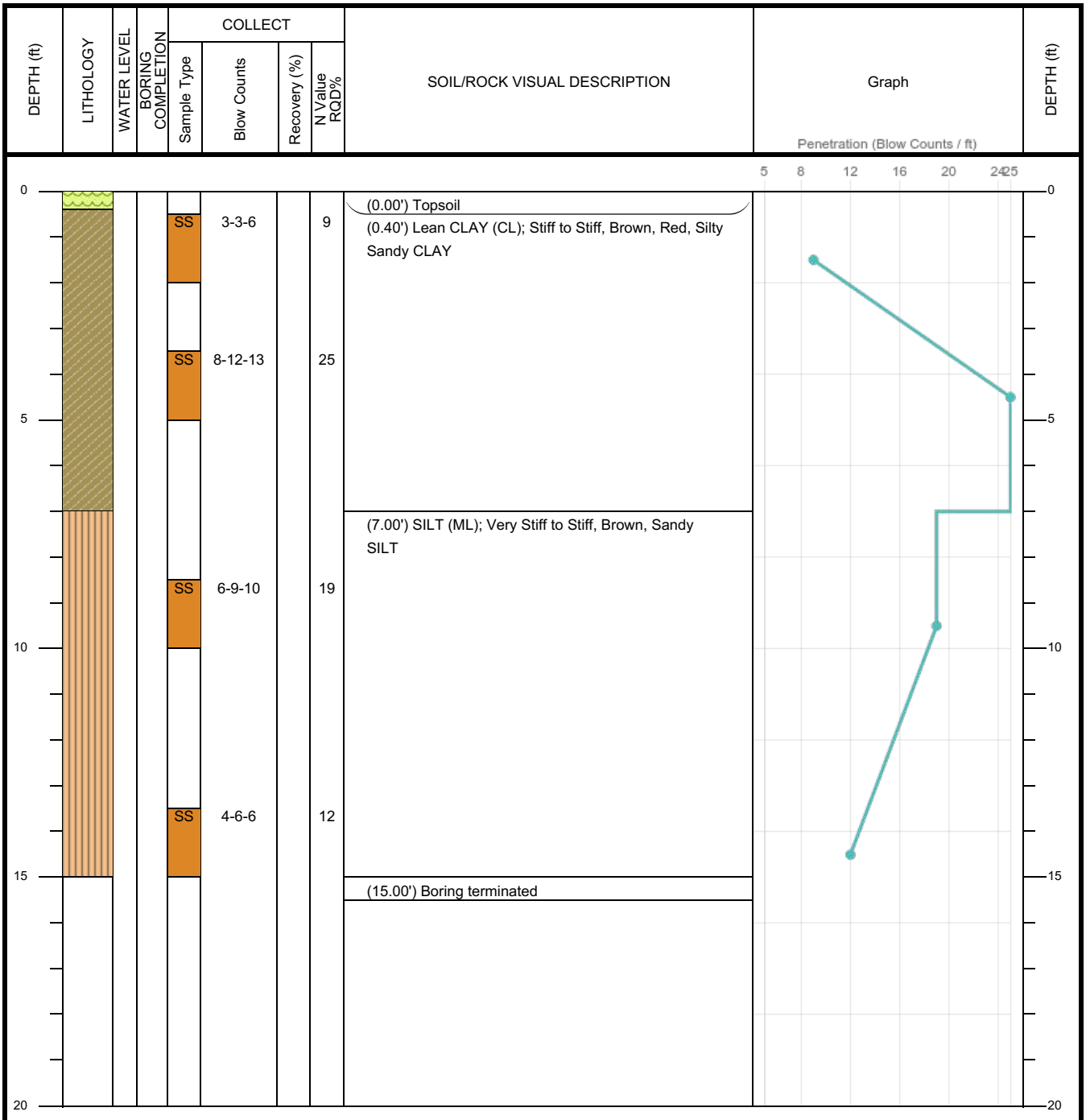
NOTES:

Checked by: MP

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Client:	**STOCKS ENGINEERING**	**BORING LOG**	
Project:	**126-0744-EA, Vance County EMS**	**Boring No.**	**B-2**
Address:	**7433 NC-39, Henderson, NC**	**Page:**	**1 of 1**

Drilling Start Date:	**9/22/26**	Boring Depth (ft):	**15**
Drilling End Date:	**9/22/26**	Cave Depth (ft):	**N/A**
Drilling Company:	**GeoTechnolgies**	Sampling Method(s):	**Split Spoon**
Drilling Method:	**Hollow Stem Auger**	DTW During Drilling (ft):	**N/A**
Drilling Equipment:	**Trailer**	DTW After Drilling (ft):	**N/A**
Driller:	**CR**	Ground Surface Elev. (ft):	**N/A**
Logged By:	**CR**	Location (Lat, Long):	**36.426902, -78.4293**



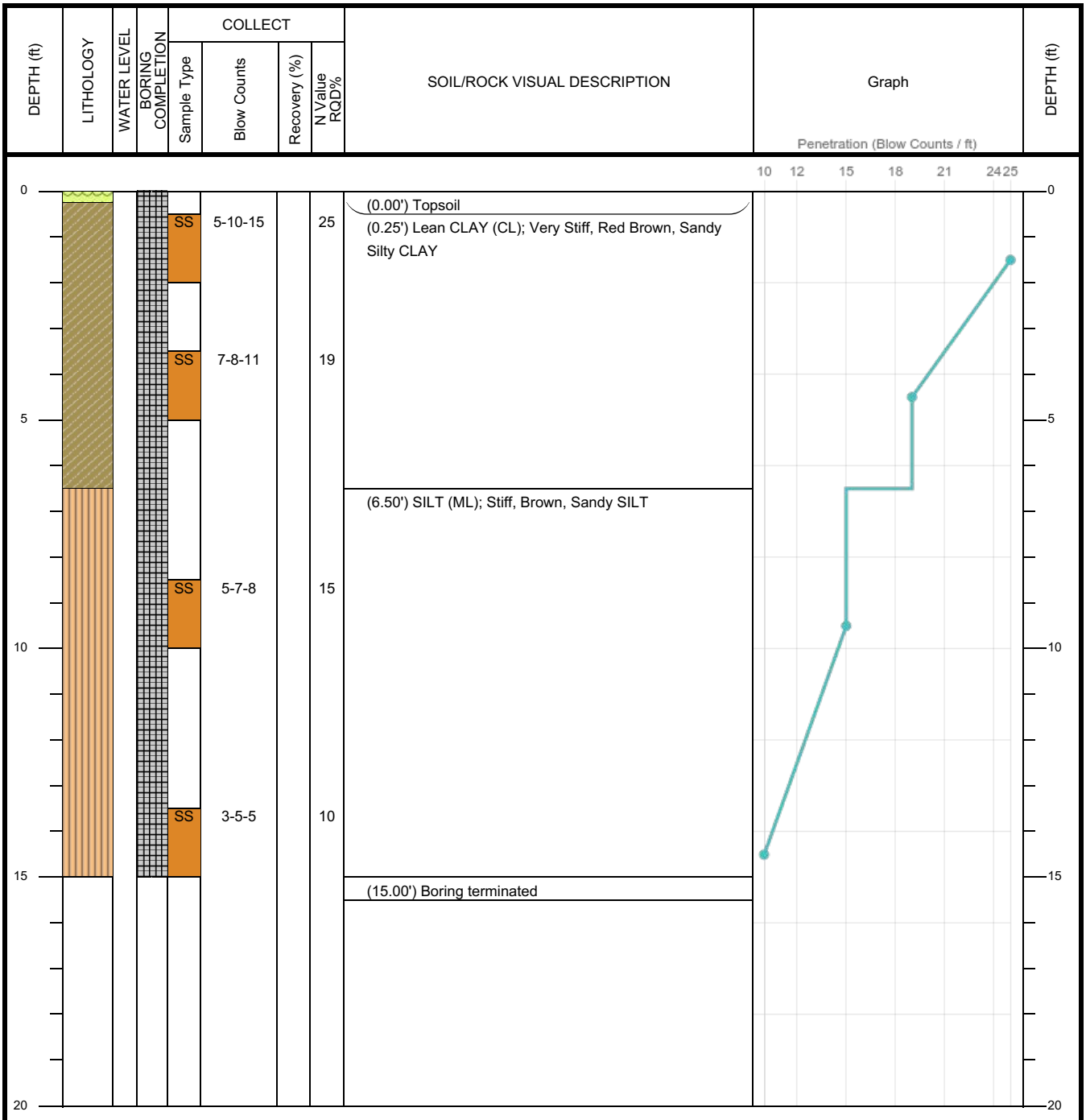
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Client:	**STOCKS ENGINEERING**	**BORING LOG**	
Project:	**126-0744-EA, Vance County EMS**	**Boring No.**	**B-3**
Address:	**7433 NC-39, Henderson, NC**	**Page:**	**1 of 1**

Drilling Start Date:	**9/24/26**	Boring Depth (ft):	**15**
Drilling End Date:	**9/24/26**	Cave Depth (ft):	**N/A**
Drilling Company:	**GeoTechnolgies**	Sampling Method(s):	**Split Spoon**
Drilling Method:	**Hollow Stem Auger**	DTW During Drilling (ft):	**N/A**
Drilling Equipment:	**Trailer**	DTW After Drilling (ft):	**N/A**
Driller:	**CR**	Ground Surface Elev. (ft):	**N/A**
Logged By:	**CR**	Location (Lat, Long):	**36.427031, -78.429826**



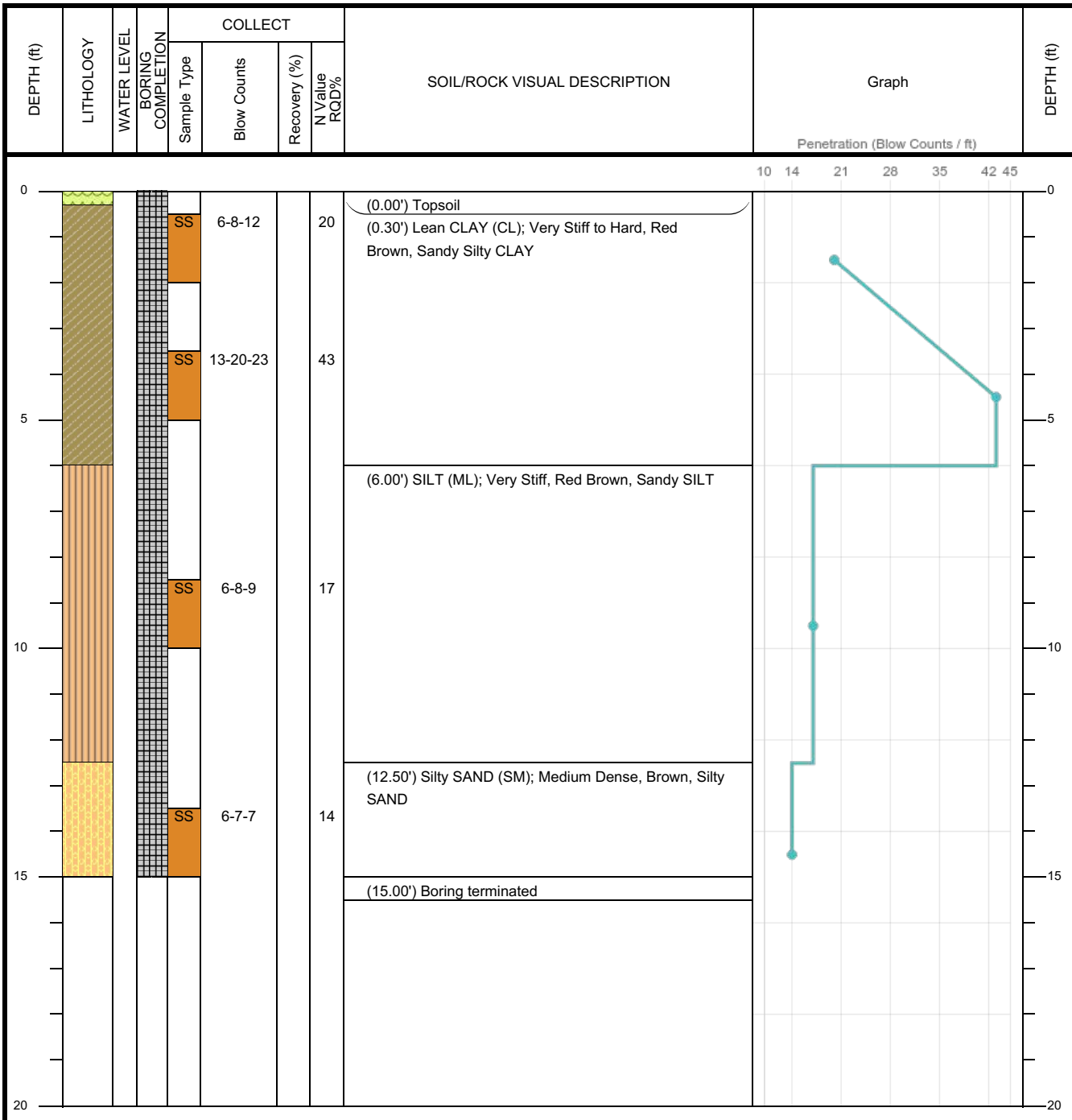
NOTES:

Checked by: MP

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Geotechnical and Construction Materials Testing Services

Client:	**STOCKS ENGINEERING**	**BORING LOG**	
Project:	**126-0744-EA, Vance County EMS**	**Boring No.**	**B-4**
Address:	**7433 NC-39, Henderson, NC**	**Page:**	**1 of 1**

Drilling Start Date:	**9/22/26**	Boring Depth (ft):	**15**
Drilling End Date:	**9/22/26**	Cave Depth (ft):	**N/A**
Drilling Company:	**GeoTechnolgies**	Sampling Method(s):	**Split Spoon**
Drilling Method:	**Hollow Stem Auger**	DTW During Drilling (ft):	**N/A**
Drilling Equipment:	**Trailer**	DTW After Drilling (ft):	**N/A**
Driller:	**CR**	Ground Surface Elev. (ft):	**N/A**
Logged By:	**CR**	Location (Lat, Long):	**36.42674, -78.429586**



NOTES:

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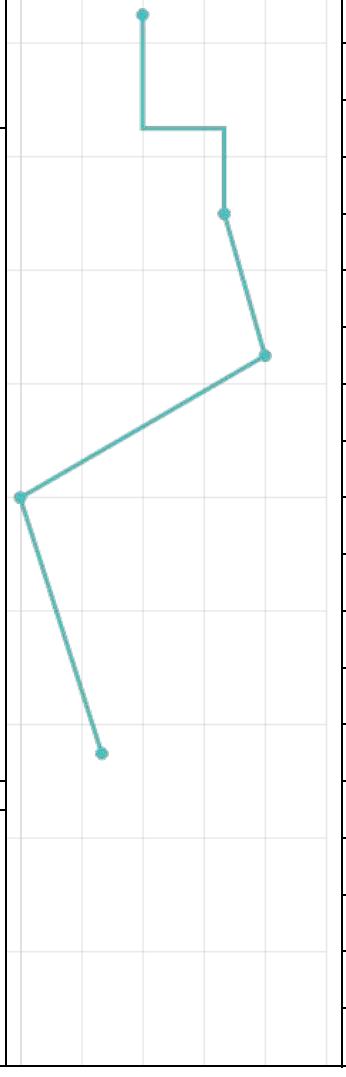
Client:	**STOCKS ENGINEERING**	**BORING LOG**	
Project:	**126-0744-EA, Vance County EMS**	**Boring No.**	**B-5**
Address:	**7433 NC-39, Henderson, NC**	**Page:**	**1 of 1**

Drilling Start Date:	**10/8/26**	Boring Depth (ft):	**15**
Drilling End Date:	**10/8/26**	Cave Depth (ft):	**N/A**
Drilling Company:	**GeoTechnolgies**	Sampling Method(s):	**Split Spoon**
Drilling Method:	**Hollow Stem Auger**	DTW During Drilling (ft):	**N/A**
Drilling Equipment:	**ATV**	DTW After Drilling (ft):	**N/A**
Driller:	**KC**	Ground Surface Elev. (ft):	**N/A**
Logged By:	**KC**	Location (Lat, Long):	**36.42661, -78.429811**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	COLLECT: Blow Counts	COLLECT: Recovery (%)	COLLECT: N Value RQD%	SOIL/ROCK VISUAL DESCRIPTION
0								(0.00') Topsoil
				SS	5-10-11		21	(0.70') Lean CLAY (CL); Very Stiff, Brown, Sandy Silty CLAY
				SS	9-12-13		25	(3.50') Silty Sand to Low Plasticity Silt (SM/ML): Medium Dense, Brown to Tan, Silty SAND to Sandy SILT
5				SS	11-12-15		27	
				SS	5-7-8		15	
10								
				SS	6-8-11		19	
15								(15.00') Boring terminated
20								

Graph: Penetration (Blow Counts / ft)

15 18 21 24 27 30



DEPTH (ft)

NOTES:

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Client:	**STOCKS ENGINEERING**	**BORING LOG**
Project:	**126-0744-EA, Vance County EMS**	**Boring No. B-6**
Address:	**7433 NC-39, Henderson, NC**	**Page: 1 of 1**

Drilling Start Date:	**10/8/26**	Boring Depth (ft):	**15**
Drilling End Date:	**10/8/26**	Cave Depth (ft):	**N/A**
Drilling Company:	**GeoTechnolgies**	Sampling Method(s):	**Split Spoon**
Drilling Method:	**Hollow Stem Auger**	DTW During Drilling (ft):	**N/A**
Drilling Equipment:	**ATV**	DTW After Drilling (ft):	**N/A**
Driller:	**KC**	Ground Surface Elev. (ft):	**N/A**
Logged By:	**KC**	Location (Lat, Long):	**36.42689, -78.430404**

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT: Sample Type	COLLECT: Blow Counts	COLLECT: Recovery (%)	COLLECT: N Value RQD%	SOIL/ROCK VISUAL DESCRIPTION
0								(0.00') Topsoil
				SS	9-11-9		20	(0.40') Silty SAND (SM); Medium Dense, Brown, Silty SAND
								(3.00') Lean CLAY (CL); Hard, Brown, Sandy CLAY
5				SS	12-23-24		47	
				SS	7-8-9		17	(6.00') SILT (ML); Medium Dense, Brown, Tan, Sandy SILT
				SS	7-9-9		18	
10								
				SS	8-12-13		25	
15								(15.00') Boring terminated
20								

Graph: Penetration (Blow Counts / ft) — 15 21 28 35 42 490

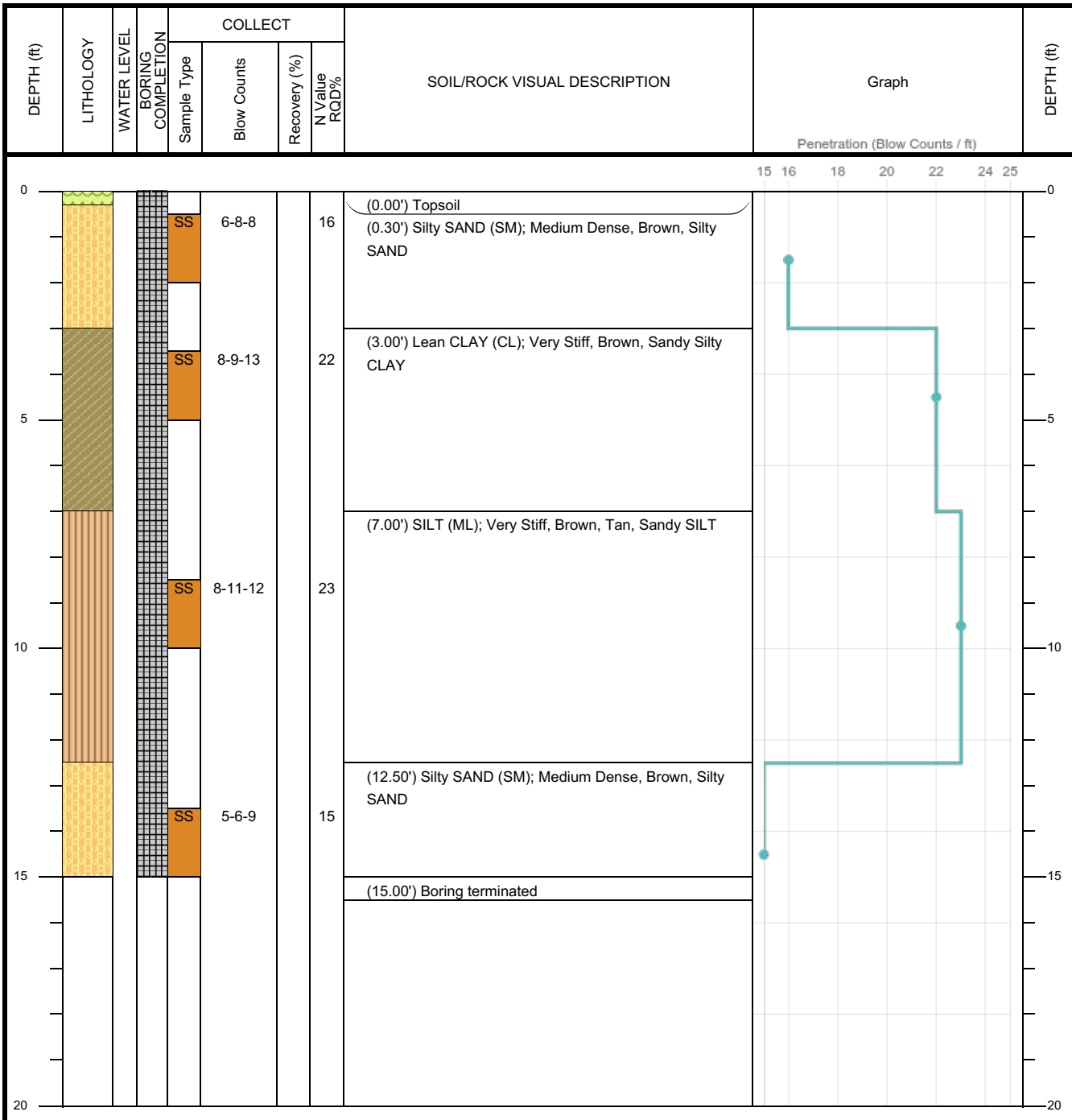
NOTES:

Checked by: MP

GeoTechnologies, Inc.
Geotechnical and Construction Materials Testing Services

Client:	**STOCKS ENGINEERING**	**BORING LOG**	
Project:	**126-0744-EA, Vance County EMS**	**Boring No.**	**B-7**
Address:	**7433 NC-39, Henderson, NC**	**Page:**	**1 of 1**

Drilling Start Date:	**9/22/26**	Boring Depth (ft):	**15**
Drilling End Date:	**9/22/26**	Cave Depth (ft):	**N/A**
Drilling Company:	**GeoTechnolgies**	Sampling Method(s):	**Split Spoon**
Drilling Method:	**Hollow Stem Auger**	DTW During Drilling (ft):	**N/A**
Drilling Equipment:	**Trailer**	DTW After Drilling (ft):	**N/A**
Driller:	**CR**	Ground Surface Elev. (ft):	**N/A**
Logged By:	**CR**	Location (Lat, Long):	**36.426454, -78.430092**



NOTES:

Checked by: MP

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: New EMS Station.

B. Owner's Name: Vance County, North Carolina.

C. Architect's Name: Oakley Collier Architects, PA.

D. The Project consists of the construction of a new EMS Station of approximately 5,000 square feet single story building to include the following spaces: (1) double apparatus bays, (1) office, (1) conference room, (1) workroom, (1) laundry room, (4) sleeping rooms, (2) shower rooms, (1) day room with kitchen, general storage, and accessories / utility spaces. The design includes plumbing, mechanical, and electrical, and fire protection along with related site development. Structural engineering is provided for foundation and slab design. Construction includes slab on grade, pre-engineered metal building with non-load bearing masonry and steel stud walls, masonry veneer, metal siding, standing seam roofing systems, aluminum storefront, resilient flooring, sealed and liquid covered concrete finishes, gypsum board wall and ceiling finishes and suspended acoustical ceilings.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on stipulated sum .

1.03 WORK BY OWNER

A. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Date of Substantial Completion. Some items include:

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:

1.04 OWNER OCCUPANCY

A. Owner intends to occupy the Project upon Substantial Completion.

B. 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 and premises 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.

D. Utility Outages and Shutdown:
   1. Prevent accidental disruption of utility services to other facilities.

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. Form to be used: AIA G703 latest edition.

B. Electronic media printout including equivalent information will be considered; submit sample to for approval.

C. Forms filled out by hand will not be accepted.

D. Submit Schedule of Values _____ 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. Form to be used: AIA G702 and G703 latest edition.

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 one electronic and three hard-copies of each Application for Payment.

J. Include the following with the application:
   1. Transmittal letter as specified for submittals in Section 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 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 and a statement describing the effect on Work by separate or other contractors. 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 Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
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 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. Contingency allowance.

C. 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. Architect Responsibilities:
   1. Consult with Contractor for consideration and selection of products .
   2. Select products in consultation with Owner and transmit decision to Contractor.

B. Contractor Responsibilities:
   1. Assist 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 CONTINGENCY ALLOWANCE

A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.

B. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.05 ALLOWANCES SCHEDULE

A. In addition to the allowance amounts included in Section 01 22 00 – Unit Prices, include the following lump sum cash allowances in the Base Bid:
   1. Allowance No. 1: Owner / Architect Contingency:
      a. Include in the Base Bid a lump sum cash allowance of $40,000 for Owner / Architect’s Contingency. Contingency items shall be as determined and approved by the Architect and shall include all materials, labor, profit, and overhead associated with the approved contingency item.
   2. Allowance No. 2 - Landscaping:
      a. Include the stipulated sum of $25,000 for design, purchase, delivery and installation of landscaping.
         1) Design of landscaping is included in the landscape allowance.

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 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 , 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. Item: Unit Price No. 1 - Undercut/Fill in Trench Excavations.
   1. Description: Removal of unsuitable soils encountered at subgrade elevations and replacement with suitable off site washed stone material in trench excavations (including footings) as authorized by the Architect, including disposal of excavated unsuitable materials off site, if required, and as further required in Division 31- Earthwork.
   2. Unit of Measurement: Cubic Yards Excavated
   3. Amount to be included in Base Bid: 50 cubic yards

B. Item: Unit Price No. 2 - Undercut/Fill in Open Excavations.
   1. Description: Removal of unsuitable soils encountered in open excavations and replacement with suitable off site fill material as authorized by the Architect, including disposal of excavated unsuitable materials off site, if required, and as further defined in Division 31 - Earthwork.
   2. Unit of Measurement: Cubic Yards Excavated
   3. Amount to be included in Base Bid: 100 cubic yards

C. Item: Unit Price No. 3 - Transformer Feeder
   1. Furnish and install 50 linear feet of transformer feeder as delineated in the electrical plans to feed from transformer to CT.
   2. Unit of Measurement: Linear feet.
   3. Amount to be included in Base Bid: 50 linear feet

D. Item: Unit Price No. 4 - 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: 10 Occurances

E. Item: Unit Price No. 5 - Duplex Receptacle and Circuit.
   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: 10 Occurances

F. Item: Unit Price No. 6 - Pre-Engineered Building Coordination - Concrete Footings.
   1. Description: Furnish and install concrete footings in compliance with plans and specifications as required for coordination with actual reactions provided by pre-engineered building manufacturer.
   2. Unit of Measurement: Per cubic yard.
   3. Amount to be included in Base Bid: 10 cubic yards.

G. Item: Unit Price No. 7 - Pre-Engineered Building Coordination - Reinforcing Steel.

1. Description: Furnish and install reinforcing steel in concrete footings in compliance with plans and specifications as required for coordination with actual reactions provided by pre-engineered building manufacturer.
2. Unit of Measurement: Per ton.
3. Amount to be included in Base Bid: 1/2 tons.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Alternates.

B. Procedures for pricing Alternates.

C. Documentation of changes to Contract Price and Contract Time.

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 PREFERRED BRAND ALTERNATES

1.04 SCHEDULE OF ALTERNATES

A. Deduct Alternate C-1: Delete Curb & Gutter (Civil Drawings, Sheet CE-03):
   1. Provide alternate pricing to remove all curb and gutter as shown on the civil drawings. Site to be graded smooth and asphalt to have a tapered, gently sloping edge to grade.

B. Deduct Alternate C-2: Delete Undergorund Roof Drain Piping (Civil Drawings, Sheet CE-03):
   1. Provide alternate pricing to remove all underground roof drain piping and provide concrete splash pads at all downspouts. See civil drawings for locations.

C. Deduct Alternate C-3: Delete HDPP Pipe and Catch Basins (Civil Drawings, Sheet CE-03):
   1. Provide alternate pricing to remove all underground HDPP pipe and catch basins from Invert #3 to Catch Basin #5 as shown on civil drawings.

D. Deduct Alternate A-1: Extruded Aluminum Fencing:
   1. Provide alternate pricing to change the patio fencing to extruded aluminum privacy fencing in lieu of wood plastic composite (WPC) privacy fencing at covered patio. See architectural drawings for locations and details.

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 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. CSI Substitution Request or similar format 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.
a. Links to web sites or multiple document folders are not acceptable and will be rejected.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

A. Submittal Time Restrictions:

B. Submittal Time Restrictions:

C. Submittal Form (before award of contract):
1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request. See this form for additional information and instructions. Other similar forms of submission are acceptable.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

A. Submittal Form (after award of contract):
1. Submit substitution requests by completing CSI/CSC Form 13.1A - Substitution Request. See this form for additional information and instructions. Other forms of submission are acceptable.

B. Architect will consider requests for substitutions only within 15 days after date of Agreement.

C. 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.

D. Submit request for Substitution for Convenience within 14 days of discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by , 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.

E. 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

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SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preconstruction meeting.

B. Site mobilization meeting.

C. Progress meetings.

D. Construction progress schedule.

E. Progress photographs.

F. Coordination drawings.

G. Submittals for review, information, and project closeout.

H. Number of copies of submittals.

I. Requests for Interpretation (RFI) procedures.

J. Submittal procedures.

1.02 PROJECT COORDINATOR

A. Project Coordinator: Construction Manager.

B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.

C. During construction, coordinate use of site and facilities through the Project Coordinator.

D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 10 00 - Summary.

F. Coordinate field engineering and layout work under instructions of the Project Coordinator.

G. Make the following types of submittals to through the Project Coordinator:
   1. Requests for Interpretation.
   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. Project Coordinator 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. Designation of personnel representing the parties to Contract.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.

D. Contractor will record minutes and distribute copies within two days after meeting to participants, with one copy to participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

A. Project Coordinator 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 one copy to participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Attendance Required: Job superintendent, Owner, Architect, major Subcontractors and suppliers as appropriate to agenda topics for each meeting.

C. Agenda:
1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.

9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to work.

D. Contractor will record minutes and distribute copies within two days after meeting to participants, with one copy to participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. 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.

C. Within 10 days after joint review, submit complete schedule.

D. 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 Final Acceptance.
2. Consult with 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.
4. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

3.06 COORDINATION DRAWINGS

A. Provide information required by Project Coordinator for preparation of coordination drawings.

B. Review drawings prior to submission to .

3.07 REQUESTS FOR INTERPRETATION (RFI)

A. Definition: A request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or

system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.

2. A resolution to an issue which has arisen due to field conditions and affects design intent.

B. 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.

C. 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.
   2. Prepare in a format and with content acceptable to Architect.

D. 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, with an explanatory notation.
   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.

E. 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.

F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

G. 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.

H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.

I. 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.

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. No action will be taken.

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 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.
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 '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 's approval, allow an additional 30 days.
8. Provide space for Contractor and Arhitect and Engineer review stamps.
9. When revised for resubmission, identify all changes made since previous submission.
10. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
11. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.

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.

E. Transmit each submittal with approved form.

F. Deliver submittals to Architect at business address.

3.13 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 and Consultant Engineer'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 Consultant Engineer's 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 Consultant Engineer's 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 RELATED SECTIONS

A. Section 01 10 00 - Summary: Work sequence.

1.03 REFERENCE STANDARDS

A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.

B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; 2016, with Addendum (2021).

1.04 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.

1.05 QUALITY ASSURANCE

A. Contractor's Administrative Personnel: three years minimum experience in using and monitoring CPM schedules on comparable projects.

1.06 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 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, Owner , and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 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

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SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. References and standards.

D. Testing and inspection agencies and services.

E. Control of installation.

F. Mock-ups.

G. Tolerances.

H. Manufacturers' field services.

I. 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; 2026a.

C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2025.

D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing of Soil and Rock as Used in Engineering Design and Construction; 2026.

E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2026.

F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2026.

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 , 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 Owner's information.

C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor to Architect, in quantities specified for Product Data.

1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to .

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 Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

F. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.04 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 before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ and pay for services of an independent testing agency to perform Special Inspections.

B. Contractor shall employ and pay for services of an independent testing agency to perform all other specified testing.

C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

D. Contractor Employed Agency:
1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
3. Laboratory: Authorized to operate in the State in which the Project is located.
4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Accepted mock-ups establish the standard of quality the will use to judge the Work.

C. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.

D. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

E. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

F. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

G. Where mock-up has been accepted by 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 .

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 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 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. Perform additional tests and inspections required by Architect/Engineer.
6. 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-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 , start-up of equipment, test, adjust, and balance 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

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.

B. New permanent facilities may be used.

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.

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.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way.

C. Provide protection for plants designated to remain. Replace damaged plants.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: Contractor's option.

B. Provide fence around construction site; equip with vehicular gates with locks at the Contractor's discretion.

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 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.

1.09 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.

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

1.10 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.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.

B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - 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 apprpriate ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

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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. 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.

C. Other Furnishings: Contractor's option.

D. 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 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.
      b. North American Green: www.nagreen.com/#sle.
      c. Propex Geosynthetics: 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 3inches (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 .

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 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 . 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 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 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 .

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 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 .
   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 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 when work is considered ready for '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 '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 's and Contractor's comprehensive list of items identified to be completed or corrected and submit to .

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify when work is considered finally complete and ready for 's Substantial Completion final inspection.

H. Complete items of work determined by 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

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. 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 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 , 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. Conveying systems.
   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 a 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 05 16
UNDERSLAB VAPOR BARRIER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sheet vapor barrier under concrete slabs on grade.

1.02 REFERENCE STANDARDS

A. 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; 2024.

B. 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 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products.

C. Samples: Submit samples of underslab vapor barrier to be used.

D. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Underslab Vapor Barrier:
   1. Water Vapor Permeance: Not more than 0.010 perms (0.6 ng/(s m2 Pa)), maximum.
   2. Complying with ASTM E1745 Class A.
   3. Thickness: 15 mils (0.4 mm).
   4. Product:
      a. Stego Industries LLC; Stego Wrap Vapor Barrier: www.stegoindustries.com/#sle.
      b. W.R. Meadows: www.wrmeadows.com.
      c. Inteplast Group: www.barrierbac.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.

B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.

C. Lap joints minimum 6 inches (150 mm).

D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.

E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.

F. Repair damaged vapor retarder before covering with other materials.

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.

B. 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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SECTION 03 30 00
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 and Interior Slabs-on-grade.
2. Exterior Slabs-on-grade.

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.

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. Curing compounds.
6. Floor and slab treatments.
7. Bonding agents.
8. Adhesives.
9. Vapor retarders.
10. Semirigid joint filler.
11. Joint-filler strips.
12. 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. 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.”

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. 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.

2. Review testing 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.

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. 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 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.

2.7 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 siliconate 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 Industraseal.
o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.

2.8 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.

2.9 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.

2.10 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.

2.11 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.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings and Interior 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).

B. Exterior Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4500 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: 5 percent, plus or minus 1.5 percent at point of delivery (prior to pumping).

2.13 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.14 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 ¾ 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 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.

3.5 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.

3.6 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.

3.7 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.

3.8 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. 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.

3.9 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, 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 restraightening 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.

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.

3.10 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.

3.11 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.

3.12 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.

3.13 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.

3.14 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will 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. 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.

6. 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.

7. 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.
8. 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.

9. 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.
10. 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.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. 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

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SECTION 03 30 05
MOISTURE VAPOR REDUCING ADMIXTURE FOR CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Moisture vapor reducing admixture (MVRA).

1.02 REFERENCE STANDARDS

A. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.

B. ACI PRC-302.2 - Concrete Slabs That Receive Moisture-Sensitive Flooring Materials; 2023.

C. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.

D. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2026c.

E. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2024.

F. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2025a.

G. ASTM D5084 - Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter; 2024.

H. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2026.

I. ASTM F3311 - Standard Practice for Mat Bond Evaluation of Performance and Compatibility for Resilient Flooring System Components Prior to Installation; 2024.

J. NSF 61 - Drinking Water System Components - Health Effects; 2025, with Addendum

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 affected installers.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's data on products and installation instructions.

C. Mix Design: Submit MVRA manufacturer approval of proposed concrete mix design.

D. Material Certificate: Certify products of this section meet or exceed specified requirements.

E. Material Test Report: Document products of this section comply with specified requirements.

F. Field Quality Control Submittals: Include project name and number, date of MVRA application, name of testing agency, location of concrete batch in work, mix proportions, materials, and test result.

G. Manufacturer's qualification statement.

H. Concrete supplier's qualification statement.

I. Concrete finisher's qualification statement.

J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Concrete Supplier Qualifications: Company certified by MVRA manufacturer with not less than three years of documented experience.

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C. Concrete Finisher Qualifications: Company certified by MVRA manufacturer with not less than three years of documented experience, and approved by manufacturer.

D. Moisture Testing: Provide ASTM F710 and testing required by MVRA manufacturer's representative.

E. Bond Testing: Provide ASTM F3311 and testing required by MVRA manufacturer's representative.

F. For slabs required to have MVRA, do not proceed with placement unless manufacturer's representative is present for every day of placement.

G. Obtain MVRA from a single 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. Slabs with Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover the cost of flooring failures due to moisture migration from slabs for life of the concrete.
   1. Include cost of repair or removal, including labor, of failed flooring or roofing, placement of topical moisture remediation system, and replacement of flooring or roofing with comparable flooring system.
   2. Provide warranty by manufacturer of MVRA matching terms of flooring or roofing adhesive or primer manufacturer's material defect warranty.

PART 2 PRODUCTS

2.01 MOISTURE VAPOR REDUCING ADMIXTURE

A. Moisture Vapor Reducing Admixture (MVRA): ASTM C494/C494M, Type S; nontoxic, volatile organic compound (VOC) free liquid admixture; reacts with hydroxide ions produced by cement hydration process; creates hydration product within capillary pores and blocks them; manufactured with deionized water to remove trace mineral ions and containing no chloride-based materials.
   1. Location: Provide admixture in all slabs.
   2. Potable Water Contact Approval: National Science Foundation (NSF) certification for use on structures holding potable water, based on testing in accordance with NSF 61.
   3. Capillary Break: Calcium silicate hydrate.
   4. Hydraulic Conductivity: 1.968 x 10^-9 feet per second (6 x 10^-8 cm/s), maximum, when tested according to ASTM D5084.
   5. Toxicity: None.
   6. Odor: None.
   7. Flammability: None.
   8. Solvent: Water.
   9. Freezing Temperature: 32 degrees F (0 degrees C).
   10. pH: 11.3.
   11. Products:
      a. Basis of Design:ISE Logik Industries, Inc; MVRA 900: www.iselogik.com/#sle
      b. AVECS, LLC; PRO-ACT: www.avecs.build/#sle..
      c. Specialty Products Group; Vapor Lock 20/20: www.spggogreen.com.
      d. Substitutions: See Section 01 60 00 - Product Requirements .

2.02 CONCRETE MIX DESIGN

A. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and according to manufacturer's instructions.

2.03 MIXING

A. Mixers:
   1. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch at high setting not less than seven minutes.
   2. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 PREPARATION

A. Where new concrete with MVRA is to be bonded to previously placed concrete, prepare surfaces according to admixture manufacturer's instructions.

3.02 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. Also see Section 03 30 00.
   1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI PRC-306 for cold-weather protection and ACI PRC-305 for hot-weather protection during curing.
   2. Cure concrete slabs to receive moisture sensitive coatings according to ACI PRC-302.2 by one or more of the follwing methods:
      a. Moisture-retaining cover curing.
      b. Self-dissipating curring compound.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. An independent testing agency will perform field quality control tests. See Section 01 40 00 - Quality Requirements.

C. Provide free access to concrete operations at project site and cooperate with appointed testing agency.

D. Slab Testing: Cooperate with manufacturer of specified MVRA to allow access for sampling and testing concrete for compliance with warranty requirements.

E. Provide test cylinders as required by MVRA manufacturer.

F. Demonstrate test cylinders comply with requirements specified in Part 2.

G. Field Quality Control Reports:
   1. Submit test results to , Contractor, and MVRA manufacturer, within 48 hours of testing.
   2. Include project name, project number, date of MVRA application, name of testing agency, location of concrete in the work, concrete mix design, and waterproofing capability.
   3. Furnish batch ticket information showing dosage of MVRA product in mix.

H. When test results indicate concrete does not comply with specified requirements, conduct additional tests as directed by . The cost of additional testing shall be borne by Contractor when defective concrete is identified.

I. Repair or replacement of defective concrete will be determined by the .

END OF SECTION

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SECTION 03 35 11
CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface treatments.

B. Liquid densifiers and hardeners.

C. Polished concrete.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

B. Coordinate the work with concrete floor placement and concrete floor curing.

C. For slabs indicated to receive concrete polishing system, do not proceed with concrete polishing unless manufacturer's representative and specialized equipment is present for every day of placement.

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. Manufacturer's Instructions: Indicate manufacturer's installation instructions for preparation of substrate, application of finishing products, and requirements for polishing and protection of finished surface.

D. Manufacturer's qualification statement.

E. Installer's qualification statement.

F. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

G. Specimen warranty.

H. Executed warranty.

1.04 QUALITY ASSURANCE

A. For slabs indicated to receive concrete polishing system, do not proceed with concrete polishing unless manufacturer's representative and specialized equipment is present for every day of placement.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least 3 years of documented experience.

C. Installer Qualifications: Company specializing in performing work of type specified and with at least 3 years of documented experience.

1.05 MOCK-UPS

A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.

B. Locate where directed.

C. Mock-up may remain as part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.07 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.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide two-year manufacturer warranty for _____ commencing on the Date of Substantial Completion.

C. Installer Warranty: Provide two-year manufacturer warranty for _____ commencing on the Date of Substantial Completion.

D. Finish Warranty: Provide five-year manufacturer warranty against excessive degradation of finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

E. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Unless otherwise indicated on drawings, finish concrete floors using troweling aid, densifier, and curing agent.

B. Densifier and Hardener:
   1. Use at the following locations: All exposed concrete flooring.

C. Polished Finish:
   1. Use at following locations: at exposed slab interior.

2.02 SURFACE TREATMENTS

A. Troweling Aid, Densifier and Curing Agent: Liquid reactive colloidal silica-based topical treatment, spray-applied to wet concrete and floated or troweled into the surface.

2.03 DENSIFIERS AND HARDENERS

A. Liquid Densifier and Hardener: Penetrating chemical compound that reacts with concrete, filling the pores, hardening, and dustproofing.
   1. Composition: Lithium silicate, with siliconate.
   2. Products:
      a. Basis of Design: Concrete Sealers USA; PS104: www.concretesealersusa.com/#sle.
      b. Euclid Chemical Company; ULTRASIL LI+: www.euclidchemical.com/#sle.
      c. HTS Chemical; CD-LS: www.htspoly.com/#sle.
      d. PROSOCO, Inc; Consolideck LS: www.prosoco.com/consolideck/#sle.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 POLISHED CONCRETE SYSTEM

A. Description: Materials, equipment, and procedures designed and furnished by single manufacturer to produce densely polished concrete of specified sheen.

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. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer.

C. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.

D. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

3.04 CONCRETE POLISHING

A. Execute using materials, equipment, and procedures specified by manufacturer, using manufacturer approved installer.

3.05 PROTECTION

A. Protect installed coatings from subsequent construction operations.

B. Do not permit traffic over unprotected floor surface.

END OF SECTION

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SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete block.

B. Concrete facing brick.

C. Mortar and grout.

D. Reinforcement and anchorage.

E. Accessories.

1.02 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; 2026.

C. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2026.

D. ASTM C90 - Standard Specification for Dry-Cast Loadbearing Concrete Masonry Units; 2024a.

E. ASTM C91/C91M - Standard Specification for Masonry Cement; 2025.

F. ASTM C129 - Standard Specification for Dry-Cast Nonloadbearing Concrete Masonry Units; 2026.

G. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2026.

H. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.

I. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2024.

J. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2026.

K. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2026.

L. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

M. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2024.

N. ASTM C1634 - Standard Specification for Dry-Cast Concrete Facing Brick and Other Concrete Masonry Facing Units; 2025.

O. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

P. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls; 2017.

Q. BIA Technical Notes No. 28B - Brick Veneer/Cold-Formed Steel Framed Walls; 2025.

R. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

S. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

T. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata (2024).

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.04 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. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.

D. Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.

E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

F. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.

G. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

H. Designer's Qualification Statement.

I. Manufacturer's Qualification Statement.

J. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

A. Comply with provisions of TMS 402/602, except where exceeded by requirements of Contract Documents.

1.06 MOCK-UPS

A. Construct a masonry wall as a mock-up panel sized 6 feet (1.8 m) long by 4 feet (1.2 m) high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.

B. Locate where directed.

C. Mock-up may remain as part of work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Handle and store pre-faced concrete block units in protective cartons or trays. Do not remove from protective packaging until ready for installation.

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 and control joint edges.
   3. Nonloadbearing Units: ASTM C129.
      a. Hollow block, as indicated per structural engineer.

B. Concrete Brick:
   1. Size: As indicated on drawings.
   2. Concrete Facing Brick: ASTM C1634; cored and solid, normal weight; for architectural and below grade use.
      a. Exposed Faces: Color and texture to be selected from manufacturer's full range.
      b. Manufacturers:
         1) Basis of Design: Johnson Concrete Products; Prestige Masonry Series; https://johnsonproductsusa.com/..
         2) Techno-Bloc; Architectural Block; https://www.techo-bloc.com/..

3) Spec Block USA; Architectural Block; https://specblockusa.com/.
4) Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91/C91M, Type N.

B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
   1. Not more than 0.60 percent alkali.

C. Hydrated Lime: ASTM C207, Type S.

D. Mortar Aggregate: ASTM C144.

E. Grout Aggregate: ASTM C404.

F. 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.

G. Water: Clean and potable.

H. Integral Water Repellent Admixture for Mortar: Polymeric liquid admixture added to mortar at the time of manufacture.
   1. Use only in combination with masonry units manufactured with integral water repellent admixture.
   2. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
   3. Meet or exceed performance specified for water repellent admixture used in masonry units.

2.03 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. Heckmann Building Products, Inc.: www.heckmannbuilding prods.com.
   2. Blok-Lok Limited: www.blok-lok.com/#sle.
   3. Hohmann & Barnard, Inc: www.h-b.com/#sle.
   4. WIRE-BONDwww.wirebond.com/#sle.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa), deformed billet bars; galvanized.

C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Truss or 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.

E. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch (16 mm) of mortar coverage from masonry face.

F. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A153/A153M 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).

G. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws; corrosion resistant finish or hot dip galvanized to ASTM A153/A153M.
   1. Manufacturers:

2.04 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Blok-Lok Limited: www.blok-lok.com/#sle.
      b. Hohmann & Barnard, Inc; _____: www.h-b.com/#sle.
      c. WIRE-BOND; _____: www.wirebond.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Performance Characteristics:
      a. Rubber: Conforming to ASTM D 2000 2 AA 805.
      b. Durometer hardness: 85 (+/- 5) when tested with ASTM D 2240-05.
      c. Length: Maximum available, 48" minimum.
      d. Water Absorption: Per ASTM D 570.
      e. Ultimate Elongation - sheet: 375%.
      f. Modulus Elongation @ 100 psi: 1100.
      g. Tensile Strength: 2425 psi.

B. Backer Rod: Closed cell polyethylene; oversized 50 percent to joint width; self expanding; maximum lengths available.
   1. Performance Characteristics.
      a. Water absorption, oz/in3 (g/cc): <0.017 (<0.03) per ASTM C 1016.
      b. Density, lb/ft3 (kg/m3): 1.50 - 3.0 (24-48) per ASTM D 1622.
      c. Compression recovery, %: >90 per ASTM D 5249.
      d. Compression deflection, psi (Kpa): >2.97 (>20.5) per ASTM D 5249.
      e. Tensile strength, psi (Kpa): >29.0 (>200) per ASTM D 1623.

C. 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.

D. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
      a. Manufacturers:
         1) 3GEN Masonry Products; Mortar Clear: www.3genmp.com/#sle.
         2) Advanced Building Products Inc; Mortar Break: www.advancedbuildingproducts.com/#sle.
         3) Mortar Net Solutions; MortarNet: www.mortarnet.com/#sle.
         4) WIRE-BOND: www.wirebond.com/#sle.
         5) York Flashings: www.yorkflashings.com/#sle.
         6) Substitutions: See Section 01 60 00 - Product Requirements.

E. Weeps:
   1. Type: Molded PVC grilles, insect resistant.
   2. Color(s): Match mortar.
   3. Manufacturers:

a. Advanced Building Products, Inc: www.advancedbuildingproducts.com/#sle.
b. Blok-Lok Limited: www.blok-lok.com/#sle.
c. CavClear, a Division of Archovations Inc; _____: www.cavclear.com/#sle.
d. Hohmann & Barnard, Inc: www.h-b.com/#sle.
e. Masonry Technology, Inc: www.mtidry.com/#sle.
f. Mortar Net Solutions: www.mortarnet.com/#sle.
g. WIRE-BOND: www.wirebond.com/#sle.
h. Substitutions: See Section 01 60 00 - Product Requirements.

F. Cavity Vents:

G. Type: Extruded propylene with honeycomb design.

H. Color(s): to match mortar.

I. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.05 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
1. Masonry below grade and in contact with earth: Type S.
2. Exterior, loadbearing masonry: Type N.
3. Exterior, non-loadbearing masonry: Type N.
4. Interior, loadbearing masonry: Type N.
5. Interior, non-loadbearing masonry: Type O.

B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

D. Mixing: Use mechanical batch mixer and comply with referenced standards.

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. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

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: As indicated for different locations.
2. Coursing: One unit and one mortar joint 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. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

F. Interlock intersections and external corners.

G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

I. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

J. 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.

B. Install cavity vents in veneer and cavity walls at 24 inches (600 mm) on center horizontally below shelf angles and lintels and near top 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 - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.

F. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches (38 mm) with at least 1/2 inch (16 mm) mortar cover to the outside face of the anchor.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches (400 mm) on center vertically and 36 inches (900 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

3.10 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches (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 over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer’s directions.

C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.

D. Extend metal flashings to within 1/2 inch (12 mm) of exterior face of masonry and cover remaining with mortar. Ensure weep or cavity vent is directly above metal flashing with bottom of vent unobstructed by mortar cover.

E. Support flexible flashings across gaps and openings.

F. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

3.11 GROUTED COMPONENTS

A. Lap splices minimum 32 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 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Size control joints as indicated on drawings; if not indicated, 3/4 inch (19 mm) wide and deep.

3.13 TOLERANCES

A. Install masonry within the site tolerances found in TMS 402/602.

B. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).

C. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

D. 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.

E. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.

F. 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).

G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).

H. 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 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.

3.16 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel and aluminum items, including:

B. Downspout boots.

1.02 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2022 (Reapproved 2026).

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.

F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

H. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2025.

I. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings; 2025.

J. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

K. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2026.

L. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2023.

M. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

O. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2026.

P. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

Q. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

R. SSPC-SP 2 - Hand Tool Cleaning; 2024.

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.

1.04 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.01 MATERIALS - FERROUS METALS

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. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

F. Stainless Steel Finish: No. 4 Bright Polished finish.

G. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.

H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.

C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.

D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.

E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.

F. Aluminum-Alloy Die Castings: ASTM B85/B85M.

G. Bolts, Nuts, and Washers: Stainless steel.

H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 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.

2.04 FABRICATED ITEMS

A. Bollards: Steel pipe, concrete filled, manufactured crowned cap, as detailed; prime paint finish.

B. Door Frames for Overhead Door Openings, Wall Openings, and _____: Channel and Angle sections; prime paint finish.

2.05 DOWNSPOUT BOOTS

A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots and on-body cleanout and cover with neoprene gaskets.
   1. Configuration: Angular.
   2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
   3. Finish: Manufacturer's standard factory applied powder coat finish.

4. Color: To be selected by from manufacturer's full range.
5. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, and rubber coupling.
6. Manufacturers:
   a. Downspoutboots.com, a division of J. R. Hoe & Sons: www.downspoutboots.com/#sle.
   b. Zurn Manufacturers. www.zurn.com
   c. J.R.Smith.jrsmith.com
   d. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 FINISHES - STEEL

A. Prime paint steel items.
   1. Exceptions: Galvanize items to be embedded in concrete and items to be imbedded in masonry.
   2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

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.

2.07 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 - GENERAL

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. Obtain approval prior to site cutting or making adjustments not scheduled.

D. After erection, prime welds, abrasionsand surfaces not shop primed or galvanized , except surfaces to be in contact with concrete.

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 53
MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire-retardant treatment (FRT).

B. Communications and electrical room mounting boards.

C. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

A. APA E30 - Engineered Wood Construction Guide; 2019.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

C. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel; 2021.

D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2025.

E. ITS (DIR) - Directory of Listed Products; Current Edition.

F. PS 1 - Structural Plywood; 2022.

G. PS 20 - American Softwood Lumber Standard; 2025.

H. UL (DIR) - Online Certifications Directory; Current Edition.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Fire-retardant treatment.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Cover wood products to protect against moisture. Support stacked products to prevent deformation and allow air circulation.

B. Fire-Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org), and that provides grading service for species and grade specified. Provide lumber stamped with grade mark unless otherwise indicated.
   2. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. 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. Communications and Electrical Room Mounting Boards: PS 1, A-D plywood; 3/4 inch (19 mm) thick; fire-retardant treated.

2.04 FIRE-RETARDANT TREATMENT (FRT)

A. Provide factory-treated wood members in accordance with AWPA U1 and use category indicated.

B. Fire-Retardant Treatment: Interior Type A, Use Category UCFA (LT), Low-Temperature (low hygroscopic).
   1. Treat blocking and other wood members concealed in noncombustible construction.
   2. Treat electrical and communications panel backer boards.

C. Kiln-dry after treatment (KDAT) to maximum moisture content of 19 percent for sawn material and 15 percent for plywood.

D. Fabrication of FRT Wood:
   1. Ripping or milling of boards, lumber, and timber after treatment is not permitted.
   2. Field cutting to length and drilling of holes in boards, lumber, and timber are permitted without additional treatment.
   3. Field cutting and drilling of holes in plywood are permitted.

E. Label or brand FRT wood with classification mark of UL (DIR) or ITS (DIR) or other approved inspection agency, the treatment plant, name of treatment, species of wood, flame spread and smoke-developed indexes, method of drying after treatment, and treating standard.

2.05 ACCESSORIES

A. Metal and Finish of Fasteners:
   1. Fire-Retardant-Treated Wood:
      a. Nails, timber rivets, wood screws, and lag screws: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
      b. Staples: Type 304 stainless steel.
      c. Fasteners other than staples, nails, timber rivets, wood screws, and lag screws: Mechanically deposited zinc-coated steel, ASTM B695 Class 55 or better.
   2. Untreated Wood: Unfinished steel.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to 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.

3.02 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 another method of support is explicitly indicated.

C. Where ceiling mounting is indicated, provide blocking and supplementary supports above ceiling unless another method of support is explicitly indicated.

D. Provide the following specific nonstructural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Grab bars.

4. Towel and bath accessories.
5. Wall-mounted door stops.
6. Chalkboards and marker boards.
7. Wall paneling and trim.

3.03 WATERPROOFING-RELATED CARPENTRY

A. Coordinate installation of carpentry with deck construction, framing of openings, and waterproofing assembly installation.

B. Provide blocking and nailers required by waterproofing assembly.

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Construction Panels - General: Install in accordance with APA E30.

B. Communications and Electrical Room Mounting Boards: Secure with screws to studs; space fasteners at maximum 24 inches (610 mm) on center.
   1. At fire-rated walls, install board over wallboard indicated as part of 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 SITE-APPLIED WOOD TREATMENT

A. Apply preservative treatment in accordance with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

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.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave wood, shavings, sawdust, etc. on ground or buried in fill.

C. Prevent sawdust and wood shavings from entering storm drainage system.

END OF SECTION

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SECTION 07 14 00
FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Modified-polymer elastomeric waterproofing.

1.02 ABBREVIATIONS AND ACRONYMS

A. HDPE: High-Density Polyethylene.

1.03 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 D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

D. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide information for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.

C. Certificate: Certify products of this section meet or exceed specified requirements.

D. Manufacturer's Instructions: Indicate special procedures.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of type specified, with minimum 3 years of documented experience and approved by manufacturer.

1.06 FIELD CONDITIONS

A. Ambient Conditions: Maintain temperatures above 40 degrees F (5 degrees C) for 24 hours before, during, and after cured application.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for craftsmanship and fabrication. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Modified-Polymer Elastomeric Waterproofing: 100 percent solids, single-component, moisture-reacted, elastomeric, coal-tar and solvent-free, modified polymer that cures to form flexible, monolithic, waterproof membrane on vertical and horizontal surfaces.
   1. Tensile Strength: 100 psi (0.69 MPa), minimum, measured in accordance with ASTM D412.
   2. Hardness: 60, Shore A, minimum, measured in accordance with ASTM C661.
   3. Water Vapor Permeance: 0.05 perm (3.1 ng/(Pa s sq m)), maximum, measured in accordance with ASTM E96/E96M.
   4. Products:
      a. Henry, a Carlisle Company; Henry MiraSeal: www.henry.com/#sle.
      b. W. R. Meadows, Inc; HYDRALASTIC 836: www.wrmeadows.com/#sle.
      c. TREMCO; TREMproof 250GC; https://www.tremcosealants.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES

A. Protection Board: Provide type capable of preventing damage to waterproofing due to backfilling and construction traffic.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.

C. Verify that items penetrating surfaces to receive waterproofing are securely installed.

D. Where existing conditions are responsibility of another installer, notify of unsatisfactory conditions.

E. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Protect adjacent surfaces from damage not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.

C. Do not apply waterproofing to surfaces unacceptable to waterproofing manufacturer.

D. Fill nonmoving joints and cracks with filler compatible with waterproofing materials.

E. Seal moving cracks with sealant and nonrigid filler, using procedures recommended by sealant and waterproofing manufacturers.

3.03 INSTALLATION

A. Install waterproofing to specified minimum thickness in accordance with manufacturer's instructions and NRCA (WM) requirements.

B. At joints and cracks 1/2 inch (13 mm) maximum in width, including joints between horizontal and vertical surfaces, apply 12-inch (300 mm) wide strip of joint cover sheet.

C. At joints from 1/2 to 1 inch (12.7 to 25.4 mm) in width, loop joint cover sheet down into joint between 1-1/4 to 1-3/4 inches (31.8 to 44.5 mm), and extend sheet minimum 6 inches (152 mm) on either side of expansion joint.

D. Center joint cover sheet over joints, roll sheet into 1/8-inch (3 mm) thick coating of waterproofing, and apply second coat over sheet extending at least 6 inches (152 mm) beyond sheet edges.

E. Apply extra thickness of waterproofing material at corners, intersections, and angles.

F. Seal membrane and flashings to adjoining surfaces.

3.04 INSTALLATION - PROTECTION BOARD

A. Place protection board directly against drainage panel; butt joints, and scribe and cut boards around projections, penetrations, and interruptions.

3.05 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Batt insulation in exterior wall construction.

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

1.02 DEFINITIONS

A. Mineral Fiber Material Composition: Insulation referred to as mineral fiber block, board, and blanket insulation is composed of fibers from mineral based substances such as rock, slag, or glass and processed from the molten state into fibrous form.
   1. Based on type of insulation substance, the material will be referred to as a mineral fiber when having a rock or slag base, and glass fiber with a glass or silica sand base, also considered a mineral.
   2. Insulation blankets are flexible units consisting of felted, bonded, or unbonded fibers formed into rolls or flat cut pieces referred to as batts; rolls are simply longer versions of batts.
   3. For additional information about mineral fiber and the various classification types, refer to the following reference standards; ASTM C553, ASTM C612, ASTM C665, and ASTM C726.

1.03 REFERENCE STANDARDS

A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.

B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2025.

C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.

D. ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board; 2024.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

F. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2026.

1.04 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.

1.05 QUALITY ASSURANCE

1.06 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 in Metal Framed Walls: Batt insulation with no vapor retarder.

B. Insulation Above Lay-In Acoustical Ceilings: Batt insulation with no vapor retarder.

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2.02 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.
   6. Products:
      a. CertainTeed Corporation: www.certainteed.com/#sle.
      b. Johns Manville: www.jm.com/#sle.
      c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: www.owenscorning.com/en-us/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
   1. Application: Sealing of interior circular penetrations, such as pipes or cables.
   2. Width: Are required for application.

B. 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.

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 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install in exterior wall 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.

E. Tape insulation batts in place.

3.03 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION - ROCKWOOL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mineral fiber board insulation.

1.02 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023, with Editorial Revision (2024).

B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2025.

C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.

D. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).

E. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2025.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

G. EN 15804 - Sustainability of Construction Works - Environmental Product Declarations - Core Rules for the Product Category of Construction Products; 2022 (Corrigendum 2021).

H. ISO 14025 - Environmental Statements and Programmes for Products - Environmental Product Declarations (EPDs); 2026.

I. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

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.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and accessories in insulation manufacturer’s original packaging with identification labels intact and in sizes to suit project.
   1. Ensure insulation materials are not exposed to moisture during delivery.
   2. Replace wet or damaged insulation materials.

B. Store materials off ground in dry location and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer; store in original packaging until installed.

C. Packaging Waste Management: Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities. Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Thermal Insulation:
   1. ROCKWOOL: www.rockwool.com/#sle.

2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MINERAL FIBER BOARD INSULATION MATERIALS

A. Type ___ - Mineral Fiber Board Fire-Safing Insulation: Semi-rigid stone wool insulation that is noncombustible, firestopping component; Type IVA in accordance with ASTM C612.
   1. Applications: Fire-safing insulation for filling perimeter gaps around conduit pipes and duct openings through walls and floor slabs and between fire rated wall assemblies and roof decking, and firestopping control as indicated on drawings.
   2. Flame Spread Index (FSI): 25 or less, when tested in accordance with ASTM E84 or UL 723.
   3. Smoke Developed Index (SDI): 50 or less, when tested in accordance with ASTM E84 or UL 723.
   4. Smoke Barrier Sealant: Provide firestopping sealant as listed in applicable fire test assembly; see Section 07 84 00.
   5. Facing: Unfaced.
   6. Board Thickness: 2 inches (51 mm).
   7. Board Size: 24 by 48 inches (610 by 1220 mm).
   8. Board Edges: Square.
   9. Noise Reduction Coefficient (NRC): Not less than 1.00 for 2 inches (51 mm) thick when measured and calculated in accordance with ASTM C423.
   10. Density: 4.5 pcf (72 kg/cu m), nominal.
   11. Moisture Resistance: Absorption of less than 0.04 percent by volume.
   12. Metallic Corrosion Resistance: Noncorrosive/passed, when tested in accordance with ASTM C665 for steel, and ASTM C795 for stress corrosion cracking tendency of austenitic stainless steel.
   13. Melting Point: 2,150 degrees F (1177 degrees C), minimum.
   14. Fungi Resistance: Zero mold growth when tested in accordance with ASTM C1338.
   15. Environmental Product Declaration (EPD): Material included on UL-certified EPD in accordance with EN 15804 and ISO 14025; see 01 60 00 - Product Requirements for additional information.
   16. Products:
      a. ROCKWOOL; ROXUL SAFE: www.rockwool.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

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 honeycombs, fins, or irregularities.

3.02 INSTALLATION

A. Install insulation in accordance with manufacturer’s written installation instructions.

B. Ensure that insulation installation maintains continuity of thermal protection to building interior spaces.

C. Do not compress insulation to fit into spaces.

3.03 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 26 00
VAPOR RETARDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Vapor retarders.

1.02 DEFINITIONS

A. Vapor Retarder: Airtight barrier made of material that is relatively water vapor impermeable, to degree specified, with seams and joints sealed to adjacent surfaces.

B. Vapor Retarder Class: A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class is defined using Procedure A, Desiccant Method at 73 degrees F (23 degrees C) and 50 percent Relative Humidity (RH), in accordance with ASTM E96/E96M and ICC (IBC), as follows:
   1. Class I: 0.1 perm or less.
   2. Class II: Greater than 0.1 perm to 1.0 perm.
   3. Class III: Greater than 1.0 perm to 10 perms.
   4. Vapor Permeable: 5 perms or greater.

1.03 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 D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay; 2026.

C. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

D. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing; 2015, with Editorial Revision (2020).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

1.05 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 VAPOR RETARDERS

A. Underslab Vapor Retarders: See Section 03 30 00.

B. Vapor Retarder Coating: Liquid applied, resilient, ultra-violet (UV) light resistant coating; associated joint treatment.
   1. Dry Film Thickness (DFT): 40 mil, 0.040 inch (1.016 mm), minimum.
   2. Water Vapor Permeance: 1.0 perm (57 ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M.
   3. VOC Content: Less than 6.68 oz/gal (50 g/L), when tested in accordance with 40 CFR 59, Subpart D - EPA Method 24.
   4. Resistance to Fungal Growth: No growth when tested in accordance with ASTM D5590.
   5. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.
   6. Suitable for use on concrete, masonry, plywood, and gypsum sheathing.

7. Joint Preparation Treatment: Provide coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
8. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.
9. Products:
   a. Carlisle Coatings and Waterproofing; Barriseal-R: www.carlisleccw.com/#sle.
   b. Master Builders Solutions; MasterSeal AWB 660 I: www.master-builders-solutions.com/en-us/#sle.
   c. W. R. Meadows, Inc; Air-Shield LM or Air-Shield LM (All Season): www.wrmeadows.com/#sle.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Vapor Retarder and Adjacent Substrates: As indicated, complying with vapor retarder manufacturer's installation instructions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions comply with requirements of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Vapor Retarders: Install continuous airtight barrier over surfaces indicated, with sealed seams and sealed joints to adjacent surfaces.

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Vapor Retarder Coatings:
   1. Prepare substrate in accordance with coating manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
   2. Where exterior masonry veneer is being installed, install masonry anchors before installing vapor retarder over masonry; provide airtight seal around anchors.
   3. Apply flashing to seal with adjacent construction and to bridge joints in coating substrate.

E. Openings and Penetrations in Exterior Vapor Retarders:
   1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches (127 mm) onto vapor retarder and at least 6 inches (152 mm) up jambs; mechanically fasten stretched edges.
   2. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches (100 mm) wide; do not seal sill flange.
   3. At openings with nonflanged frames, seal vapor retarder to each side of framing at opening using flashing at least 9 inches (230 mm) wide, and covering entire depth of framing.
   4. At head of openings, install flashing under vapor retarder extending at least 2 inches (50 mm) beyond face of jambs; seal vapor retarder to flashing.
   5. At interior face of openings, seal gaps between window/door frame and rough framing using appropriate joint sealant over backer rod.
   6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of vapor retarder.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Owner's Inspection and Testing: Cooperate with Owner's testing agency.
   1. Allow access to work areas and staging.
   2. Notify Owner's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
   3. Do not cover work of this section until testing and inspection is accepted.

C. Do not cover installed vapor retarders until required inspections have been completed.

D. Obtain approval of installation procedures from vapor retarder manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

E. Take digital photographs of each portion of installation prior to covering up vapor retarders.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

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SECTION 07 41 13
METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal roof panel system of preformed steel panels.

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); 2026.

B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

C. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2025.

1.03 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. Summary of test results, indicating compliance with specified requirements.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Specimen warranty.

C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
   1. Show work to be field-fabricated or field-assembled.
   2. Include structural analysis signed and sealed by qualified structural engineer, indicating compliance of roofing system to specified loading conditions.

D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches (305 mm) square, representing actual roofing metal, thickness, profile, color, and texture.
   1. Include typical panel joint in sample.
   2. Include typical fastening detail.

F. Test Reports: Indicate compliance of metal roofing system to specified requirements.

G. Warranty: Submit specified 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 five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Identify fabricated components with UL 90 label where appropriate.

C. Packing, Shipping, Handling and Unloading:
   1. Bundle roofing panels in waterproof wrapping paper.
   2. Package trim and accessories in waterproof wrapping paper.

D. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.
   1. Stack prefinished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture runoff.
   2. Store products of this section in manufacturer's unopened packaging until installation of products.
   3. Maintain dry, heated storage area for products of this section until installation of products.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of thirty years from Date of Substantial Completion.

C. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of twenty years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Structural Metal Roof Panel Manufacturers:
   1. IMETCO; _____: www.imetco.com/#sle.
   2. MBCI, a Cornerstone Building Brands Company; BattenLok HS Standing Seam Panel: www.mbci.com/#sle.
   3. Taylor Metal Products: www.taylormetal.com/#sle.
   4. Basis of Design: Western State Metals; Mechanically Seamed; https://www.westernstatesmetalroofing.com/#sle.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Metal Soffit Panels Manufacturers:
   1. MBCI, a Cornerstone Building Brands Company; Artisan Panel: www.mbci.com/#sle.
   2. Petersen Aluminum Corporation; _____: www.pac-clad.com/#sle.
   3. Basis of Design: Western State Metals; Soffit Panel; https://www.westernstatesmetalroofing.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Metal Roof Panels: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:
   1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed L/180 of span length(L) when tested in accordance with ASTM E1592.
      a. Dead Loads: Weight of roofing system.
      b. Live Loads: As required by ASCE 7.
   2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
   3. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F (56 degrees C).

2.03 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's stainless steel concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.04 FABRICATION

A. Panels: Provide factory or field fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.05 FINISHES

A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch (0.023 mm); color and gloss as selected by Architect from manufacturer’s standard line.
   1. Products:
      a. Arkema, Inc; Kynar 500: www.arkema.com/#sle.
      b. Beckers Group; Beckry Fluor: www.beckers-group.com/#sle.
      c. PPG; Duranar: www.ppgmetalcoatings.com/#sle.
      d. Sherwin-Williams Company; Fluropon: www.coil.sherwin.com/#sle.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

B. Solar Reflectance Index (SRI): 82, Initial, less than 2:12 low-sloped roof.

2.06 ACCESSORIES

A. Miscellaneous Sheet Metal Items: Provide flashings, trim, moldings, closure strips, caps, equipment curbs, and all necessary components of the same material, thickness, and finish as used for the roofing panels and as required for a complete roof assembly. Items completely concealed after installation may optionally be made of stainless steel.
   1. Downspouts: Open face, rectangular profile.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of closed-cell synthetic rubber, neoprene, or PVC or combination steel and closed-cell foam.

C. Sealants:
   1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
   2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
   3. Seam Sealant: Factory-applied, non-skinning, non-drying type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Broom clean wood sheathing prior to installation of roofing system.

B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to ensure that completed roof will be free of leaks.

C. Coordinate installation of waterproof membrane over roof sheathing with Section 06 10 00.

D. Remove protective film from surface of roof panels immediately prior to installation; strip film carefully to avoid damage to prefinished surfaces.

E. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by metal roof panel manufacturer.

F. At locations where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

A. Overall: Install roofing system in accordance with approved shop drawings and metal roof panel manufacturer's instructions and recommendations, as applicable to specific project conditions; securely anchor components of roofing system in place allowing for thermal and structural movement.
   1. Install roofing system with concealed clips and fasteners.
   2. Minimize field cutting of panels. Where field cutting is required, use methods that will not distort panel profiles. Use of torches for field cutting is prohibited.

B. Accessories: Install all components required for a complete roofing assembly, including flashings, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. Install roofing felt and building paper slip sheet on roof sheathing before installing preformed metal roof panels; secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners; apply from eaves to ridge in shingle fashion, overlapping horizontal joints at least 2 inches (50 mm) and side and end laps at least 3 inches (75 mm); offset seams in building paper and seams in roofing felt.

D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
   1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by panel manufacturer.

3.04 CLEANING

A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.05 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION

SECTION 07 42 13
METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal wall panel system.

1.02 REFERENCE STANDARDS

A. AAMA 508 - Voluntary Test Method and Specification for Pressure Equalized Rainscreen Wall Cladding Systems; 2021.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

D. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, and methods of anchorage.

C. Samples: Submit two samples of wall panel, 12 inch (304.79 mm) by 12 inch (304.79 mm) in size illustrating finish color, sheen, and texture.

D. Manufacturer's qualification statement.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.05 MOCK-UPS

A. Construct mock-up, 4 feet (1.22 m) long by 4 feet (1.22 m) wide; include panel system, , attachments to building frame, associated vapor retarder and air seal materials, weep drainage system, sealants and seals, in mock-up.

B. Locate as directed by Architect.

C. Mock-up may remain as part of work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.07 FIELD CONDITIONS

A. Do not install wall panels when air temperature or relative humidity are outside manufacturer's limits.

1.08 WARRANTY

A. See Section 01 70 00 Execution and Closeout Requirements, for additional warranty requirements.

B. Finish Warranty: Provide 15-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

C. Special Warranty: Provide 2-year warranty covering water tightness and integrity of seals of metal wall panels. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Wall Panels - Concealed Fasteners:
1. Centria, a Nucor Company; CS660: www.centria.com/#sle.
2. MBCI, a Cornerstone Building Brands Company; Designer Series 16.0 Fluted Panel: www.mbci.com/#sle.
3. Petersen Aluminum Corporation; Reveal Wall Panels: www.pac-clad.com/#sle.
4. Basis of Design: Western State Metals; Western Reveal; https://www.westernstatesmetalroofing.com/#sle .
5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 METAL WALL PANEL SYSTEM

A. Description: Factory-fabricated, pressure-equalized rainscreen (PERS) panel system, site assembled; comply with AAMA 508.

B. Performance Requirements:
1. Design and size components to support assembly dead loads and withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
2. Structural Performance:
   a. Comply with ASTM E330/E330M, using test pressure 1.5 times design wind pressure, with 10-second maximum load duration.
3. Movement:
   a. Accommodate movement within system without damage to components or seal deterioration.
   b. Accommodate movement between system and perimeter components when subject to seasonal temperature cycling, dynamic loading, load release, and support framing deflection.
4. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

C. Exterior Wall Panels:
1. Profile: Vertical; 1" reveal with raised flat pan.
2. Side Seams: Batten-covered, sealed with continuous gaskets.
3. Material: Precoated steel sheet, 24 gauge, 0.0211 inch (0.511 mm) minimum thickness.
4. Panel Width: 16 inches (406 mm).
5. Color: As selected by Architect from manufacturer's full line.

D. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.

E. Trim, Closure Pieces, Caps, and Flashings: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

F. Anchors: Galvanized steel.

2.03 MATERIALS

A. Precoated Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with coating; continuous coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

2.04 FINISHES

A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch (0.023 mm); color and gloss as selected by Architect from manufacturer's standard line.

B. Products:
   1. Arkema, Inc; Kynar 500: www.arkema.com/#sle.
   2. PPG; Duranar: www.ppgmetalcoatings.com/#sle.
   3. Sherwin-Williams Company; Fluropon: www.coil.sherwin.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.

B. Sealants: Specified in Section 07 90 05. Manufacturer's standard type suitable for use with installation of system; non-staining; color as selected.

C. Fasteners: Manufacturer's standard type to suit application; steel, hot dip galvanized.

D. Field Touch-up Paint: As recommended by panel manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing members are ready to receive panels.

B. Verify air barrier, see Section 07 27 00, has been installed over wall panel substrate; see Section 05 40 00.

3.02 PREPARATION

A. Install subgirts perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane, and spaced at intervals indicated.

3.03 INSTALLATION

A. Install panels on walls in accordance with manufacturer's instructions.

B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint; allow to dry prior to wall panel installation.

C. Fasten panels to structural supports; aligned, level, and plumb.

D. Locate joints over supports.

E. Provide joints where required.

F. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.04 TOLERANCES

A. Offset From True Alignment Between Adjacent Members Abutting or In Line: 1/16 inch (1.6 mm), maximum.

B. Variation from Plane or Location As Indicated on Drawings: 1/4 inch (6.4 mm), maximum.

3.05 CLEANING

A. Remove site cuttings from finish surfaces.

B. Remove protective material from wall panel surfaces.

C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

3.06 PROTECTION

A. Protect metal wall panels until completion of project.

B. Touch-up, repair, or replace damaged wall panels or accessories before Date of Substantial Completion.

END OF SECTION

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); 2026.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

E. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement; 2025.

F. CDA A4050 - Copper in Architecture - Handbook; Current Edition.

G. 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 x 12 inch (300 x 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 andInstaller 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. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch (0.61 mm) thick base metal.

B. Anodized Aluminum: ASTM B209/B209M, 3005 alloy, H12 or H14 temper; 0.032 inch (0.81 mm) thick; clear anodized finish.

2.02 PREFINISHED ALUMINUM SHEETS

A. Description: Factory-applied topcoat systems applied to aluminum flat sheet substrates prior to fabrication by coil coating; topcoat systems consist of primers and organic topcoats on exposed side and backing coats on unexposed side.

B. Aluminum Sheet Substrates: ASTM B209/B209M, alloy and temper as recommended by manufacturer for application.

C. Superior Performance Organic Coating System: Comply with AAMA 2605 for aluminum preparation, pretreatment, primer and finish coat system; provide thermally cured 70-percent PVDF fluoropolymer systems; tested for weathering for 10 years with 5 delta units color change maximum.
   1. Clear Topcoat: Manufacturer's clear topcoat applied over finish coat system.

2.03 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.

2.04 FLASHING

A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.05 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Primer Type: Zinc chromate.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 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.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

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SECTION 07 65 26
SELF-ADHERING SHEET FLASHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Self-adhering sheet flashing.

B. Surface preparation.

C. Application of self-adhering sheet membrane flashing.

1.02 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

B. ASTM D570 - Standard Test Method for Water Absorption of Plastics.

C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

D. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.

E. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

F. ASTM E96-00e1 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.

G. ASTM E154-99 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

H. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

I. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

J. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.

K. ASTM E2178-01 - Standard Test Method for Air Permeance of Building Materials.

L. CGSB 37-GP-56M - Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Submit manufacturer's product data and application instructions.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of self-adhesive membranes.

1. Obtain self-adhesive flashing membrane materials from a single manufacturer regularly engaged in manufacturing the product.
2. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.05 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. Store adhesives and primers at temperatures of 40o F (5o C) and above to facilitate handling.
D. Store membrane cartons on pallets.
E. Do not store at temperatures above 90o F (32o C) for extended periods.
F. Keep away from sparks and flames.
G. Completely cover when stored outside. Protect from rain.
H. Protect materials during handling and application to prevent damage or contamination.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Product not intended for uses subject to abuse or permanent exposure to the elements.
B. Protect rolls from direct sunlight until ready for use
C. Do not apply membrane when air or surface temperatures are below 40o F (4o C).
D. Do not apply to frozen surfaces.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. W. R. MEADOWS, INC: www.wrmeadows.com.
   1. Product: AirShield Basis of Design
B. Carlisle: www.carlisle.com.
C. Henry: www.henry.com.
D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Rolled, Self-Adhering Sheet Flashing Membrane: 40 mils (1.0 mm) thick membrane.
B. Characteristics:
   1. Color:
      a. Carrier Film: White.
      b. Polymeric Membrane: Black.
   2. Thickness: 40 mils (1mm).
   3. Tensile Strength Film:
      a. ASTM D412, modified (MD): 4,000 psi (27.6 MPa).
      b. ASTM D882 (MD): 23.5 lb./in. (4.1 N/mm).
   4. Elongation Film:
      a. ASTM D412, modified (MD, %): 400 (Typical).
      b. ASTM D882 (MD, %): 400 Min.
   5. Puncture Resistance, ASTM E154: 40 lbf (178 N) Min.
   6. Water Vapor Permeance (free film), ASTM E 96, Procedure B: 0.035 Perms.
   7. Air Permeability, ASTM E283 / E2178: 0.004 cfm/ft.2 @ 75 Pa (1.57 lb / ft.2).
   8. Lap Peel Strength @ 39o F (3.9o C), ASTM D903, 180 Bend: 10 lbf/in. (1.75 N/mm).
   9. Low Temperature Flexibility @ -22o F (-30o C), CGSB 37-GP-56M: Pass

2.03 ACCESSORIES

A. Surface Conditioner: Per flashing membrane manufacturer.
B. Pointing Mastic: Mastic for sealing penetrations and terminations of membrane.
   1. Per flashing membrane manufacturer.
C. Concrete Repair Materials: Per flashing membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Surface Preparation
   1. Protect adjacent surfaces not designated to receive self-adhering flashing membrane.

2. Clean and prepare surfaces to receive membrane in accordance with manufacturer's instructions.
3. Do not apply membrane to surfaces unacceptable to manufacturer.
4. All surfaces must be clean, smooth, and dry and must be clean of oil, dust, and excess mortar.
5. Strike masonry joints flush.
6. Patch all holes and voids and smooth out any surface misalignments.
7. Concrete surfaces must be cured for a minimum of 14 days.

3.02 APPLICATION

A. Precut pieces of flashing to size to aid in handling.

B. Prime surfaces to be covered in one working day with applicable adhesive.

C. Remove release paper prior to application and apply membrane with a minimum overlap of 3” (75 mm) onto primed surface.

D. Recess through wall flashing 1/2” (13 mm) from the face of the masonry.

E. Roll membrane firmly into place with hand roller.

F. Ensure membrane is fully adhered and remove all wrinkles and fish mouths.

G. Overlap subsequent courses of membrane a minimum of 2” (50 mm) and ensure joints are fully adhered.

H. Seal top edge of transition membrane with pointing mastic.

I. Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

3.03 PROTECTION

A. Cover self-adhering sheet flashing as soon as possible, since it is not designed for permanent exposure.

END OF SECTION

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SECTION 07 71 00
ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured roof specialties, including fascias.

1.02 REFERENCE STANDARDS

A. NRCA (RM) - The NRCA Roofing Manual; 2026.

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.

E. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

1.04 DELIVERY, STORAGE, AND 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.

1.05 WARRANTY

A. Manufacturer's Standard Warranty: Warranted materials shall be free of defects in material and workmanship for five years after shipment.

B. 20-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/#sle.
   2. ATAS International, Inc: www.atas.com/sle.
   3. Drexel Metals Inc: www.drexmet.com/#sle.
   4. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
   5. Metal-Era Inc: www.metalera.com.
   6. Metal Roofing Systems, Inc: www.metalroofingsystems.biz/#sle.
   7. Western State Metals; https://www.westernstatesmetalroofing.com/#sle.
   8. Substitutions: See Section 01 60 00 - Product Requirements.

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.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

C. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

D. Coordinate installation of flashing flanges into reglets.

END OF SECTION

SECTION 07 71 23
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gutters and downspouts.

B. Splash guards.

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); 2026.

B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

C. CDA A4050 - Copper in Architecture - Handbook; Current Edition.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on prefabricated components.

C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

D. Samples: Two sample assemblies, 12 inches (305 mm) long, illustrating component design, finish, color, and configuration.

1.04 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Stack material to prevent twisting, bending, or abrasion and to provide ventilation. Slope to drain.

C. Prevent contact with materials that cause discoloration, staining, or damage.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 5-year manufacturer warranty for material and workmanship. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 DESIGN CRITERIA

A. Comply with applicable code for size and method of rainwater discharge.

2.02 GUTTERS AND DOWNSPOUTS

A. Gutters: Profile as indicated on plans, contemporary profile when not indicated.

B. Downspouts: Profile as indicated on plans - smooth, size as indicated on plans.

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 SPLASH GUARDS

A. Splash Pads: Precast concrete type, profiles sizes as indicated on drawings; minimum 3,000 psi (21 MPa) compressive strength at 28 days, with minimum 5 percent air entrainment.

2.04 SHOP FABRICATION

A. Form gutters and downspouts of profiles and size indicated in construction documents.

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; comply with CDA A4050

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.05 FINISHES

A. Prefinished Aluminum Sheets: Factory-applied topcoat systems applied to aluminum flat sheet substrates prior to fabrication by coil coating; topcoat systems consist of primers and organic topcoats on exposed side and backing coats on unexposed side.
   1. Aluminum Sheet Substrates: ASTM B209/B209M, alloy and temper as recommended by manufacturer for application.
   2. Superior Performance Organic Coating System: Comply with AAMA 2605 for aluminum preparation, pretreatment, primer, and finish coat system; provide thermally cured 70-percent PVDF fluoropolymer systems; tested for weathering for 10 years with 5 delta units color change maximum.
      a. Clear Topcoat: Manufacturer's clear topcoat applied over finish coat system.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify surfaces are acceptable for product installation in accordance with manufacturer's written instructions.

3.02 PREPARATION

A. Paint concealed sheet metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mils, 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. Connect downspouts to downspout boots at 12 inches (305 mm) above grade. Grout connection watertight.

E. Connect downspouts to storm sewer system. Grout connection watertight.

F. 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. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2026.

C. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2023a, with Editorial Revision (2024).

D. FM 4991 - Examination Standard for Firestop Contractors; 2026.

E. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

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. 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:
   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 MANUFACTURERS

A. Firestopping Manufacturers:
   1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
   2. Hilti, Inc: www.hilti.com/#sle.
   3. HoldRite, a Brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Firestopping Materials: Any materials meeting requirements.

B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

C. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.

B. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

C. Acoustically Rated Firestopping: Provide system tested in accordance with ASTM E90 with STC rating of 50, minimum.

2.04 FIRESTOPPING FOR FLOOR-TO-FLOOR, FLOOR-TO-WALL, HEAD-OF-WALL, AND WALL-TO-WALL JOINTS

A. Gypsum Board Walls:
   1. Wall-to-Wall Joints That Have Not Been Tested For Movement Capabilities (Static-S):

2.05 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

2.06 FIRESTOPPING SYSTEMS

A. Firestopping at Cable Tray Penetrations: Any material meeting requirements.

B. Firestopping at Cable Penetrations, not in Conduit or Cable Tray: Caulk or putty.

C. Firestopping at Control Joints (without Penetrations): Any material meeting requirements.

2.07 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.
      b. 3M Fire Protection Products: www.3m.com/firestop.
      c. Hilti, Inc: www.us.hilti.com.
      d. Specified Technologies, Inc: www.stifirestop.com.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

C. Foam Firestoppping: 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.
      b. Hilti, Inc: www.us.hilti.com.
      c. Specified Technologies, Inc: 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.
b. Hilti, Inc.: www.us.hilti.com.
c. Thermafiber, Inc.: 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.
b. Pecora Corporation: www.pecora.com.
c. Thermafiber, Inc: 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.
b. 3M Fire Protection Products: www.3m.com/firestop.
c. Hilti, Inc: www.us.hilti.com.
d. Specified Technologies, Inc: 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.
b. 3M Fire Protection Products: www.3m.com/firestop.
c. Hilti, Inc: www.us.hilti.com.
d. Specified Technologies, Inc: 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.
b. Hilti, Inc: www.us.hilti.com.
c. Nelson FireStop Products: www.nelsonfirestop.com.
d. Specified Technologies, Inc: 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. 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; 2026.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.

E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2022.

F. 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 and submit at least two physical samples for verification of color of each required sealant.

F. Executed warranty.

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.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants:
1. Adhesives Technology Corporation: www.atcepoxy.com/#sle.
2. Bostik Inc: www.bostik-us.com/#sle.
3. Dow: www.dow.com/#sle.
4. Henry Company: www.henry.com/#sle.
5. Hilti, Inc: www.us.hilti.com/#sle.
6. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com/#sle.
7. Pecora Corporation: www.pecora.com/#sle.
8. Sika Corporation: www.usa.sika.com/#sle.
9. Specified Technologies Inc: www.stifirestop.com/#sle.
10. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
11. W.R. Meadows, Inc: 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.
2. Bostik Inc: www.bostik-us.com/#sle.
3. Dow: www.dow.com/#sle.
4. Pecora Corporation: www.pecora.com/#sle.
5. Sika Corporation: www.usa.sika.com/#sle.
6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
7. W.R. Meadows, Inc: www.wrmeadows.com/#sle.
8. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
1. Do Not Seal:
   a. Intentional weep holes in masonry.
   b. Joints indicated to be covered with expansion joint cover assemblies.
   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. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.

C. Interior Wet Areas: Bathrooms and restrooms; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.

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 50 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 for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multicomponent; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface.
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. 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 ACCESSORIES

A. Preformed Extruded Polyurethane Joint Seal: Medium-modulus, preformed polyurethane extrusion used to bridge joints under elastomeric wall coatings, in sizes to fit applications indicated on drawings, combined with polyurethane sealant for bonding joint seal to substrates.
1. Size: 1-1/2 inch (38 mm) wide, in rolls 100 feet (30.5 m) long.
2. Thickness: 0.051 inch (1.3 mm), with ridges along outside bottom edges for bonding area.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. 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 bond breaker backing tape where backer rod cannot be used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. 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.

F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

G. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2026.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2025.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.

H. ASTM C143/C143M - Standard Test Method for Slump of Concrete; 2026b.

I. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

K. ITS (DIR) - Directory of Listed Products; Current Edition.

L. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.

M. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.

N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).

O. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

P. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2026.

Q. UL (DIR) - Online Certifications Directory; Current Edition.

R. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.02 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.

1.03 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.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:
   1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.

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.

2.02 HOLLOW METAL DOORS

A. Interior Doors, Non-Fire Rated:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 18 gauge, 0.042 inch (1.0 mm), minimum.
   2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
   3. Door Thickness: 1-3/4 inches (44.5 mm), nominal.
   4. Door Face Sheets: Flush.
   5. Door Finish: Factory primed and field finished.

B. Fire-Rated Doors:
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 2 - Heavy-duty.
      b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 18 gauge, 0.042 inch (1.0 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 Face Sheets: Flush.
6. Door Finish: Factory primed and field finished.

2.03 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Frame Finish: Factory primed and field finished.

C. Door Frames, Non-Fire Rated: Full profile/continuously welded type.
   1. Frame Metal Thickness: 18 gauge, 0.042 inch (1.0 mm), minimum.
   2. Frame Finish: Factory primed and field finished.

D. Door Frames, Fire-Rated: Full profile/continuously welded type.
   1. Fire Rating: Same as door, labeled.
   2. Frame Metal Thickness: 18 gauge, 0.042 inch (1.0 mm), minimum.
   3. Frame Finish: Factory primed and field finished.

E. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

G. Frames Wider than 48 inches (1219 mm): Reinforce with steel channel fitted tightly into frame head, flush with top.

2.04 FINISHES

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

2.05 ACCESSORIES

A. Glazing: As specified in Section 08 80 00, factory installed.

B. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches (102 mm) as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.

C. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

D. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 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. Coordinate installation of electrical connections to electrical hardware items.

F. 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

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire rated and non-rated.

1.02 REFERENCE STANDARDS

A. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

B. ASTM E413 - Classification for Rating Sound Insulation; 2022.

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

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2026.

E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).

F. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

G. 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. Specimen warranty.

H. Warranty, executed in Owner's name.

1.04 QUALITY ASSURANCE

A. 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.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

C. 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.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.
   1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. [Bassis of Design] Masonite Architectural: www.architectural.masonite.com.
   2. Graham Wood Doors: www.grahamdoors.com.
   3. VT Industries, Inc: www.vtindustries.com/#sle.
   4. Chappell Door Company: 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: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), AWMAC/WI (NAAWS) or WDMA I.S. 1A.
   2. Wood Veneer Faced Doors: 5-ply or 7-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. {CH#287302} veneer facing {CH#287303} transparent finish{CH#287304}.

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: Natural birch, veneer grade in accordance with quality standard indicated, rotary cut, with book match between leaves of veneer, center balance 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. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

F. Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
   1. Transparent:
      a. System - 11 Polyurethane Catalyzed.
      b. Stain: As selected by Architect from manufacturer's full range.
      c. Sheen: As selected by Architect from manufacturer's full range.

B. 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.

C. Factory finish doors in accordance with approved sample.

D. 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.
   2. Glazing: 1/4 inch (6.4 mm) thick, tempered glass, in compliance with requirements of authorities having jurisdiction.

B. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink style 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.

3.05 SCHEDULE

A. See Door and Frame Schedule appended to this section.

END OF SECTION

SECTION 08 36 13
SECTIONAL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Operating hardware and supports.

B. Electrical controls.

1.02 REFERENCE STANDARDS

A. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2026.

B. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

1.03 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 panel finish samples, 12 inch by 12 inch 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.

E. Submit manufacturer's certificate that products meet or exceed specified requirements.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for warranty requirements.

B. Extended Correction Period: Correct defective work within 2-year period commencing on mm-dd-yyyy.

C. 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. Overhead Door Corporation; Model 426: www.overheaddoor.com/#sle.
   1. Basis of Design.

B. Raynor Garage Doors: www.raynor.com/#sle.

C. C.H.I. Overhead Doors; Product 3297 : www.chiohd.com.

D. 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.

B. Air Leakage Rate: Less than 0.40 cfm/sq ft (2 L/sec/sq m) when tested in accordance with ASTM E283/E283M at test pressure difference of 1.57 psf (75 Pa).

2.03 STEEL DOORS

A. Steel 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 26 gauge, 0.016 inch (0.41 mm) minimum thickness, flush profile; inner steel sheet of 20 gauge, 0.0359 inch (0.91 mm) minimum thickness, flat profile; core reinforcement _____ inch (_____ mm) sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; polyurethane insulation.
   2. Exterior Finish:
      a. Factory finished with acrylic baked enamel; color as selected by Architect.
   3. Interior Finish:
      a. Factory finished with standard factory finish; color as selected from manufacturer's standard line.
   4. Glazed Lites: Full panel width, one row; set in place with resilient glazing channel.
      a. Glazing: Fully tempered glass; insulated glass units; clear; 1/2 inch (12 mm) nominal overall thickness.
   5. Electric Operation: Electric control station.

2.04 COMPONENTS

A. Track: Rolled galvanized steel, 0.120 inch (3.0 mm) minimum thickness; 3 inch (75 mm) wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch (6 mm) thick.

B. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.

C. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.

D. Head Weatherstripping: EPDM rubber seal, one piece full length.

E. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.

2.05 ELECTRIC OPERATION

A. HOIST-TYPE DOOR OPERATORS
   1. Industrial-Duty Operator: LiftMaster Industrial-Duty Hoist Operators, continuous-duty, high-starting torque motor with overload protection and an emergency chain hoist with electric interlock.

a. Model: LiftMaster GH.

2. Electric Operator: Industrial-duty assembly, cULus listed and cULus labeled, with electric motor and factory-prewired motor controls, manually operated chain hoist, 3-button open/close/stop control station, conduit-encased wiring from control circuit to motor, positive locking mechanical system acting as a holding brake, and accessories required for proper operation; door speed of approximately 8 to 9 inches per second.
   a. Drive Reduction: Heavy-duty 5L V-belt primary reduction and chain/sprocket secondary and third stage reduction; all reduction sprockets and pulleys shall be drilled and pinned to steel shafts plated for resistance to corrosion; operator shall be equipped with permanently lubricated ball bearings on output shaft, adjustable friction clutch and output and door driven sprockets.
   b. Brake: Electric solenoid-actuated brake capable of stopping and holding a door at any position.
   c. Limit Switches: Fully adjustable, linear-driven limit mechanism synchronizing operator with door; low-friction nylon limit nuts fitted on threaded steel shaft that rotates on oil-tight self- lubricating bronze bushings; motor shall be removable without affecting limit switch settings.
   d. Electric Motor: High-starting torque, continuous-duty, industrial-type protected against overload by current sensing and thermal overload devices. For 3-phase applications, incoming voltage field-selectable between 120v, 208V, 230V and 460V, 60 Hz by properly positioning connector.
      1) Motor Specification:
         (a) 120V, 1-phase, 1/2 HP
   e. Motor Control and Enclosure: LiftMaster Logic 5.0 motor control shall be UL-approved microprocessor solid-state type and shall include the capability to select one of 7 wiring types; additional features shall include a maintenance alert diagnostic system, programmable Timer-to-Close with timer defeat input, mid-stop programming capabilities and a maximum run timer to provide motor overrun protection; motor control shall be housed in a NEMA 1 enclosure integral to the operator and shall conform to ANSI/NEMA ICS 6.
      1) Radio Receiver: LiftMaster Logic 5.0 on-board, 3-channel receiver with standard external antenna; equipped to accept Security+ 2.0 Rolling Code Technology remote controls and trinary DIP switch remote controls. Tri-band frequency (310/315/390 MHz) sends multiple radio signals to bypass radio interference.
      2) Internet Connectivity: MyQ Technology.
         (a) LiftMaster 828LM Internet Gateway enables monitoring and control of door operators and lighting controls via smartphone, tablet or computer.
         (b) Provides two-way communication between commercial door operator and MyQ Accessories to enable remote open, close and monitoring of commercial door.
   f. 3-Button Control Station: 3-button station providing open/close/stop functionality shall be NEMA Type 1 with maintenance alert indicator to signal intervals for routine door and operator maintenance.
   g. Door Drive: Full #50 roller chain; operator shall be equipped with an electrically interlocked, floor level disconnect and chain hoist for manual operation.

3. Primary Entrapment Protection Devices:
   a. NEMA 4 Monitored Photo Sensors: LiftMaster Monitored Photo Eyes, non-contact, photo beam reversing photo sensor system.
      1) (2) Sets of photo eyes
         (a) First set to be installed with the top of the eye lens no higher than 6 inches above the floor in compliance with UL325
         (b) Second set of eyes to be installed at vehicle bumper height or a height as determined by owner and architect

B. 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.

C. Control Station: Standard three button (open-close-stop) momentary type control for each electric operator.

D. Master Control Station: Provide standard three button (open-stop-close) momentary control for each door in each group along with a master button to open all doors in group simultaneously. Group consists of all doors of truck bay.
   1. 24 volt circuit.
   2. Recess mounted.
   3. Location as indicated on plans.
      a. Two stations required.

E. Hand Held Transmitter: Digital control, resettable. Three button (open-stop-close) momentary control. One for each door.

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

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SECTION 08 43 13
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors.

C. Weatherstripping.

1.02 REFERENCE STANDARDS

A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2025.

B. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

C. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2026.

D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

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.
   1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.

D. Samples: Submit two samples 6x6 inches (150x150 mm) in size illustrating finished aluminum surface, glass, glazing materials.

E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

F. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

H. Manufacturer's qualification statement.

I. Installer's qualification statement.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of professional structural engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with minimum 3 years of documented experience.

C. Installer Qualifications: Company specializing in performing work of type specified, with minimum 3 years of documented experience.

D. Source Limitations: Obtain aluminum framed storefront system through one source from a single manufacturer.

1.06 MOCK-UPS

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Construct one mock-up, 4 feet (1.22 m) long by 4 feet (1.22 m) wide, indicating full range of details required for building.

C. Locate where directed.

D. Mock-up may remain as part of work.

1.07 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.

1.08 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.

1.09 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. Aluminum-Framed Storefronts Manufacturers:
   1. [Basis of Design] Kawneer North America: www.kawneer.com/#sle.
      a. Product - Exterior Storefront: Trifab VG 451T.
      b. Product - Interior Sotrefront: Trifab VG 451.
      c. Product - Doors: 350 Medium Stile.
   2. Oldcastle BuildingEnvelope: www.oldcastlebe.com/#sle.
   3. YKK AP America, Inc: www.ykkap.com/commercial/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 BASIS OF DESIGN -- SWINGING DOORS

A. Entrance Doors, Various Stile Widths:
   1. Thickness: 1-3/4 inches (43 mm).

2.03 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Position: Centered (front to back).
   2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (50 mm wide by 114 mm deep).
   3. Finish: Class I color anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   4. Finish Color: As selected by Architect from manufacturer's standard line.
   5. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   7. 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.
   8. 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.
   9. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   11. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel, and heel bead of glazing compound.
   12. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.

B. Components
   1. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
      a. Framing members for interior applications need not be thermally broken.
      b. Glazing Stops: Flush.
   2. Glazing: See Section 08 80 00.
   3. Swing Doors: Glazed aluminum.
      a. Thickness: 1-3/4 inches (43 mm).
      b. Bottom Rail: 10 inches (254 mm) wide.
      c. Glazing Stops: Beveled.
      d. Finish: Same as storefront.

C. Materials
   1. Extruded Aluminum: ASTM B221 (ASTM B221M).
   2. Fasteners: Stainless steel.
   3. Sealant for Setting Thresholds: Non-curing butyl type.
   4. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
   5. Glazing Accessories: See Section 08 80 00.

D. Finishes
   1. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils (0.018 mm) thick.
   2. Touch-Up Materials: As recommended by coating manufacturer for field application.

E. Hardware

1. For each door, include sill sweep strip.
2. Other Door Hardware: See Section 08 71 00.
3. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
4. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

A. Install system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Set thresholds in bed of sealant and secure.

J. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.

K. 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 inch per 3 feet (1.5 mm per m) non-cumulative or 0.06 inch per 10 feet (1.5 mm per 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 and sash 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, and take care to remove dirt from corners and to wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

D. 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 until Date of Substantial Completion.

END OF SECTION

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SECTION 08 71 00
DOOR HARDWARE

EPART 1 GENERAL

1.01 REFERENCE STANDARDS

A. BHMA A156.1 - American National Standard for Butts and Hinges; 2013.

B. BHMA A156.3 - Exit Devices; 2025.

C. BHMA A156.4 - Door Closers and Pivots; 2024.

D. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks; 2014.

E. BHMA A156.6 - American National Standard for Architectural Door Trim; 2010.

F. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.

G. BHMA A156.13 - Mortise Locks and Latches; 2022.

H. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2013.

I. BHMA A156.18 - Standard for Materials and Finishes; 2020.

J. BHMA A156.31 - American National Standard for Electric Strikes and Frame Mounted Actuators; 2013.

K. BHMA A156.36 - American National Standard for Auxiliary Locks; 2014.

L. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

M. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).

N. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

O. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2025.

P. UL 294 - Access Control System Units; Current Edition, Including All Revisions.

Q. UL 305 - Standard for Panic Hardware; Current Edition, Including All Revisions.

R. UL 437 - Standard for Key Locks; Current Edition, Including All Revisions.

1.02 RELATED DOCUMENTS

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

1.03 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.

1.04 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.

1.05 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.

1.06 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".

1.07 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.

1.08 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.

1.09 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

2.01 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.

2.02 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 (1524 mm).
b. Three Hinges: For doors with heights 61 to 90 inches (2286 mm).
c. Four Hinges: For doors with heights 91 to 120 inches (3048 mm).
d. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (762 mm) 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 (635 mm) on center apart or not more than 35 inches (889 mm) on center for doors over 121 inches (3073.4 mm) 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).

2.03 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.

2.04 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 (3.18 mm) 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).

2.05 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.

2.06 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 PSA.
   b. Schlage (SC) -L9000 Series 17A.
   c. Yale Commercial (YA) - 8800FL Series. PBR.

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. Yale Commercial(YA) - 8890FL 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.

2.07 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. Yale Commercial(YA) - 350 Series.

2.08 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.

2.09 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 (2133.6 cm)-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.
        b. Von Duprin (VD) -33/99 Series.
        c. Yale (YA) - 7000 Series.

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 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.

2.12 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.

2.13 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.

2.14 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).

2.15 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).

2.16 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).

2.17 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.

2.18 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.

2.19 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

3.01 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.

3.02 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.03 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.

3.04 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.

3.05 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.

3.06 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.

3.07 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.08 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 handing 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: SEE NEXT PAGE

END OF SECTION

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SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Plastic films.

D. 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; 2026.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2026).

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018 (Reapproved 2024).

F. ASTM C1036 - Standard Specification for Flat Glass; 2025.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2025.

I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.

J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2024.

K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.

L. BS EN 14179-1 - Glass in Building - Heat Soaked Thermally Toughened Soda Lime Silicate Safety Glass - Part 1: Definition and Description; 2016.

M. GANA (GM) - GANA Glazing Manual; 2022.

N. GANA (SM) - GANA Sealant Manual; 2008.

O. NFRC 100 - Procedure for Determining Fenestration Product U-Factors; 2026.

P. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.

Q. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2026.

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. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. 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.
   2. Guardian Industries Corp: www.sunguardglass.com.
   3. Pilkington North America Inc; _____: www.pilkington.com/na/#sle.
   4. Saint Gobain North America; _____: www.saint-gobain.com/#sle.
   5. Vitro Architectural Glass: www.vitroglazings.com.
      a. Basis of Design or approved substitution.
   6. Substitutions: See Section 01 60 00 - Product Requirements.

B. Plastic Films Manufacturers:
   1. 3M Window Film; _____: https://www.3m.com/#sle.
   2. Avery Dennison; Decorative Plastic Films: www.averydennison.com/#sle.
   3. Flexvue Films; _____: www.flexvuefilms.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with ASCE 7.

2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
4. Glass thicknesses listed are minimum.

B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
1. In conjunction with weather barrier related materials described in other sections, as follows:

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Factor: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer progam.
2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 7 computer program.
3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
2. Fully Tempered Type: Complies with ASTM C1048.
3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
4. 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 BS EN 14179-1.

2.04 INSULATING GLASS UNITS

A. Manufacturers:
1. Glass: Any of the manufacturers specified for float glass.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Metal-Edge Spacers: Aluminum, bent and soldered corners.
4. Spacer Color: Black.
5. Edge Seal:
   a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
6. Color: Black.

C. Type IGU-1 - Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with argon.
3. Outboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
   a. Tint: Blue.
   b. Coating: Low-E (solar control type), on #2 surface.
4. Inboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.

a. Tint: Clear.
5. Total Thickness: 1 inch (25.4 mm).
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.28, nominal.
7. Visible Light Transmittance (VLT): 64 percent, nominal.
8. Solar Heat Gain Coefficient (SHGC): 0.30 percent, nominal.

D. Type IGU-1* Insulating Glass Units: Safety glazing.
1. Applications: Where noted.
a. Glazed lites in exterior doors.
b. Glazed sidelights and panels next to doors.
c. Other locations required by applicable federal, state, and local codes and regulations.
d. Locations indicated on drawings.
2. Glass Type: Same as Type IG-1 except use fully tempered float glass for both outboard and inboard lites.

2.05 GLAZING UNITS

A. Type G-1 - Monolithic Interior Vision Glazing:
1. Applications: Interior glazing unless otherwise indicated.
2. Glass Type: Annealed float glass.
3. Tint: Clear.
4. Thickness: 1/4 inch (6.4 mm), nominal.

B. Type G-1* -Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
a. Glazed lites in doors, except fire doors.
b. Sliding glass doors.
c. Glazed sidelights to doors, except in fire-rated walls and partitions.
d. Glazed view windows and panels in partitions enclosing athletic activity rooms, except in fire-rated walls and partitions.
e. Other locations required by applicable federal, state, and local codes and regulations.
f. Other locations indicated on drawings.
2. Glass Type: Fully tempered safety glass as specified.
3. Tint: Clear.

2.06 PLASTIC FILMS

A. Type TG-1*, TG-2* - Solar Control Plastic Film: Mylar type.
1. Application: Locations as indicated on drawings.
2. Color: Clear.
3. Thickness Without Liner: 0.00236 inch (0.06 mm).
4. Manufacturers:
a. 3M Window Films; FASARA: www.solutions.3m.com/#sle.
b. Avery Dennison; DS Bronze 20X Film: www.averydennison.com/#sle.
c. Flexvue Films; _____: www.flexvuefilms.com/#sle.

2.07 GLAZING COMPOUNDS

A. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

B. Manufacturers:
1. Bostik Inc: www.bostik-us.com.
2. Dow Corning Corporation: www.dowcorning.com/construction.
3. Pecora Corporation: www.pecora.com.
4. BASF Corporation: www.basf.com/us/en.html.
5. Substitutions: See Section 01 60 00 - Product Requirements.

2.08 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 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Place setting blocks at 1/4 points and install glazing pane or unit.

C. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch (610 mm) intervals, 1/4 inch (6.4 mm) below sight line.

D. Fill gaps between glazing and stops with _____ type sealant to depth of bite on glazing, but not more than 3/8 inch (9 mm) below sight line to ensure full contact with glazing and continue the air and vapor seal.

E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.06 INSTALLATION - PLASTIC FILM

A. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.

B. Place without air bubbles, creases or visible distortion.

C. Install film tight to perimeter of glass and carefully trim film with razor sharp knife. Provide 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) gap at perimeter of glazed panel unless otherwise required. Do not score the glass.

3.07 FIELD QUALITY CONTROL

A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures and unacceptable conditions.

3.08 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.

3.09 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

SECTION 08 91 00
LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Louvers, frames, and accessories.

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); 2026.

B. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021, with Editorial Revision (2022).

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.

D. Samples: Submit two samples 2 by 2 inches (50 by 50 mm) in size illustrating finish and color of exterior and interior surfaces.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
   1. Finish: Include twenty year coverage against degradation of exterior finish.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

B. Storage: Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.

C. Handling: Protect materials and finishes during handling and installation to prevent damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Airolite Company, LLC: www.airolite.com/#sle.

B. Construction Specialties, Inc: www.c-sgroup.com/#sle.

C. Pottorff: www.pottorff.com/#sle.

D. Basis of Design: Ruskin Company: www.ruskin.com/#sle.

E. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
   1. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
   2. Screens: Provide insect screens at all louvers.
   3. Hinged Units: Provide secondary frame to which louver frame is attached; non-ferrous hinges; provide at top edge of louver.

B. Stationary Louvers: Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.
   1. Blades: Drainable.
   2. Frame: Depth as indicated on drawings, channel profile; corner joints mitered .
   3. Aluminum Thickness: Frame 12 gauge, 0.0808 inch (2.05 mm) minimum; blades 12 gauge, 0.0808 inch (2.05 mm) minimum.
   4. Aluminum Finish: Superior performing organic coatings; finish welded units after fabrication.
   5. Steel Finish: Superior performing organic coating, finished after fabrication.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Stainless Steel: ASTM A666/A666M, Type 304, soft temper, smooth surface, No. 4 brushed finish.

2.04 FINISHES

A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).

B. Color: Custom, to match approved sample.

2.05 ACCESSORIES

A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

B. Insect Screen: 18 x 16 size aluminum mesh.

C. Fasteners and Anchors: Galvanized steel.

D. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

E. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

B. Verify that field measurements are as indicated on shop drawings.

3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louver frames in openings with concealed fasteners.

E. Coordinate with installation of mechanical ductwork.

3.03 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

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. 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 moisture and alkalinity (pH).

D. Remediation of concrete floor slabs due to unsatisfactory moisture or 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.

1.02 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2026.

B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.

C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

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. Moisture and 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. Moisture and alkalinity (pH) test reports.
   4. Copies of specified test methods.
   5. Recommendations for remediation of unsatisfactory surfaces.
   6. Submit report to .
   7. Submit report not more than two business days after conclusion of testing.

C. Adhesive Bond and Compatibility Test Report.

1.05 QUALITY ASSURANCE

A. Moisture and 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.

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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 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

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. Moisture vapor emission tests; 3 tests in the first 1000 square feet (100 square meters) and one test in each additional 1000 square feet (100 square meters), unless otherwise indicated or required by flooring manufacturer.
3. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
4. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
5. Specified remediation, if required.
6. Patching, smoothing, and leveling, as required.
7. Other preparation specified.
8. Adhesive bond and compatibility test.
9. Protection.

C. Remediations:
1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

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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 MOISTURE VAPOR EMISSION 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. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F1869 and as follows.

D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

E. 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 test values exceed 3 pounds per 1000 square feet (1.4 kg per 93 square meters) per 24 hours.

F. Report: Report the information required by the test method.

3.04 INTERNAL RELATIVE HUMIDITY 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. Where this specification conflicts with the referenced test method, comply with the requirements of this section.

C. Test in accordance with ASTM F2170 Procedure A and as follows.

D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.

E. 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 any test value exceeds 75 percent relative humidity.

F. Report: Report the information required by the test method.

3.05 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. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
   1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
   2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch (25 mm) in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
   3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.

C. 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.

3.06 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.

3.07 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

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. Cementitious backing board.

C. Gypsum wallboard.

D. Joint treatment and accessories.

E. Acoustic (sound-dampening) wall and ceiling board.

1.02 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).

B. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2020).

C. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2024.

D. 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.

E. 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.

F. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.

G. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2024.

H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2024.

I. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2024.

J. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

L. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

M. ASTM E413 - Classification for Rating Sound Insulation; 2022.

N. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.

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:

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 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.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Interior Partitions, Indicated as Acoustic: 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 complying with applicable code.
   1. 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. CertainTeed Corporation: www.certainteed.com/#sle.
   2. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
   3. National Gypsum Company: www.nationalgypsum.com/#sle.
   4. USG Corporation: www.usg.com/#sle.
   5. 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, 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).
      b. Multi-Layer Assemblies: Thicknesses as indicated on drawings.

C. Impact Resistant Wallboard:
   1. Application: As indicated on the plans.
   2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   5. Hard Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   7. Type: Fire-resistance-rated Type X, UL or WH listed.
   8. Thickness: 5/8 inch (16 mm).
   9. Edges: Tapered.
   10. Glass Mat Faced Products: Noncombustible, moisture-resistant gypsum core encased in a fiberglass face and back that shed water. Provide minimum 20-gauge (0.0296 inch) (0.752 mm) steel studs, as defined by the Steel Stud Manufacturers Association (SSMA). Non intended for exterior applications or constant exposure to water. Protect from immersion in water and the eroding effects of cascading water. Product is not suitable for use as a substrate for tile in wet areas such as tubs, showers, gang shower and other areas subject to direct water exposure. Refer to Gypsum Association's GA-216 reference guide, or ASTM C840 reference standard for additional installation requirements.
      a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Interior Extreme IR Gypsum Panel: www.goldbondbuilding.com/#sle.

b. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough VHI Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
c. USG Corporation; USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough VHI Firecode X 5/8 in)15.9 mm): www.usg.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Backing Board For Wet Areas: One of the following products:
1. Application: Surfaces behind tile in wet areas, including manufactured housing, tub and shower surrounds, and shower ceilings.
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. Regular Type: Thickness 1/2 inch (13 mm).
b. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch (16 mm).
c. Products:
1) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com/#sle.
2) Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Tile Backer: www.goldbondbuilding.com/#sle.
3) Temple-Inland Building Product by Georgia-Pacific, LLC; GreenGlass Tile Backer.
4) Substitutions: See Section 01 60 00 - Product Requirements.

E. 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: Regular and Type X, in locations indicated.
4. Type X Thickness: 5/8 inch (16 mm).
5. Regular Board Thickness: 5/8 inch (16 mm).
6. Edges: Tapered.
7. Products:
a. American Gypsum Company; M-Bloc: www.americangypsum.com/#sle.
b. Georgia-Pacific Gypsum; DensShield Tile Backer.
c. Lafarge North America Inc; Mold Defense Drywall.
d. National Gypsum Company; Gold Bond Brand XP Gypsum Board.
e. Temple-Inland Building Product by Georgia-Pacific, LLC; ComfortGuard WR.
f. USG Corporation; Sheetrock Brand Mold Tough Gypsum Panels.
g. Substitutions: See Section 01 60 00 - Product Requirements.

F. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
2. Thickness: 5/8 inch (16 mm).
3. Edges: Tapered.
4. Products:
a. American Gypsum; Interior Ceiling Board.
b. Lafarge North America Inc; Sagcheck.
c. National Gypsum Company; High Strength Brand Ceiling Board.
d. Temple-Inland Building Products by Georgia-Pacific, LLC; Span24 Ceiling Board.
e. USG Corporation; Sheetrock Brand Sag-Resistant Interior Gypsum Ceiling Board.
f. Substitutions: See Section 01 60 00 - Product Requirements.

G. Acoustical Sound Dampening Wall and Ceiling Board: Two layers of heavy paper-faced, high-density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.

1. Thickness: 5/8 inch (16 mm).
2. Long Edges: Tapered.
3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
4. Products:
    a. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond SoundBreak XP Wall Board: www.goldbondbuilding.com/#sle.
    b. Temple-Inland Building Products by Georgia-Pacific, LLC; ComfortGuard Sound Deadening Gypsum Board: www.temple.com.
    c. Substitutions: See Section 01 60 00 - Product Requirements.

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. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, unless noted otherwise.
1. Corner Beads: Low profile, for 90 degree outside corners.

E. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
1. Fiberglass Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
    a. Use in wet locations.
2. Paper Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
3. Ready-mixed vinyl-based joint compound.
4. Joint Compound: Setting type, field-mixed.

F. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

G. 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.

H. 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.

I. Nails for Attachment to Wood Members: ASTM C514.

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. 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.

3.05 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
    1. Level 5: Walls and ceilings to receive enamel, egg-shell, semi-gloss or gloss paint finish and other areas specifically indicated.
    2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

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. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

E. 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

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SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal partition, ceiling, ceiling, soffit, and soffit framing.

B. Framing accessories.

1.02 REFERENCE STANDARDS

A. AISI S201 - North American Standard for Cold-Formed Steel Framing - Product Data; 2017.

B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

D. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.

E. ASTM C1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections; 2024.

F. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

G. 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 framed openings, anchorage to structure, acoustic details, and accessories.
   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. Notify manufacturer of damaged materials received prior to installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. 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: www.clarkdietrich.com/#sle.
   2. MarinoWARE; ____: www.marinoware.com/#sle.
   3. The Steel Network, Inc: www.SteelNetwork.com/#sle.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FRAMING MATERIALS

A. Fire-Resistance-Rated Assemblies: Comply with applicable applicable code and as indicated on drawings.

B. Firestopping: Materials meeting requirements necessary to maintain rating of penetrated assembly.
   1. See Section 07 84 00.

C. Material and Product Requirements: AISI S201 and AISI S220.

D. Nonstructural Framing System Components: Sheet steel, of size and properties necessary for spacing indicated on drawings, with maximum wall framing deflection of L/120 at 10 psf (480 Pa).
   1. Studs: C-shaped with flat faces.
   2. Runners: U-shaped, sized to match studs.
   3. Ceiling Channels: U-shaped.
   4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).

E. Partition Head to Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

F. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.

G. Preformed Top Track Firestop Seal:

H. Nonstructural 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.
   3. Bracing and Bridging: ASTM A653/A653M, G90 (Z275) galvanized steel; for lateral bracing of wall studs with slots for engaging on-module studs.
   4. Framing Connectors: ASTM A653/A653M steel clips; secures cold rolled channel to wall studs for lateral bracing.
   5. Fasteners: ASTM C1513 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. Install non-structural members in accordance with ASTM C754.

B. Extend partition framing as indicated on plans.

C. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs as indicated.

D. Align and secure top and bottom runners at 24 inches (600 mm) on center.

E. At partitions indicated with an acoustic rating:

1. Provide components and install as required to produce STC ratings as indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.

F. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

G. Install studs vertically at 16 inches (400 mm) on center.

H. Align stud web openings horizontally.

I. Secure studs to tracks using fastener method. Do not weld.

J. Stud splicing is not permissible.

K. Fabricate corners using a minimum of three studs.

L. Install double studs at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.

M. Brace stud framing system rigid.

N. Coordinate erection of studs with requirements of door frames and window frames; install supports and attachments.

O. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.

P. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and opening frames.

Q. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches (150 mm).

3.03 CEILING AND SOFFIT FRAMING

A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

B. Install furring independent of walls, columns, and above-ceiling work.

C. 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.

D. 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.

E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

F. Place furring channels perpendicular to carrying channels, not more than 2 inches (50 mm) from perimeter walls, and rigidly secure. Lap splices securely.

G. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches (600 mm) past each opening.

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 shower receptors.

B. Ceramic trim.

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 A108.19 - Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2025.

C. ANSI A108.20 - Exterior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs; 2025.

D. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2023.

E. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2019.

F. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2023.

G. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.

H. ANSI A326.3 - American National Standard Test Method for Measuring Dynamic Coefficient of Friction of Hard Surface Flooring Materials; 2021.

I. 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).

J. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2026.

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, control and expansion joints, thresholds, ceramic accessories, and setting details.

D. Certificate: Certify products of this section meet or exceed specified requirements.

E. Installer's qualification statement.

F. 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.

B. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.
   1. Tile and Trim Units: Furnish quantity of full-size units equal to three (3) percent, not less than one full carton, for each type, composition, color, pattern, size and shape installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 PERFORMANCE REQUIREMENTS

A. Floor Tile: Provide tile for flooring applications with minimum wet Dynamic Coefficient of Friction (DCOF) of 0.42 when tested in accordance with ANSI A326.3.

B. Glazed Wall Tile, Type WT-1, WT-2, WT-3, WT-4: ANSI A137.1 standard grade.
   1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
   2. Size: 3 by 6 inch (76 by 152 mm), nominal.
   3. Edges: Cushioned.
   4. Color(s): To be chosen by Architect from manufacture's full line..
   5. Pattern: As inidicated on drawings.
   6. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.
   7. Products:
      a. Dal-Tile Corporation; Color Wheel Linear: www.daltile.com/#sle.
      b. Trinity Tile; https://www.trinitytile.com/.
      c. Umore Tile; Classico; https://findyourumore.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 TRIM AND ACCESSORIES

A. Trim: Matching bullnose, double bullnose, cove, and base shapes in sizes coordinated with field tile.
   1. Applications:

a. Open Edges: Bullnose.
b. Inside Corners: Coved.
c. Floor to Wall Joints: bullnose base.

2. Manufacturers: Same as for tile.

B. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions as indicated on drawings, for setting using tile mortar or adhesive.

1. Applications:
   a. Open edges of wall and floor tile.
   b. Wall corners, outsidee.
   c. Borders and other trim as indicated on drawings.
2. Products:
   a. Schluter-Systems; Schiene: www.schluter.com/#sle.
      1) Quadec Basis of Design or approved substitution.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 SETTING MATERIALS

A. Provide setting and grout materials from same manufacturer.

B. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.

1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.

2.05 GROUTS

A. Provide setting and grout materials from same manufacturer.

B. Standard Grout: ANSI A118.6 standard cement grout.

1. Applications: Use where indicated on drawings 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: As selected by from manufacturer's full line.
4. Products:
   a. LATICRETE International, Inc; LATICRETE 1500 Sanded Grout: www.laticrete.com/#sle.
   b. Merkrete, by Parex USA, Inc; Merkrete Duracolor Non-Sanded Grout: www.merkrete.com/#sle.
   c. Sika Corp; SikaTile 800 Grout Sanded: www.sika.com/#sle.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, modified silane polymer, 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.
   b. Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com/#sle.
   c. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
   d. 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.

2.07 ACCESSORY MATERIALS

A. Waterproofing Membrane at Showers: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive tile.

B. Verify wall surfaces are smooth and flat within tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

3.02 PREPARATION

A. Vacuum clean surfaces and damp clean.

B. Install cementitious 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 feather edge.

C. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.20, manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated on drawings. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Seal substrate surface cracks with filler.

E. 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.

F. Form internal angles square and external angles bullnosed.

G. Install non-ceramic trim in accordance with manufacturer's instructions.

H. Install thresholds where indicated on drawings.

I. Sound tile after setting. Replace hollow sounding units.

J. Keep control and expansion joints free of mortar, grout, and adhesive.

K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

L. Grout tile joints unless otherwise indicated on drawings. Use standard grout unless otherwise indicated on drawings.

M. 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 - SHOWERS AND BATHTUB WALLS

A. At bathtub walls with prefabricated receptors, install in accordance with TCNA (HB) Method B411, mortar bed on studs with waterproofing membrane.

B. Grout with standard grout.

3.05 CLEANING

A. Clean tile and grout surfaces.

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. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019 (Reapproved 2025).

C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2024a.

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 samples each, 12 inches long, of suspension system .

F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

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. Basis of Design: Armstrong World Industries, Inc: www.armstrongceilings.com/#sle.
   2. CertainTeed Corporation: www.certainteed.com/ceilings-and-walls/#sle.
   3. USG Corporation: www.usg.com/ceilings/#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 A.
   2. Size: 24 by 24 inches (610 by 610 mm).
   3. Thickness: 3/4 inch (19 mm).
   4. Panel Edge: Square.
   5. Suspension System: Exposed grid.
   6. Products:
      a. Armstrong World Industries, Inc; Dune: www.armstrongceilings.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 SUSPENSION SYSTEMS

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold-down clips, stabilizer bars, clips, and splices as required.

B. Exposed Suspension System: Hot-dipped galvanized steel grid with steel cap.
   1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
   2. Profile: Tee; 15/16 inch (24 mm) face width.
   3. Finish: Baked enamel.
   4. Color: White.
   5. Products:
      a. Armstrong World Industries, Inc; Prelude XL: www.armstrongceilings.com/#sle.
      b. Certainteed Architectural; 15/16" EZ Stab Classic System: www.certainteed.com/ceilings-and-walls/#sle.
      c. USG Corporation; Donn Brand ZXLA 15/16 inch Acoustical Suspension System: www.usg.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

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.

E. 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 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions, 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. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches (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.

3.03 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.

3.04 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

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SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient sheet flooring.

B. Resilient tile flooring.

C. Resilient base.

D. 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; 2025a.

B. ASTM F1700 - Standard Specification for Solid Vinyl Floor in Modular Format such as Tile(s) or Plank(s); 2025.

C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2021 (Reapproved 2025).

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; 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. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

G. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.

H. Manufacturer's Qualification Statement.

I. Installer's Qualification Statement.

J. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

K. 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 Flooring Material: _____ square feet (_____ square meters) 5% of each type and color.
   3. Extra Wall Base: _____ linear feet (_____ linear meters) 5% of each type and color.

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. Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.

D. 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 materials from damage by storing per manufacturer's recommendations.

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).

PART 2 PRODUCTS

2.01 SHEET FLOORING

2.02 TILE FLOORING

A. Vinyl Tile - Type ____ - Type LVT-1: Surface-decorated, with wear layer.
   1. Manufacturers:
      a. Armstrong Flooring; Natural Creations with Diamond 10 Technology: www.armstrongflooring.com/#sle.
      b. Basis of Design: Tarkett; Techtonic, Event Wood; https://www.tarkett.com//#sle.
      c. Interface; Earthen Forms; https://www.interface.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
   3. Plank Tile Size: ___ by ___ inch (___ by ___ mm).
   4. Total Thickness: 0.125 inch (3 mm).
   5. Pattern: Random Layup.
   6. Color: To be selected by from manufacturer's full range.

2.03 RESILIENT BASE

A. Resilient Base - Type WBR-1: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
   1. Manufacturers:
      a. Flexco Corporation; Base Sculptures: www.flexcofloors.com/#sle.
      b. Burke Flooring: www.burkeflooring.com.
      c. Roppe Corporation; Contours Profiled Wall Base System: www.roppe.com/#sle.
         1) Basis of Design or approved substitution.
      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 ASTM E648.
   3. Height: 4 inches (100 mm).
   4. Thickness: 0.125 inch (3.2 mm).
   5. Finish: Matte.
   6. Length: Roll.
   7. Color: To be selected by from manufacturer's full range.
   8. Accessories: Premolded external corners and internal corners.

2.04 ACCESSORIES

A. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

B. Moldings, Transition and Edge Strips: Same material as flooring.
   1. Provide transition/reducing strips tapered to meet abutting materials.

C. Filler for Coved Base: Plastic.

D. Premolded base internal and external corners and end caps.

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 moisture and alkalinity (pH).
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.

D. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

F. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

G. 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 as recommended by flooring and adhesive manufacturers.

B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

C. Prohibit traffic until filler is fully cured.

D. Clean substrate.

E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

F. Perform subfloor moisture testing in accordance with ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using in-situ Probes", ASTM F1869, "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" and Bond Tests per manufacturer to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Relative humidity shall not exceed 80%, MVER shall not exceed 5 lbs./1000 sq. ft./24 hrs. Where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

G. Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.

H. 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. Where no floor finish plan is provided a multi-color (four colors) layout shall be installed in all rooms larger than 144 square feet.
   2. Architect will provide final floor tile pattern design prior to installation.
   3. Pattern: Quarter turn.

3.04 INSTALLATION - SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.

3.05 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. Install square tile to ashlar pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

D. Install plank tile with a random offset of at least 6 inches (152 mm) from adjacent rows.

3.06 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, use premolded units. At exposed ends, use manufacturer's premolded units.

C. Millwork Resilient Base - Use manufacturer's premolded units at internal and external corners. At exposed ends use manufacturer's premolded units.

D. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.07 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.08 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 3 to 5 coats of high-quality commercial floor polish.

3.09 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 13
TRANSITIONS AND ADAPTORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient Transitions and Adaptors.

1.02 SUBMITTALS

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

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.

D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by the manufacturer, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

1.04 PROJECT CONDITIONS

A. Install resilient products after other finishing operations, including painting, have been completed.

B. Maintain ambient temperatures within range recommended by the manufacturer, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C) in spaces to receive resilient products during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

C. Maintain the ambient relative humidity between 40% and 60% during installation.

D. Until Substantial Completion, maintain ambient temperatures within range recommended by the manufacturer, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Johnsonite, Inc; Product: www.johnsonite.com.

B. Burke Flooring: www.burkemercer.com.

C. Roppe Corp: www.roppe.com.

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 RESILIENT TRANSITIONS AND ADAPTORS

A. ADAPTORS - Resilient Adaptor with the following physical characteristics:
   1. Material: Homogeneous composition of polyvinyl chloride (PVC).
   2. Accessibility: Complies with A.D.A. Change of Level requirements and meets the requirements for slope to rise ratio for Ramps.
   3. Critical Radiant Flux: 0.45 watts/cm2 or greater, Class I per ASTM E 648.
   4. Abrasion Resistance: 0.22 mg/cycle per ASTM D 3389.
   5. Length per piece: 12 foot minimum.
   6. Profile:
      a. 1" wide for 1/4" to 1/8" material.
         1) Product: CTA-C by Johnsonite or approved substitution.
      b. 1" wide for 5/16" to 1/2" material.
         1) Product: CWA by Johnsonite or approved substitution.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
   3. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.
   4. Prepare Substrates according to ASTM F 710 including the following:
      a. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
      b. A pH test for alkalinity must be conducted. Results should range between 7 and 9. If the test results are not within the acceptable range of 7 to 9, the installation must not proceed until the problem has been corrected.
      c. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
   5. Wood subfloors must have a minimum 19" (47 cm) of cross-ventilated space beneath the bottom of the joist.
      a. The floor must be rigid, free of movement.
      b. Single wood and tongue and groove subfloors should be covered with ¼" (6.4 mm) or ½" (13 mm) APA approved underlayment plywood.
         1) Use ¼" (6.4 mm) thick underlayment panels for boards with a face width of 3" (76 mm) or less.
         2) Use ½" (76 mm) thick underlayment panels for boards with a face width wider than 3" (76 mm).
      c. Do not install over OSB (Oriented Strand Board), particle board, chipboard, lauan or composite type underlayments.

B. Fill cracks, holes, depressions and irregularities in the substrate with good quality Portland cement based underlayment leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Floor covering shall not be installed over expansion joints.

D. Do not install resilient products until they are same temperature as the space where they are to be installed.
   1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.03 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Install with manufacturer adhesive specified for the site conditions and follow adhesive label for proper use.

3.04 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
   1. No traffic for 24 hours after installation.
   2. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.

D. Cover resilient products until Substantial Completion.

E. Wait 72 hours after installation before performing initial cleaning.

F. A regular maintenance program must be started after the initial cleaning.

END OF SECTION

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SECTION 09 67 00
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied seamless flooring and integral cove base.

1.02 REFERENCE STANDARDS

A. ANSI/ESD STM7.1 - Standard Test Method for the Protection of Electrostatic Discharge Susceptible Items Flooring Systems Resistive Characterization; 2020.

B. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

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 and colors available.

C. Samples: Submit two samples, 12 by 12 inch (300 by 300 mm) in size illustrating color and pattern for each floor material for each color specified.

D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and application rate for each coat.

F. Manufacturer's Qualification Statement.

G. Applicator's Qualification Statement.

H. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section.
   1. Minimum three years of documented experience.
   2. Approved by manufacturer.

1.05 MOCK-UPS

A. Construct mock-up(s) of fluid applied flooring to serve as basis for evaluation of texture and workmanship.
   1. Number of Mock-Ups to be Prepared: One.
   2. Use same materials and methods for use in the work.
   3. Locate where directed by Architect.
   4. Minimum Size: 96 inches by 96 inches (2440 mm by 2440 mm).

B. Obtain approval of mock-up by Architect before proceeding with work.

C. Approved mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store resin materials in a dry, secure area.

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.07 FIELD CONDITIONS

A. Maintain minimum temperature in storage area of 55 degrees F (13 degrees C).

B. Store materials in area of installation for minimum period of 24 hours prior to installation.

C. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.
   1. Concrete to receive surfacing shall have cured for at least 28 days and shall have been free of water for at least 7 days.

D. Dew Point: Substrate temperature must be minimum of 5 degrees above dew point prior to, during or up to 24 hours after application of flooring system.

E. Advise other trades of fixtures and fittings not to be installed until flooring is cured and protected.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fluid-Applied Flooring:
   1. Flowcrete Americas: www.flowcreteamericas.com/#sle.
   2. Key Resin Company: www.keyresin.com/#sle.
      a. Basis of Design or approved susbtitution.
   3. APF Flooring: www.apfepoxy.com..
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FLUID-APPLIED FLOORING SYSTEMS

A. Fluid-Applied Flooring Type SSC-2 :
   1. Primer: Mix, Squeegee and Back Roll apply Key Resin # 502 Epoxy Primer @ 200 – 250 sq. ft. per gallon.
   2. Slurry: Mix and apply Key Resin # 511 Epoxy Binder + Key Resin SL Filler @ 45 sq. ft. per gallon.
   3. Broadcast: Evenly broadcast Key Resin 30 Mesh Broadcast Aggregate into wet Slurry @ 45 - 50 lb. per 100 sq. ft. area. Allow to cure, sweep and vacuum excess aggregate from the surface.
   4. Grout Coat: Mix, Squeegee and Back Roll apply Key Resin # 520 Epoxy Coating @ 80 - 100 sq. ft. per gallon.
   5. Finish Coat: Mix, squeegee and back roll apply Key Resin # 570 Polysiloxane (pigmented) @ 350 sq. ft. per gallon.
   6. System Thickness: 1/8 inch (3.2 mm), nominal, dry film thickness (DFT).
   7. Texture: Slip resistant.
   8. Sheen: High gloss.
   9. Color: 170 Dark Grey.
   10. Basis of Design Product: Key Resin Company; Key Mortar SLT System: www.keyresin.com/#sle or approved substitution.

2.03 ACCESSORIES

A. Base Caps: Extruded rigid PVC with projecting base of 1/8 inch (3 mm);

B. Integral Cove Base: Provide integral cove base formed from flooring over substrate per job conditions.
   1. Provide cove base cap strip at top of base and trowel material up wall to form smooth, integral transition and base four (4) inches high.

C. Primer: Type recommended by fluid-applied flooring manufacturer.

D. Lane Stirpes:
   1. Location and size: As indicated on drawings.
   2. Product: Key Resin #470 or #471 Polyaspartic Clear with Pigment Pack.
   3. Color: As selected by Architect from manufacturers full range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of materials to sub-floor surfaces.

C. Verify that concrete sub-floor surfaces are ready for flooring installation by testing for moisture emission rate and alkalinity: obtain instructions if test results are not within limits recommended by flooring materials manufacturer.

D. Verify that floor mounted utilities are in correct location.

3.02 PREPARATION

A. Inspect surfaces to receive flooring and verify that condition is smooth and free from conditions that will adversely affect execution, permanence, or quality of work.
   1. Remove all projections, all debris detrimental to flooring system, and dirt, oil contaminates, grease, and surface coatings affecting bond. [if !supportLineBreakNewLine]

B. Notify Architect or Owner in writing prior to commencing work of any conditions deemed unsatisfactory for the installation; installation of flooring materials is understood as acceptance of the substrate as satisfactory.

C. Concrete: The General Contractor shall be responsible for hiring an independent testing service to test for moisture content and moisture vapor emission rate; install no flooring over concrete until the concrete has been cured and is sufficiently dry to achieve acceptable bond with flooring as determined by material manufacturer's recommended bond and moisture tests.
   1. Effectively remove concrete laitance by steel shot blasting or other method approved by flooring manufacturer.
   2. Concrete slab shall have an efficient puncture-resistant moisture vapor barrier 10 mils thick minimum placed directly under the concrete slab (for slab on grade). Testing must be done to verify that the moisture vapor emission rate of the slab does not exceed that as recommended by the manufacturer at time of installation of the flooring or at any future date. Moisture vapor emission and moisture content testing must conform with the requirements of ASTM F-1869-98 (Calcium Chloride Test) and ASTM F-2170-02 (Relative Humidity Probe Test). If test results show excessive levels of moisture content or vapor emission rate, installation shall not proceed until source of excessive moisture is identified and removed or corrected. If excessive moisture cannot be removed or prevented, apply manufacturer’s recommended moisture vapor emission control material.
   3. Treat cracks in concrete using manufacturer's recommended practices. Rout out crack and fill with rigid epoxy; Reinforce crack with fiberglass cloth.

3.03 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive flooring.

B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
   1. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.04 PREPARATION

A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Route out all cracks (larger than hairline width) and fill with Key Crack Filler or other material approved by Manufacturer of floor materials. Reinforce crack with fiberglass cloth using Key #502 Primer or the epoxy used to fill the crack.

C. Prepare concrete surfaces according to ICRI 310.2R, CSP 3.

D. Vacuum clean substrate.

E. Apply primer to surfaces required by flooring manufacturer.

3.05 INSTALLATION - ACCESSORIES

A. Install cant strips at base of walls where flooring is to be extended up wall as base.

B. Install terminating cap strip at top of base; attach securely to wall substrate.

3.06 INSTALLATION - FLOORING

A. Apply in accordance with manufacturer's instructions.

B. Apply each coat to minimum thickness required by manufacturer.

C. Finish to smooth level surface.

D. Fillet and cove at vertical surfaces.

3.07 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Test installed floor surface in accordance with ANSI/ESD STM7.1 .

3.08 PROTECTION

A. Barricade area to protect flooring until fully cured.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   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.

C. 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. Floors, unless specifically indicated.
   6. Glass.
   7. 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; 2007.

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. Benjamin Moore & Co: www.benjaminmoore.com.
   2. Duron, Inc: www.duron.com.
   3. PPG Paints: www.ppgpaints.com/#sle.
   4. Sherwin-Williams Company: 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 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 from the manufacturer's full line.

E. Colors: As indicated in Color Schedule.
1. Selection to be made by after award of contract.
2. Allow for minimum of three 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 .

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 ME-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
1. One coat of latex primer.
2. Semi-gloss: Two coats of latex enamel.

C. 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.

D. 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 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 are below the following maximums:
   1. Exterior Plaster and Stucco: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or 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. 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.

G. 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. 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.

C. 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. Floors, unless specifically indicated.
   6. Glass.
   7. 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; 2007.

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 three years 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. Benjamin Moore & Co: www.benjaminmoore.com.
   2. PPG Paints: ppgpaints.com.
      a. Basis of Design or by Approved Substitution
   3. Sherwin-Williams Company: 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 from the manufacturer's full line.

E. Colors: As indicated on drawings.
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 .
3. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.
4. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.03 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board 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-DF - Dry Fall: Metals; exposed structure and overhead-mounted services, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
1. One prime coat.
2. One top coat; white.
3. Top Coat: Latex Dry Fall; MPI #118, 155, or 226.

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 MgI-OP-3L - Galvanized Metals, Latex, 3 Coat:
   1. One coat galvanize primer.
   2. Semi-gloss: Two coats of latex enamel.

F. 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 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.

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. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

G. Galvanized Surfaces:

H. 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.

I. 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 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 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 14 16
PLAQUES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plaques.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

PART 2 PRODUCTS

2.01 PLAQUES

A. Metal Plaques:
   1. Material: Bronze sheet, flat, etched.
   2. Material Thickness: 1/8 inch (3 mm), minimum.
   3. Size: As indicated on drawings.
   4. Text and Typeface:
      a. Character Font: Times or other serif font.
      b. Character Case: Upper case only.
      c. Character Color: Contrast with background color.
   5. Background Texture: Pebble.
   6. Surface Finish: Brushed, satin.
   7. Painted Background Color: Dark oxide stain.
   8. Mounting: Rosettes and toggle bolts.

B. County Seal:
   1. Manufacturer: International Bronze Plaque Company (Basis of Design).
   2. Material: Single sided Bronze sheet, flat, etched on HDU polyurethan seal.
   3. Size: As indicated on drawings.
   4. Letter Style: Custom.
   5. Border Style: Single line.
   6. Bacground Texture: Pebble.
   7. Surface Finish: As selected by Architect from manufacturer's full range.
   8. Painted Background Color: Light oxide stain.
   9. Mounting: Concealed mounting.

2.02 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

B. Exposed Screws: Solid brass.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install with horizontal edges level.

C. Protect from damage until mm-dd-yyyy; repair or replace damaged items.

END OF SECTION

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SECTION 10 14 19
DIMENSIONAL LETTER SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dimensional letter signage.

1.02 REFERENCE STANDARDS

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 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.

1.04 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 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: Concealed screws.

2.02 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify 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.

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 at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
      c. Submit for approval by Owner through 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. Best Sign Systems, Inc: www.bestsigns.com/#sle.
2. Inpro Corporation: www.inprocorp.com/#sle.
   a. Boston Basis of Design or approved substitution.
3. Vista System LLC: www.vistasystem.com/#sle.
4. 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: Laminated colored plastic engraved through face to expose core as background color.
   7. Material: Acrylic plastic base with applied plastic letters and braille.
   8. Profile: Flat panel without frame.
   9. Tactile Letters: Raised 1/32 inch minimum.
   10. Braille: Grade II, ADA-compliant.
   11. One-Sided Wall Mounting: Concealed screws.

2.04 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; provide "window" section with sliding "In Use/Vacant" indicator.
   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.
   5. Exit Doors: Tactile "EXIT" signs at each exit door. Signs shall include raised letters and braille.

2.05 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify 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 23 10
GLAZED INTERIOR WALL AND DOOR ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Framed glazed interior wall and door assemblies.

1.02 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

C. ASTM E413 - Classification for Rating Sound Insulation; 2022.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene at project site seven calendar days prior to scheduled beginning of construction activities of this section to review section requirements.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's descriptive literature for each component in partition assembly.

C. Shop Drawings: Drawings showing layout, dimensions, identification of components, and interface with adjacent construction.

D. Verification Samples: Two samples, minimum size of 2 inch by 3 inch (51 mm by 76 mm), representing actual material and finish of exposed metal.

E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

F. Specimen Warranty.

G. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

H. Manufacturer's qualification statement.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating products specified in this section, with minimum 3 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until installation.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a one year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against excessive degradation of metal finishes. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN - FRAMED GLAZED INTERIOR WALL AND DOOR ASSEMBLIES

A. Basis of Design: Steelcase; Everwall; https://www.steelcase.com/#sle.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Acoustical Performance: Provide glass partitions and door assemblies tested by qualified testing agency, calculated in accordance with ASTM E413, tested in accordance with ASTM E90, and rated for not less than Sound Transmission Class (STC) indicated.
   1. Partition STC Rating: 35, minimum, for framed partition.
   2. Door STC Rating: 18, minimum, for sliding door.

2.03 FRAMED GLAZED INTERIOR WALL AND DOOR ASSEMBLIES

A. Framed Glazed Interior Wall Assembly: Factory fabricated assemblies consisting of center-glazed rectilinear aluminum framing with screw spline or clip joinery.
   1. Coordinate wall and door assembly preparation and provide hardware as necessary for fully operable installation.
   2. Design system to withstand normal operation without damage, racking, sagging, or deflection.
   3. Factory assembled to greatest extent practical; may be disassembled to accommodate shipping constraints.

B. Sliding Glass Doors: Top supported from roller assembly inside head channel frame with cushioning open/close feature.
   1. Door Configuration: As indicated on drawings and transom lites.
   2. Provide accessories as required for complete installation.

2.04 FINISHES

A. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.

B. Color: Dark bronze.

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that track supports are properly braced, level within 1/4 inch (6 mm) of required position and parallel to the floor surface.

B. Verify floor flatness of 1/8 inch in 10 feet (3 mm in 3 m), non-cumulative.

C. Do not begin installation until supports and adjacent substrates have been properly prepared.

D. If substrate preparation is the responsibility of another installer, notify of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean substrates thoroughly prior to installation.

B. Prepare substrates using the methods recommended by the manufacturer for achieving acceptable result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with glazed interior wall and door assembly manufacturer's instructions.

B. Fit and align glazed interior wall and door assembly level and plumb.

3.04 ADJUSTING

A. Adjust glazed interior wall and door assembly to operate smoothly from sliding or pivoting positions.

3.05 CLEANING

A. Remove protective film from exposed metal surfaces.

B. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.

C. Glass and Glazing: Clean glazing surfaces; remove excess glazing sealant compounds, dirt, and other substances.

3.06 CLOSEOUT ACTIVITIES

A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.

B. Demonstrate operation of glazed interior wall and door assembly and identify potential operational problems.

3.07 PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

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.

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; 2025.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

E. ASTM C1036 - Standard Specification for Flat Glass; 2025.

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 and reinforcement of toilet partitions to receive anchor attachments.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:
   1. [Basis of Design]: ASI - American Specialties, Inc: www.americanspecialties.com.
   2. Bradley Corporation: www.bradleycorp.com.
   3. Bobrick: 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 Owner .

C. Stainless Steel Sheet: ASTM A666/A666M, 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

2.05 COMMERCIAL SHOWER AND BATH ACCESSORIES

A. Shower Curtain Rod - SC: 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 installation with exposed fasteners.
   1. Product:
      a. Rod: ASI 1214-2 or approved substitution.
      b. Flanges: ASI 1214-1 or approved substitution.

B. Shower Curtain - SC:
   1. Material: Opaque vinyl, 0.008 inch (0.2 mm) thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
   2. Size:
      a. Size: 36 by 72 inches (914 by 1830 mm), hemmed edges.
      b. Size: 72 by 72 inches (1830 by 1830 mm), hemmed edges.
   3. Grommets: Stainless steel; pierced through top hem on 6 inch (150 mm) centers.
   4. Color: As selected from manufacturer's standard colors.
   5. Shower curtain hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
      a. Product: ASI 1200-SHU or approved substitution.
   6. Product: 1200-V manufactured by ASI of approved substitution.
      a. Width: Varies.

C. Folding Shower Seat - SS: Wall-mounted recessed; 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. Product: ASI 8203 or approved substitution.

D. Robe Hook - H: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
   1. Product: ASI 7340-S or approved substitution.

2.06 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Under-Lavatory Pipe and Supply Covers:
   1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
   2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.

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.

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.

1.02 REFERENCE STANDARDS

A. FM (AG) - FM Approval Guide; Current Edition.

B. NFPA 10 - Standard for Portable Fire Extinguishers; 2026.

C. UL (DIR) - Online Certifications Directory; Current Edition.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.

C. Manufacturer's Instructions: Indicate special criteria and wall opening coordination requirements.

D. Operation and Maintenance Data: Include test, refill, or recharge schedules and recertification requirements.

1.04 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature causes 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.
   2. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
   3. Potter-Roemer: www.potterroemer.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Fire Extinguisher Cabinets and Accessories:
   1. Activar Construction Products Group, Inc. - JL Industries: www.activarcpg.com/#sle.
   2. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
   3. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
   4. Potter-Roemer: www.potterroemer.com/#sle.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FIRE EXTINGUISHERS

A. General Requirements: 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 on drawings.

B. Multipurpose Dry-Chemical-Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
   1. Stored Pressure Operated: Deep drawn.
   2. Class: A:B:C.
   3. Size: 5 lb (2.27 kg).
   4. Finish: Baked polyester powder coat; color as selected by Architect.
   5. Temperature range: Minus 65 degrees F (Minus 54 degrees C) to 120 degrees F (49 degrees C).

2.03 FIRE EXTINGUISHER CABINETS

A. Cabinet Construction: Non-fire rated.
   1. Formed primed steel sheet; 20-gauge, 0.036-inch (0.9 mm) thick base metal.

B. Fire-Rated Cabinet Construction: One-hour fire rated.
   1. Steel; double wall or outer and inner boxes with 5/8-inch (16 mm) thick fire barrier material.

C. Cabinet Configuration: Recessed type.
   1. Size to accommodate accessories.

D. Configuration: Semi-recessed.
   1. Sized to accommodate extinguisher and accessories.
   2. Provide cabinet enclosure with right-angle inside corners and seams and with formed perimeter trim and door stiles.

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.

F. Type:
   1. Non-Rated: Provide at locations where no wall fire rating is indicated on plans.
   2. Rated: Provide at locations where a wall fire rating is indicated on the plans.

G. Door Glazing: Float glass, clear, 1/8 inch (3 mm) thick, and set in resilient channel glazing gasket.

H. Cabinet Mounting Hardware: Appropriate to cabinet, with predrilled holes for placement of anchors.

I. Fabrication: Weld, fill, and grind components smooth.

J. Finish of Cabinet Exterior Trim and Door: Primed for field paint finish.
   1. See Section 09 91 23 for field painting.

K. Finish of Cabinet Interior: White colored enamel.

L. Product: Larsen's Manufacturing Company "Architectural Series" Basis of Design or approved substitution.

2.04 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

B. Lettering: FIRE EXTINGUISHER text on decal or self-adhesive vinyl, prespaced black lettering in accordance with authorities having jurisdiction.

2.05 FIRE DEPARTMENT LOCK BOX

A. Fore 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.
      a. Options: 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 Sysyem; www.knoxbox.com
   2. Kidde; 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 dimensions, tolerances, and interfaces with other work.

B. Verify substrate and site conditions for product installation are in accordance with manufacturer's written instructions.

C. Verify rough openings for cabinet are sized and located in accordance with manufacturer's written instructions.

D. Notify in writing of conditions detrimental to completion of work. Do not proceed with installation until detrimental conditions are corrected.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, inside bottom of cabinet.

C. Secure rigidly in place.

D. Place extinguishers and accessories 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. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2026.

B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.

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. Samples: Submit two samples 6 by 6 inches (___ by ___ mm) in size showing color and finish of metal locker material.

E. 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. ASI Storage Solutions: www.asi-storage.com/#sle.

B. Penco Products, Inc: www.pencoproducts.com/#sle.

C. Spacesaver Corporation: www.spacesaver.com/#sle.

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 METAL LOCKERS

A. Locker Case Construction:
   1. Standard-Duty, Fully Assembled Construction: Made of formed sheet steel; metal edges finished smooth without burrs; baked enamel or powder coat finished inside and out.
      a. Locker Body Components: Formed and flanged from steel sheet of the following type and minimum thicknesses:
         1) Unperforated Steel Sheet: Commercial Steel (CS), Type B, supplied for exposed applications and complying with ASTM A1008/A1008M and the following:
      b. Where ends or sides are exposed, provide flush panel closures.
      c. Provide filler strips where indicated, securely attached to lockers.

B. 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.

C. Latches and Door Handles: Manufacturer's standard.
   1. Latching Components: 300 Series Stainless Steel (ASTM A240/A240M).

D. Hinges: Heavy-duty, 7-knuckle type; two for doors under 42 inches (1050 mm) high; three for doors over 42 inches (1 050 mm) high.

E. Number Plates: Provide oval shaped aluminum plates. Form numbers ____ inch (____ mm) high of block font style with ADA designation, in contrasting color.

F. Built-In Combination Locks:
   1. Built-In Combination Lock: Single-dial combination lock.
      a. Single-Dial Numerical Combination Lock: Three-number dialing lock, key-controlled, capable of minimum five combination changes with key.
      b. Latch: _____.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.

B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Place and secure on prepared base.

C. Install lockers plumb and square.

D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 pounds (445 N).

E. Bolt adjoining locker units together to provide rigid installation.

F. Install end panels.

G. Install fittings if not factory installed.

H. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION

SECTION 10 73 16.13
METAL CANOPIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Attached metal canopies.

1.02 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

F. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2025.

G. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs; 2024.

H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2026.

I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Submit product data sheets, including material descriptions and finishes, and preparation instructions and recommendations.

C. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing profiles, sections of components, finishes, and fastening details.

D. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.

E. Manufacturer's Qualification Statement.

F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
   1. Not less than three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site ready for erection.

B. Package using methods that prevent damage during shipping and storage on site.

C. Store materials under cover and elevated above grade.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Metal Canopies: Correct defective work within a two year period after Date of Substantial Completion.

C. Finish Warranty: Provide manufacturer's ten year warranty on factory finish against cracking, peeling, and blistering.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Canopies:
   1. Form Metal Systems; Coda Series: www.formmetal.com/#sle.
   2. Kingspan Light + Air, LLC; Briteway: www.kingspanlightandair.us/#sle.
   3. Basis of Design: Mapes Industries; Super Lumideck: https://mapes.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 METAL CANOPIES

A. Shop Fabricated Steel Canopy

B. Configuration: Layout and dimensions, column layout, canopy clearance, fascia profile, and roof covering design as indicated on drawings.
   1. Installation: Face-mounted to building structure.
   2. Structural Framing System: Aluminum.
   3. Covering Material: Aluminum.
   4. Drainage Concept: Water collected in decking conducted into perimeter gutters and discharged through integrated gutter scuppers.

C. Performance Requirements:
   1. Design and fabricate metal canopy system to resist wind, snow, live, and seismic loads without failure, damage, or permanent deflection in accordance with ASCE 7:
      a. Loads: As indicated on drawings.
   2. Thermal Movement: Design canopy system to accommodate thermal movement caused by ambient temperature range of 120 degrees F (49 degrees C) and surface temperature range of 180 degrees F (82 degrees C) without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects on assembly components.

2.03 COMPONENTS

A. Structural Steel Framing:
   1. Columns: ASTM A500/A500M, Grade B, round or rectangular tubing, sized to suit project design load requirements.
   2. Base and Top Plates: ASTM A36/A36M, with pre-drilled bolt holes.
   3. Beams: Wide flange, ASTM A572/A572M Grade 50.
   4. Other Structural Steel Members: ASTM A36/A36M.

B. Structural Aluminum Framing: Alloy and temper 6063-T5, 6063-T6, or 6061-T6.

C. Covering:
   1. Aluminum Decking:

D. Fascia: Manufacturer's standard flat profile.
   1. Material: Aluminum Composite Material (ACM) panel.

E. Anchor Bolts: ASTM A307 or ASTM A572/A572M, formed with bent shank, assembled with template for casting into concrete.
   1. Minimum exposed thread of 7 inches (178 mm) above footing and 23 inch (584 mm) minimum embedment.
   2. Provide nuts and washers as required for column leveling and plumbing.

F. Concrete Footings: Refer to Section 03 30 00 for additional requirements.

G. Exposed Gutters and Downspouts: Aluminum with AAMA _____ organic coating, color to match canopy covering, manufacturer's recommended size for canopy specified.

2.04 SHOP FABRICATION

A. Provide a complete system ready for erection at project site.

B. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.

C. Weld steel members in accordance with AWS D1.1/D1.1M.

D. Fabricate connections for bolt, nut, and washer connectors.

2.05 FINISHES

A. Structural Steel Framing:
   1. Shop Primer: Rust-inhibitive red oxide.
   2. Finish Coating: As specified in Section 09 96 00.

B. Aluminum Framing and Decking:
   1. High Performance Organic Coatings: AAMA 2604, multiple coats, thermally cured, fluoropolymer system.

C. Steel Decking and Roofing: Polyester baked enamel finish; color as selected from manufacturer's standard range.

D. Fascia: Fluoropolymer finish; color as selected from manufacturer's standard range.

2.06 ACCESSORIES

A. Structural Bolts: ASTM F3125/F3125M, Grade A325, minimum 3/4 inch (19 mm) diameter.

B. Trim, Closure Pieces, and Flashings: Same material, thickness and finish as sheet metal decking; factory-fabricated to required profiles.
   1. Exposed Fasteners: Not permitted.

C. Fasteners, Non-Structural: ASTM F593 stainless steel or ASTM A307 carbon steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and site area for conditions that might prevent satisfactory installation.

B. Verify that foundation, electrical utilities, and placed anchors are in correct position.

C. Verify that bearing surfaces are ready to receive this work.

D. Do not proceed with installation until all conditions are satisfactory.

3.02 INSTALLATION - FRAMING

A. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation.

B. Set column base plates with non-shrink grout to achieve full plate bearing.

C. Fasten columns to anchor bolts.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 INSTALLATION - CANOPY COVERING

A. Install in accordance with manufacturer's instructions.

B. Fasten metal decking to metal support members, aligned level and plumb.

C. Install fascia panels, trim, and flashing.

D. Separate dissimilar metals using concealed bituminous paint.

E. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

3.04 TOLERANCES

A. Maximum Variation from Level: Plus/Minus 1/8 inch (3.175 mm).

3.05 CLEANING

A. Clean surfaces of dust and debris; follow manufacturer's cleaning instructions for the finish used.

3.06 PROTECTION

A. Protect canopy after installation to prevent damage due to other work until Date of Substantial Completion.

END OF SECTION

SECTION 10 75 00
FLAGPOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum Flagpoles.

1.02 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. NAAMM FP 1001 - Guide Specifications for Design Loads of Metal Flagpoles; 2007.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pole, accessories, and configurations.

C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.

D. Samples: Submit finish samples for each finised metal used on flagpoles.

E. Designer's Qualification Statement.

1.04 QUALITY ASSURANCE

A. Designer Qualifications: Design flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed the State in which the Project is located.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

C. Obtain each flagpole as a complete unit from a single source.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers.

B. Store flagpoles in a dry location, protected from the weather and moisture, as recommended by the manufacturer.

C. Protect flagpole and accessories from damage or moisture.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Concord Industries, Inc: www.concordindustries.com.

B. Morgan-Francis Flagpoles & Accessories: www.morgan-francis.com/#sle.

C. Pole-Tech Co., Inc: www.poletech.com.

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FLAGPOLES

A. Flagpoles: Designed in accordance with NAAMM FP 1001
   1. Material: Aluminum.
   2. Design: Cone tapered.
   3. Mounting: Ground mounted type.
   4. Nominal Height: 30 ft (9 m); measured from nominal ground elevation.
   5. Halyard: External type 5/16" (#10) polypropylene.

B. Performance Requirements:
   1. Wind Pressure Loading on Flagpole with Flag: Resistant without permanent deformation to 150 miles/hr (241 km/hr) wind speed, in accordance with NAAMM FP 1001; the factor of safety used is 2.5.

2.03 POLE MATERIALS

A. Aluminum: Seamless, extruded tubing complying with ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.04 ACCESSORIES

A. Ground Mounted Flood Light:.

B. Truck Assembly: Cast aluminum; revolving, stainless steel ball bearings, non-fouling.

C. Flag: Owner to select design, 5 ft by 8 ft (1.5 m by 2.4 m) size, nylon fabric, brass grommets, hemmed edges.

D. Cleats: 9 inch (230 mm) size, aluminum with galvanized steel fastenings, one per halyard.

E. Halyard: 5/16 inch (8 mm) diameter nylon, braided, white.

F. Primer: Zinc chromate type.

2.05 OPERATORS

A. Hand Crank: Removable _____ type.

2.06 MOUNTING COMPONENTS

A. Foundation Tube Sleeve: AASHTO M 36M, corrugated 16 gage (1.5 mm) steel, galvanized, depth per manufacturer.

B. Pole Base Attachment: Flush; steel base with base cover.

C. Lighting Ground Rod: Copper rod, 3/4 inch (19 mm) diameter.
   1. Length: Per flagpole manufacturer.

2.07 FINISHING

A. Metal Surfaces in Contact With Concrete: Asphaltic paint.

B. Aluminum: Mill finish.

C. Finial: Gold anodized finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

3.02 PREPARATION

A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.03 INSTALLATION

A. Install flagpole, base assembly, and fittings in accordance with manufacturer's instructions.

B. Electrically ground flagpole installation.

C. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/2 inch (12 mm).

3.05 ADJUSTING

A. Adjust operating devices so that halyard and flag function smoothly.

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 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.

1.03 REFERENCE STANDARDS

A. WCMA A100.1 - Standard for Safety of Window Covering Products; 2022.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the placement of concealed blocking to support blinds. See Section 06 10 00.

1.05 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.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 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; CD Model: www.hunterdouglasarchitectural.com/#sle.
   2. Lotus & Windoware, Inc: https://www.lotusblind.com/#sle.
   3. SWFcontract, a division of Spring Window Fashions, LLC.: www.swfcontract.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Source Limitations: Furnish blinds and associated controls produced by a single manufacturer and obtained from a single supplier.

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 cord with full range locking; blade angle adjustable by control wand.

C. Wood Slats: White Maple species, radiused slat corners.
   1. Width: 2 inch (50 mm).

2. Pre-finished, color as selected by Architect from manufacturers full range.

D. Slat Support: Woven polypropylene cord, ladder configuration.

E. Head Rail: Pre-finished, formed wood box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.
1. Color: Same as slats.

F. Bottom Rail: Pre-finished, formed wood; with end caps.
1. Color: Same as headrail.

G. Lift Cord: Braided nylon, continuous loop with restraining device; comply with WCMA A100.1.
1. Free end weighted.
2. Color: As selected by Architect from manufacturers full range.

H. 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.

I. Headrail Attachment: Wall brackets.

J. 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.

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 32 00
MANUFACTURED WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured standard casework, with cabinet hardware.

1.02 DEFINITIONS

A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches (1.066 m) above finished floor, tops of cases less than 72 inches (1.82 m) above finished floor and all members visible in open cases or behind glass doors.

B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches (1.828 m) above finished floor and bottoms of cabinets more than 30 inches (0.762 m) but less than 42 inches (1.066 m) above finished floor.

C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches (762 mm) above finished floor.

1.03 REFERENCE STANDARDS

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

B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2026.

C. BHMA A156.9 - Cabinet Hardware; 2020.

D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 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.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Component dimensions, configurations, construction details, joint details, attachments.

C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements, placement dimensions and tolerances, clearances required, and keying information.

D. Samples for Finish Selection: Fully finished, for color selection. Minimum sample size: 2 inches by 3 inches (51 mm by 75 mm).
   1. Wood samples for color and species selection.
   2. Thermally fused laminate samples, for color, texture, and finish selection.

E. Manufacturer's Installation Instructions.

F. Manufacturer's Qualification Statement.

G. Installer's Qualification Statement.

H. Maintenance Data: Manufacturer's recommendations for care and cleaning.

I. Finish touch-up kit for each type and color of materials provided.

1.06 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 the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

B. Acceptance at Site:
   1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.

C. Storage:
   1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

1.08 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 Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:
   1. Ruptured, cracked, or stained finish coating.
   2. Discoloration or lack of finish integrity.
   3. Cracking or peeling of finish.
   4. Delamination of components.
   5. Failure of adhesives.
   6. Failure of hardware.

PART 2 PRODUCTS

2.01 CASEWORK, GENERAL

A. Quality Standard: AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Thermally Fused Laminate Cabinets: Economy Grade.

2.02 FABRICATION

A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.

B. Construction: As required for selected grade.

C. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.

D. Hardware Application: Factory-machine casework members for hardware that is not surface applied.

E. Fixed panels at backs of open spaces between base cabinets.

F. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

G. Apron Frames: Construction similar to other cabinets, with modifications.

2.03 THERMALLY FUSED LAMINATE CASEWORK

A. Thermally Fused Laminate Casework: Thermally fused laminate panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base cabinets.
   1. Style: Flush overlay. Ease doors and drawer fronts slightly at all edges.

2. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions:
   a. Base Cabinets: 24 inches (610 mm).
   b. Tall Cabinets: 22 inches (559 mm).
   c. Wall Cabinets: 13 inches (330 mm).
3. Panels: Grade M-S particleboard or Grade 155 MDF core, with melamine-impregnated decorative surface papers and transparent protective topcoat; NEMA LD 3 Type VGL.
   a. Finish: Matte or suede, gloss rating of 5 to 20.
   b. Surface Color and Pattern: As selected by from manufacturer's standard line.

2.04 CABINET HARDWARE

A. Manufacturer's standard types, styles and finishes, and as indicated below.

B. Comply with BHMA A156.9 requirements.
   1. Acceptable base materials for plated finishes include brass, bronze, and steel.

C. Shelves in Cabinets:
   1. Shelf Standards and Rests: plastic type.

D. Swinging Doors: Hinges, pulls, and catches.
   1. Hinges: Visible, number as required by referenced standards for width, height, and weight of door.
      a. Visible Hinges: Installed on framed cabinet face, and on door face, bright chromium plated over nickel on base material.
   2. Pulls: Brass wire pulls, 4 inches (102 mm) wide.
      a. Pull design to comply with project's referenced accessibility requirements.
   3. Catches: Mechanical catch.

E. Drawers: Pulls and slides.
   1. Pulls: Brass wire pulls, 4 inches (102 mm) wide.
      a. Pull design to comply with project's referenced accessibility requirements.
   2. Slides: Steel, full extension arms, ball bearings; self-closing; capacity as recommended by manufacturer for drawer height and width.

2.05 MATERIALS

A. Wood-Based Materials:
   1. Solid Wood: Air-dried to 4.5 percent moisture content, then tempered to 6 percent moisture content before use.

B. Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels.

2.06 ACCESSORIES

A. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

PART 3 EXECUTION

3.01 PREPARATION

A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

3.02 EXAMINATION

A. Site Verification of Environmental Conditions:
   1. Do not deliver casework until the following conditions have been met:
      a. Building has been enclosed (windows and doors sealed and weather-tight).
      b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
      c. Ceiling, overhead ductwork, piping, and lighting have been installed.
      d. Installation areas do not require further “wet work” construction.

B. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch (13 mm) leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.

C. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:

D. Verify adequacy of support framing and anchors.

E. Verify that service connections are correctly located and of proper characteristics.

3.03 INSTALLATION

A. Perform installation in accordance with manufacturer's instructions.

B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.

C. Set casework items plumb and square, securely anchored to building structure.

D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.

E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch (1.6 mm). In addition, do not exceed the following tolerances:
   1. Variation of Tops of Base Cabinets from Level: 1/16 inch (1.6 mm) in 10 feet (3 m).
   2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
   3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
   4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.6 mm).

F. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches (407 mm) on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.

G. Install hardware uniformly and precisely.

H. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.

I. Replace units that are damaged, including those that have damaged finishes.

3.04 ADJUSTING

A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.05 CLEANING

A. Clean casework and other installed surfaces thoroughly.

3.06 PROTECTION

A. Do not permit finished casework to be exposed to continued construction activity.

B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.

C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION

SECTION 12 36 00
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Countertops for architectural cabinet work.

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; 2026.

C. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

E. PS 1 - Structural Plywood; 2022.

1.03 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. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, texture, patterns, markings and surface finish.
   1. Sample of sealant.

F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.

G. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

H. Installation Instructions: Manufacturer's installation instructions and recommendations.

I. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.04 QUALITY ASSURANCE

A. Fabricator Qualifications: Natural Stone Institute (NSI) Accredited Natural Stone Fabricator; www.naturalstoneinstitute.org/#sle.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

C. Quality Certification:
   1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
   2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
   3. Provide designated labels on shop drawings as required by certification program.
   4. Provide designated labels on installed products as required by certification program.
   5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 COUNTERTOPS

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Wood Countertops: One-piece, glued-laminated under pressure.
   1. Thickness: 1-1/4 inch (32 mm), minimum.
   2. Construction (Butcher Block): Maximum 1/2 inch (12 mm) thick strips glued perpendicular to surface.
   3. Species: Maple; clear grade.
   4. Exposed Edges: Rounded to approximately 3/8 inch (9 mm) radius.
   5. Finish: Sanded smooth; two coat boiled linseed oil rubbed in with 48 hours between coats.

C. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
   1. Flat Sheet Thickness: 3/4 inch (19 mm), minimum.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. Manufacturers:
         1) Dupont; _____: www.corian.com/#sle.
         2) LG Hausys America, Inc; HI-MACS 12mm: www.lghausysusa.com/#sle.
         3) Wilsonart; _____: www.wilsonart.com/#sle.
         4) Substitutions: See Section 01 60 00 - Product Requirements.
      b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
      c. Color and Pattern: As selected by from manufacturer's full line.
   3. Other Components Thickness: 1/2 inch (12 mm), minimum.
   4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch (32 mm) thick; square edge; use marine edge at sinks.
   5. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.
   6. Skirts: Same sheet material.
   7. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.

2.02 MATERIALS

A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

2.03 ACCESSORIES

A. Fixed Top-Mounted Countertop Support Brackets for Island Applications:

1. Material: Steel.
2. Finish: Manufacturer's standard, factory-applied, textured powder coat.
3. Color: Black.

2.04 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.
   2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
   3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
   2. Height: 4 inches (102 mm), unless otherwise indicated.

C. Solid Surfacing: Fabricate tops and wall panels up to 144 inches (3657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

D. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

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 of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

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. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Attach wood countertops using screws with minimum penetration into substrate board of 5/8 inch (16 mm).
   1. Seal joint between back/end splashes and vertical surfaces.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet (3 mm in 3 m), maximum.

B. Offset From Wall, Countertops: 1/8 inch (3 mm) maximum; 1/16 inch (1.5 mm) minimum.

C. Field Joints: 1/8 inch (3 mm) wide, maximum.

3.05 CLEANING

A. Clean countertops surfaces thoroughly.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 13 34 19
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufacturer-engineered, shop-fabricated structural steel building frame.

B. Metal wall and roof panels including soffits and gutters and downspouts.

1.02 REFERENCE STANDARDS

A. AISC 360 - Specification for Structural Steel Buildings; 2022, with Errata (2026).

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

G. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2026.

H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

I. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2026.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

K. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.

L. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2026.

M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

N. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2026.

O. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).

P. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2024, with Editorial Revision (2025).

Q. MBMA (MBSM) - Metal Building Systems Manual; 2024.

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. Product Data: Provide data on profiles, component dimensions, fasteners.

C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections, openings, and loads; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation; framing anchor bolt settings, sizes,

and locations from datum, foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

D. Samples: Submit two samples of precoated metal wall and roof panels for each color selected, 12 by 12 inch (300 by 300 mm) in size illustrating color and texture of finish.

E. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement.

F. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

G. Designer's Qualification Statement.

H. Manufacturer's Qualification Statement: Provide documentation showing metal building manufacturer is accredited under IAS AC472.
   1. Include statement that manufacturer designs and fabricates metal building system as integrated components and assemblies, including but not limited to primary structural members, secondary members, joints, roof, and wall cladding components specifically designed to support and transfer loads and properly assembled components form a complete or partial building shell.

I. Erector's Qualification Statement.

J. 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.

K. Project Record Documents: Record actual locations of concealed components and utilities.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this type of work.
   1. Design Engineer Qualifications: Licensed in the State in which the Project is located.
   2. Comply with applicable code for submission of design calculations as required for acquiring permits.
   3. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.

B. Perform work in accordance with AISC 360 and MBMA (MBSM).

C. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
   1. Not less than five years ofdocumented experience
   2. Accredited by IAS in accordance with IAS AC472.
   3. AISC Certified.

D. Erector Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

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

1.06 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 Substantial Completion.

C. Provide twenty year manufacturer warranty for metal panel finishes.
   1. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

D. Provide ten year manufacturer warranty against leakage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Buildings Systems:
   1. Butler Manufacturing Company: www.butlermfg.com.
   2. Ceco Building Systems: www.cecobuildings.com.
   3. Chief Buildings: www.chiefbuildings.com/sle.
   4. Kirby Building Systems: www.kirbybuildingsystems.com.
   5. Metallic Building Company: www.metallic.com.
   6. Nucor Building Systems: www.nucorbuildingsystems.com.
   7. VP Buildings: www.vp.com.
   8. Ascent Buildings: www.ascentbuildings.net.
   9. Star Building Systems: www.starbuildings.com.
   10. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ASSEMBLIES

A. Multiple systems as indicated on the plans.
   1. Straight columns.
   2. Interior columns where indicated on the plans.

B. Primary Framing: Rigid frame of rafter beams and columns, intermediate columns and end wall columns, and wind bracing.
   1. Endwall framing: Expandable where indicated on plans.

C. Secondary Framing: Purlins, Girts, Eave struts, Flange bracing, Sill supports, and Clips, and other items detailed.

D. Wall System: Preformed metal panels of vertical profile, with sub-girt framing/anchorage assembly, and accessory components.

E. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly, and accessory components.

F. Roof Slope: As indicated on plans.

2.03 PERFORMANCE REQUIREMENTS

A. Design structural members to withstand dead load, applicable snow load, and design loads due to pressure and suction of wind calculated in accordance with applicable code.
   1. Refer to structural drawing S0.1 for specific Design Criteria.

B. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

C. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range recommended by manufacturer.

D. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

2.04 MATERIALS - FRAMING

A. Structural Steel Members: ASTM A36/A36M.

B. Structural Tubing: ASTM A500/A500M Grade B cold-formed.

C. Plate or Bar Stock: ASTM A529/A529M, Grade 50.

D. Anchor Bolts: ASTM A307, Grade A, with no preference for protective coatings.

E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1; galvanized to ASTM A153/A153M.

F. Welding Materials: Perform in accordance with AWS D1.1/D1.1M.

G. Primer: Manufacturers standard.

H. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch (13.7 MPa).
   2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch (48 MPa).

2.05 MATERIALS - WALLS AND ROOF

A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Designation SS (structural steel), Grade 33 (230), with G90/Z275 coating.

B. Metal Building Type, Factory Applied, Vapor-Barrier Insulation Facings: Water vapor permeance no greater than 0.10 perm (5.7 ng/(Pa s sq m)) when tested in accordance with ASTM E96/E96M; flame spread index of 25 or less, and smoke developed index of 40 or less when tested in accordance with ASTM E84.

C. Joint Seal Gaskets: Manufacturer's standard type.

D. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.

E. Bituminous Paint: Asphaltic type.

F. Sealant: Manufacturer's standard type.

G. Trim, Closure Pieces, Caps, Flashings, Gutters, Downspouts, Rain Water Diverter, Fascias, and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

2.06 FABRICATION - FRAMING

A. Fabricate members in accordance with AISC 360 for plate, bar, tube, or rolled structural shapes.

B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.

C. Provide wall opening framing for doors, windows, and other accessory components.

2.07 FABRICATION - WALL AND ROOF PANELS

A. Siding: 24 gauge smooth concealed fastener system.
   1. Product: MBCI FW-120-1 Basis of Design or approved susbtitution.

B. Roofing: 24 gauge smooth striated 16" width, 2" high, mechanically seamed concealed fastener system.
   1. Product: MBCI SuperLok Basis of Design or approved susbtitution.

C. Soffit Panels: Minimum .025 inch (____ mm) metal thickness, flat profile indicated, perforated for ventilation.

D. Girts/Purlins: Rolled formed structural shape to receive siding, roofing sheet.

E. Flashings, Closure Pieces, Fascia, Infills, and Caps: Same material and finish as adjacent material, profile to suit system.

F. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

2.08 FABRICATION - GUTTERS AND DOWNSPOUTS

A. Fabricate of same material and finish as roofing metal.

B. Form gutters and downspouts of standard profile and sizeindicated to collect and remove water. Fabricate with connection pieces.

C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.

D. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.09 FINISHES

A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.

B. Exterior Surfaces of Wall and Roof Components and Accessories: Fluoropolymer Two-Coat System, 0.2-0.3 mil primer with 0.7-0.8 mil 70 percent PVDF fluoropolymer color coat, AAMA 621.
   1. Basis of Design: MBCI, Signature 300.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.02 ERECTION - FRAMING

A. Erect framing in accordance with AISC 360.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
   1. Bracing shall be portal frame.

C. Set column base plates with non-shrink grout to achieve full plate bearing.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION - WALL AND ROOF PANELS

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding system to structural supports, aligned level and plumb.

D. Locate end laps over supports. End laps minimum 2 inches (50 mm). Place side laps over bearing.

E. Provide expansion joints where indicated.

F. Use concealed fasteners.

G. Install sealant and gaskets, providing weather tight installation.

3.04 ERECTION - GUTTERS AND DOWNSPOUTS

A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

3.05 TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from level; 1/8 inch (3 mm) from plumb.

B. Siding and Roofing: 1/8 inch (3 mm) from true position.

END OF SECTION

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SECTION 210000 – FIRE PROTECTION REQUIREMENTS

PART 1 GENERAL

1.01 Scope of Work

A. The Sprinkler Contractor shall be licensed for sprinkler work

B. The Sprinkler Contractor shall provide all materials and labor necessary to install a complete and operating sprinkler system in accordance with the Engineering Drawings and as specified herein.

1.02 Quality Assurance

A. All work shall be in accordance with State Building Codes, National Fire Protection Association and all applicable codes.

B. The Notice to Bidders, Instructions to Bidders, General Conditions, and Supplementary General Conditions are a part of these specifications.

C. Any inspection and test charges required for the sprinkler work by approving authorities and Owners and any permits needed for installation of a complete system shall be secured and paid for by the Sprinkler Contractor.

D. Where the words "Approved", "Approval", or "Approved Equivalent" appear, it is intended that items other than the model number specified shall be subject to approval of the Engineer.

E. “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 require 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.

F. 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. Items that are submitted for approval after this date will not be accepted.

G. The Sprinkler Contractor shall refer to the General Conditions for provisions of temporary utilities required under this Contract.

H. All work shall be performed in accordance with U. S. Department of Labor, Occupational Safety and Health Standards.

I. The entire system will be accepted as a unit. There will be no partial acceptance.

J. The Owner shall provide heat in the building to protect the wet pipe system after acceptance of the system and provide all fire extinguishers.

K. Submittals

i. See General and Supplementary General Conditions.

ii. Within ten days after notification of the award of 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. Four sets of submittal data shall be provided for approval.

iii. Each submittal shall bear the approval of the Contractor indicating 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.

iv. Shop drawings and data sheets shall provide all pertinent information for proper evaluation of each item. The drawings are diagrammatic only and are not intended to show minor details and exact locations. Locations of pipes, ducts, electrical raceways, panels, equipment, light fixtures, ceiling diffusers, etc., shall be reviewed, and anticipated interferences shall be coordinated with other Prime Contractors prior to installation. Lines, whose elevation cannot be changed, shall have the right- of-way, and larger lines shall have the right-of-way over smaller lines. Shop drawings shall show all principal dimensions, "tie-in" dimensions, sizes and locations.

L. The Contractor shall submit to the Engineer a set of accurately marked plans indicating all changes encountered during the construction. Final payment will be contingent on receipt of these As-Built Plans.

M. The Contractor shall furnish four (4) bound sets 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.

N. The Contractor shall submit to the Owner all certificates required for operating system in compliance with state and federal regulations.

1.03 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. Designated areas for material storage will be established by the Owner, and each Contractor will be responsible for maintaining his own area.

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.

1.04 Work Conditions and Coordination

A. The Contractor shall review the plans of all other Prime Contractors on the job and inform them of anticipated areas of conflict prior to installation of fire protection system.

B. The Contractor shall review the electrical requirements for the equipment provided and 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 electrical contracting firm.

C. The Contractor will be responsible for the final electrical connections to all equipment installed as part of his contract. Unless otherwise noted, this Contractor shall wire from his equipment to disconnect switches, junction boxes, or panelboard circuit breakers as provided by the Electrical Contractor.

D. Electrical work by this Contractor shall be in accordance with all state and national codes, and as specified in Division 16 contained herein.

E. Pipe sleeves and chases required for the installation of a complete fire protection system shall be furnished by this Contractor, and he shall be responsible for coordinating the location and correct number of all required openings. The Contractor will be responsible to the General Contractor for coordinating this work with his schedule and will not cause him any undue hardship or loss of time.

F. 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.

1.05 Guarantee

A. Contractor will provide extent and length of warranty and guarantee for all products with his submittals. If no warranties are available or offered, it shall be understood that the Contractor shall guarantee and warrant all materials and labor done under his contract for 12 months from the date of acceptance.

B. Where extended warranties or guaranties 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 PRODUCTS

2.01 Valves

A. Valves shall be approved by and bear identification of the Underwriter's Laboratories.

B. All valves or connections to water supplies and in supply pipes to sprinklers shall be approved indicating valves.

C. Drain valves and test valves shall be of approved type.

D. Check valves shall be of approved type and may be installed in a vertical or horizontal position.

E. Identification sign indicating which portion of the system is controlled by each valve shall be provided at each control valve in the system.

F. Shut-off valves shall be Jenkins Figure 825-A, or approved equivalent by Crane or Nibco

G. Check valves shall be Jenkins Figure 629, or approved equivalent by Crane or Nibco.

H. Inspector's Test Valve: Provide inspector's test valve and piping as shown on the Drawings.

I. Standard design identification signs shall be provided on all control drain, test and alarm valves.

2.02 Fire Department Connections

A. Approved equipment shall be by Crocker, Seco, Standard, W. D. Allen, or Elkhart, or approved equivalent.

B. Sprinkler alarms shall be installed as required by NFPA or local authorities for a complete sprinkler system.

C. Wiring from tamper switches and flow switches to fire alarm control panel shall be by the Electrical Contractor.

2.03 Piping

A. Piping 2 1/2" and larger shall be schedule 10, and piping 2 " and smaller shall be schedule 40, black steel pipe conforming to ASTM Specification A795. Other type piping may be submitted for approval only if listed, and it meets the standards cited in NFPA.

B. Standard weight welding fittings shall be used and shall conform to ANSI B16.11.

C. Screwed fittings shall be malleable iron, 150 pounds s.w.p. with banded pattern conforming to ANSI B16.3.

D. Standard riser plate signage shall be provided on each system riser.

E. Pipe 2" and smaller shall have screwed joints.

F. Pipe 2 1/2" and larger shall be welded. Welding of pipe shall be in accordance with NFPA 13, Chapter 3-3.12.4

G. Welding ties or weldolets shall be used.

H. No "stub-in" shall be permitted.

I. When risers are 3" and larger in size, a flange joint shall be used at the riser where required.

J. Screwed unions shall not be used on pipe larger than 2". Couplings and unions of other than screwed type shall be of types approved specifically for use in the sprinkler systems.

K. A one-piece reducing fitting shall be used wherever a change is made in the size of the pipe, except hexagonal or face bushings may be used in reducing the size of the openings of fittings when standard fittings of the required size are not available.

L. 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 or insulation on the pipe. Sleeves through wall and ceiling shall be flush. Sleeves through floors shall extend one inch above finished floor. Sleeves in exterior walls shall be caulked and made watertight. Pipes passing through sleeves shall be painted with a rust inhibiting paint. Pipes passing through fire walls or floors shall be sealed to conform to Underwriters' Laboratories requirements.

M. All piping tests for the sprinkler system shall be in accordance with NFPA 13, Chapter 1-1.11.3. A Contractor's Material and Test Certificate Part "C" will be filled out for each riser by the Contractor and signed with copies prepared for approving authorities, Owner, and Architect/Engineer. Any leaks that occur shall be repaired and another test started. All defects shall be corrected and the system left in service before the Contractor leaves the job.

2.04 Hangers and Supports

A. Installation of hangers and inserts shall be coordinated with all other Contractors on a priority basis. Each Contractor shall be responsible for providing all inserts, hangers, and rods necessary for the installation of his work

B. Hangers supporting horizontal piping shall be installed and spaced in accordance with NFPA 13, Chapter 3-3.14.

C. Figure numbers given below are devices as manufactured by B-Line Systems, Inc.

Concrete Inserts	Fig. B2500
Hanger Rod	Fig. B3205
Riser Clamp	Fig. B3373

Hanger	Fig. B3100
Pipe Saddles	Fig. B3160
Insulating Protector	Fig. B3151
Rod Ceiling Plate	Fig. B3199
Beam Clamps	Fig. 3050
Offset Clamps	Fig. B351L
Roller Hanger	Fig. B3110

2.05 Sprinkler Heads

A. Only listed sprinkler heads shall be used. Sprinkler heads shall not be altered in an respect, nor have any type of ornamentation or coatings applied after shipment from the place of manufacture.

B. Guards shall be furnished wherever heads will be subject to damage.

C. The Contractor shall provide the Owner a cabinet containing a minimum of 6 spare sprinklers of each type used in the installation. A special sprinkler wrench shall also be provided to be used in the removal and installation of sprinklers. Mount cabinet adjacent to riser.Where possible, all sprinkler heads shall be trimmed with materials to allow ceiling tile replacement

D. Spacing, location and position of sprinkler heads and piping are approved on plans and shall be in accordance with minimum standards set forth in NFPA 13, Chapter 3.

E. All sprinkler heads, unless otherwise noted, will be centered in ceiling tiles.

F. All sprinkler heads, unless otherwise noted, will be installed on a swing connection.

2.06 Sprinkler Alarms

A. Alarm check valve of the approved type with water motor alarm gong, riser trim, drain valves and riser lines shall be located at the main system control valve as indicated on the Drawings.

B. Water flow switches are to be furnished and installed by the Sprinkler Contractor.

C. Wiring from flow switches and alarm valves to fire alarm control panel shall be by Electrical Contractor.

2.07 Gauges

A. Approved pressure gauges shall be installed as indicated on the Drawings. The gauge connection shall be equipped with a shut-off valve and with provision for draining.

B. The pressure gauges shall be of approved type and shall have a maximum limit not less than twice the normal working pressure at the point where installed. They shall be installed to permit removal and shall be located where they will not be subject to freezing.

PART 3 EXECUTION

3.01 Inspection

A. This Contractor shall examine all areas of completed work prior to installation of the fire protection systems and insure that no defects or errors are present which would result in the poor application or installation of subsequent work.

B. It is the responsibility of this Contractor to coordinate all work performed by others for this Contractor. Upon inspection, should errors or omissions be found, it will be the responsibility of this Contractor to resolve the problem at no cost to the Owner.

3.02 Installation

A. 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.

B. 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.

C. All materials, products and equipment and components thereof which make up a complete fire protection system, shall be such as appear on the Fire Underwriters Equipment List of the Underwriters Laboratories, Inc.

D. All work shall be performed in a manner indicating proficiency in the trade.

E. All pipes, conduit, etc., shall be either parallel to the building walls or plumb where installed in a vertical position, unless otherwise noted, and shall be concealed when located in architecturally finished areas.

F. 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.

G. All patching shall be done in such a manner as to restore the areas or surfaces to match existing finishes.

H. This Contractor shall familiarize himself with the method and schedule of installation of poured concrete floors and walls. He shall lay out his work in advance and furnish all sleeves and opening locations to the General Contractor for installation. This Contractor shall provide and install all inserts and hangers required to support his equipment, pipes, conduit, etc.

I. All piping and conduit shall be accurately roughed in according to manufacturer's installation dimensions so that no offset adaptors, flexible connections or other imprecision not required by the manufacturer are necessary. All incorrect work shall be torn out and corrected and walls and floors patched at no expense to the Owners.

J. Items such as alarms, valves, test connections, drains, etc., shall be accessible for operating, servicing, maintaining and repairing. Those which are installed in unsuitable locations shall be relocated as directed by the Architect/Engineer at no cost to the Owner.

K. Connections to water lines shall be made a locations shown on the drawings.

3.01 Performance

A. This Contractor shall perform all excavation and backfill operations necessary for installation of his work.

3.02 Erection

A. All support steel, angles, channels, pipes or structural steel studs and anchoring devices that may be required to rigidly support or anchor material and equipment shall be provided and installed by this Contractor, unless otherwise noted.

3.03 Testing and Flushing

A. Upon completion of work, inspection and tests shall be made by the Contractor's representative and witnessed by an Owner's representative. All defects shall be corrected and system left in service before a final certificate is issued. The NFPA Contractor's Material and Test Certificate shall be completed and signed by both representatives. Copies shall be prepared for approving authorities, Owner and Contractor.

B. The entire fire protection system, including yard piping, shall be hydrostatically tested at not less than 200 pounds per square inch pressure for two hours or at 50 pounds per square inch in excess of the maximum static pressure when the maximum static pressure is in excess of 150 pounds. The hydrostatic test pressure shall be measured at the low point of the individual system or zone being tested.

C. The inside sprinkler piping shall be installed in such a manner that there will be no visible leakage when the system is subjected to the hydrostatic pressure test.

D. The yard piping test shall be made before the joints are covered in order that any leaks may be readily detected. Leakage shall not exceed 2 quarts per hour per 100 joints. It is important to backfill the trench between joints before testing to prevent movement of pipe. The yard piping shall be flushed before connecting to the internal sprinkler systems.

E. Instruments, specialties and equipment subject to damage shall be isolated during tests.

F. Prior to final acceptance, each control valve shall be closed and opened under pressure, to insure proper operation.

G. Test of drainage facilities shall be made while the control valve is wide open. The main drain valve shall be opened and remain open until the system pressure stabilizes.

H. Final report forms shall be prepared, delivered to and approval obtained from local authorities, IRI, and any other agency having approval authority and delivered to the Owner. Contractor's Certificate covering materials and tests shall be prepared and delivered to the Owner.

END OF SECTION 210000

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SECTION 220000 - PLUMBING REQUIREMENTS

1.0 GENERAL

1.01 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.

1.02 Bidding:

See General conditions.

1.03 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.

1.04 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.

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1.05 Codes, 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.

1.06 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.

1.07 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.

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 affect these offsets and changes in direction.

1.08 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.

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.

1.09 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.

1.10 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.

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.

1.11 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.

1.12 Workmanship:

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.

1.13 Singular:

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.

1.14 Use of the Word "Provide":

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".

1.15 Supervision and Superintendence:

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 Contractor or the Owner. Efficient supervision shall be given to all work under this contract.

2.0 PRODUCTS

2.01 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.

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.

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 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.

2.02 Sanitary, Waste, and Vent Lines:

A. The following lines and fittings shall be Schedule 40 PVC:

Underfloor and underground waste lines
Above floor sanitary waste lines
Above floor vent lines

B. The following lines and fittings shall be Service Weight Cast Iron:

None

C. Installation:

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.

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.

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.

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.

Drilling and tapping of house drains, soil, waste or vent pipes, and the use of saddle hubs and bands are prohibited.

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.

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.

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.

2.03 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.

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:

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.

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.
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.

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.

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.

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.

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.

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.

As appropriate to the penetration size and location, provide firestopping using one of the following:

High-temperature non-shrink grout shall be installed in accordance with recommendations of ACI, CSI and the manufacturer's specifications.

Fill openings with Thermafiber Safing insulation.

Caulk full depth of wall or floor with 3M fire barrier; material - No. 25 caulk or 303 putty.

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.

2.04 Open Ends:

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.

2.05 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:

Horizontal soil pipe,	5'-0" on centers.
Copper tubing,	2" size, 10'-0" on centers,
	1-1/2" and smaller 6'-0" on centers.

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.

2.06 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.

F. Insulation shall pass through all sleeves and walls unbroken.

G. All insulation material shall have 25/50 smoke and flame rating.

2.07 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.

3.0 EXECUTION

3.01 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.

3.02 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.

3.03 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:

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.

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:

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.

3.04 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.

3.05 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.

3.06 Emergency Repairs:

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.

3.07 Painting:

A. All factory finished metal surfaces of plumbing equipment installed that are damaged during construction shall be restored to the original condition.

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.

3.08 Maintenance and Operating Manuals:

At the completion of this project the contractor shall furnish the Owner three (3) operating and maintenance manual s 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.

3.09 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.

3.10 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

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SECTION 230000 - HEATING VENTILATING AND AIR CONDITIONING REQUIREMENTS

1.0 GENERAL

1.01 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 HVAC Contractor.

C. Contractors bidding on this section are notified that they shall hold licenses for Heating H-2 and H-3 as issued by the State Board of Examiners of Plumbing and Heating Contractors.

D. Reference shall be made to the Architectural, Structural, Plumbing 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.

1.02 Bidding:

The HVAC work shall be included under the General Contract.

1.03 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 complete and leave ready for operation the installation of the HVAC system in strict accordance with these specifications and applicable drawings; and subject to the forms and conditions of the contract.

B. The work shall include the following items but is not intended to cover every item in detail. The list is not necessarily a complete list:

Heat Pump Indoor Unit
Heat Pump Outdoor Unit
Exhaust Fans
Ultra High Air Cleaner Filtration
Exhaust Ventilation Controller
Toxic Gas
Pipe Penetrations
Sheet Metal Work
Grilles
Insulation
Piping

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1.04 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 plans and specifications using skilled workmen.

B. It shall be the responsibility of this Contract or 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.

1.05 Codes, Permits and Inspections:

A. All work under this specification shall comply with all local and state codes, laws, ordinances and regulations particularly Volume III of the North Carolina State Building Code. 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 there with, 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, fuel, equipment, and apparatus and bear all expenses of such tests as are hereinafter specified for the work under this section of the specifications.

1.06 Drawings and Specifications:

A. The HVAC drawings show the general arrangement of all piping, ductwork, equipment, and appurtenances and shall be followed as closely as actual building construction will permit.

B. HVAC work shall conform to the requirements shown on all the 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 complimentary 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.

1.07 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 system sand equipment. Work shall be installed in proper sequence with other trades, and without necessary delays.

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 supporting structural members.

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, subject to final approval of the Owner.

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 duct prior to fabrication. Pipe lines which pitch shall have right of way over ductwork.

E. Offsets and changes in direction in ducts shall be made as required to maintain proper headroom and to avoid sloping pipelines whether or not indicated on the drawings. The Contractor shall furnish and install all accessories as required to affect these offsets and changes in direction.

1.08 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. Proposed substitutions with descriptive data shall be submitted to the Owner at least ten days before the Bid date. 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 approve 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.

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.

G. Manufacturer's directions shall be followed completely in the deliver, storage, protection and installation of all equipment and materials. The Contractor shall promptly notify the Owner in writing of any conflict between any requirement of the contract documents and the manufacturer's directions and shall obtain the Owner's written instruction before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or such written instruction from the Owner, he shall bear all costs arising in correcting the deficiencies.

1.09 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 steelbolts, inserts, pipe stands, brackets and accessories for proper support whether or not shown on the drawings.

1.10 Cutting, Patching and Repairing:

A. In new construction the General Contractor will provide all openings in wall, floor, and roof construction required by HVAC 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 HVAC 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. 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 tardiness or because of any damage done by him.

C. Under no circumstances shall the Contractor cut any structural beam or support without prior approval and instructions from the Owner.

D. If HVAC Contractor installs HVAC work through exposed finish walls, ceiling or floor after they are in place, the HVAC Contractor shall close excess openings around his work to match finish surface.

1.11 Shop Drawings and Submittal Data:

A. The Contractor shall submit to the Owner after award of the contract, a folder containing catalog cuts and descriptions giving the name of the 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. After receiving the approval of the Owner, it shall be the responsibility of the Contractor to verify all dimensions and arrangements of equipment or apparatus with job conditions to insure correct application and installation.

C. Contractor shall then prepare, or cause to be prepared, shop drawings showing in detail (a) the equipment he has been authorized to install, and (b) the methods by which the installation of his work is to be made. Shop drawings shall show make, model number, capacity, dimensions, construction, and all pertinent data regarding the equipment to be furnished. Shop drawings shall bear Contractor's stamp certifying that he has checked each item of equipment for size, location, capacities and performance that each item meets all conditions indicated on drawings and specified.

D. The manufacturer's standard drawings will be accepted for manufacturer's standard production items if certified for installation at the location noted. Shop drawings shall be made for all items of equipment, specially fabricated for this contract.

E. Shop drawings shall be submitted as soon after award of the contract as possible, allowing ample time for checking and processing and the Contractor shall assume responsibility for delays incurred due to rejected items. Failure to submit suitable drawings will not be considered sufficient cause for extension of time.

F. 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 requirement.

G. Shop drawings must comply with the requirements of all regulatory bodies having jurisdiction.

H. Contractor shall furnish at least five (5) copies of submittal data. Three (3) copies will be returned to the Contractor.

1.12 Workmanship:

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 the Engineer who will jointly interpret the meaning of the drawings and specifications and shall have the power to reject any work or materials which, in their judgment, are not in full accordance therewith.

1.13 Singular:

In all cases where a device or piece of equipment is referred to herein or on the plans in the singular number, it is intended that such reference shall apply to as many such devices as are required to complete the installation.

1.14 Use of the Word "Provide":

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".

1.15 Supervision and Superintendence:

The Contractor shall, during the progress of the work, maintain a competent superintendent who shall not be changed except if he proves unsatisfactory to the Contractor or the Owner. Efficient supervision shall be given to all work under this contract.

2.0 PRODUCTS

2.01 Split System Heat Pump (DX Indoor Unit):

A. Casing shall be galvanized steel, bonderized with baked enamel finish.

B. Section shall have forward curved blades, centrifugal type, belt driven. 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. Condensate drain pan shall be furnished with threaded pipe connections and shall extend completely under the coil section. Internal insulation shall be wrapped waterproof and of rigid closed-cell polyurethane. Insulated copper piping is to be used for condensate drain lines.

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.

2.02 Heat Pump Outdoor Unit

A. Unit casing shall be galvanized steel, zinc phosphated, baked enamel finish and fully weatherproof.

B. Condenser coil shall be of non-ferrous construction, aluminum plate fins, mechanically bonded to seamless copper tube, sub-cooling circuitry.

C. 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 guards.

D. 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.

E. 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.

F. Compressor shall be hermetically sealed, high efficiency, with special lubricating system, bearing surfaces and motor installation, internal over-current, over temperature, and over-pressure protection and cranckcase heater. The compressor shall have a five (5) year warranty.

2.03 Exhaust Fans:

A. Bathroom Exhauster: Provide bathroom exhauster, designed for ceiling mounting, of type, size, and capacity as shown in Equipment Schedule. Fans shall be as manufactured by Cook, Carnes, Broan, Nutone, or Penn.

B. Provide HVI (Home Ventilating Institute) Certified Ratings Seal. Provide galvanized steel housing with fan impeller directly connected to motor, and removable as unit from housing for service. Provide integral backdraft damper in fan discharge. Provide stainless steel louvered grille with flange on intake with thumbscrew attachment to fan housing. Provide permanent split-capacitor motor, permanently lubricated, with grounded cord and plug. Provide junction boxes for electrical connection on housing, and receptacle for motor plug-in.

2.04 Ultra High Air Cleaner Filtration:

A. **Ultra High Air Cleaner Device (ACD's):** The Ultra High Air Cleaner Devices required shall be manufactured by a company that has produced industrial air filtration equipment for no less than 20 years. This requirement is equal to the projected life expectancy of the systems to be purchased. The ACD's shall be able to produce a minimum airflow through the unit of 3000 cfm with clean filters that are specified herein.

B. **Ultra High Air Cleaner Device Construction:** The Ultra High Air Cleaner Devices shall be manufactured for long life as an industrial quality product that is a minimum of 16 gauge welded zinc coated steel cabinet finished with two coats of two part chemical and oil resistant paint in the color of red.

C. **Filter Access and Holders:** The ACD's filter access shall be by a hinged side door that allows for easy removal of filter elements by service technician or municipal employee. The filter shall be retained by a filter track that will not allow for air to bypass filter elements that are under pressure from particulate accumulation as the filter becomes dirty. Filter tracks must have track and seal design to meet the maximum pressure drop of all filters when dirty as per filter manufacturer specifications for recommended final pressure drop in inches water gauge. Note: Filters that stack or do not slide into filter track will be rejected.

D. **Filter Element Arrangement and Efficiency:** The filters listed are the minimum type, quality and efficiency that will be allowed in all air cleaning devices offered. There shall be no substitutions from filter types as outlined below:

1. ***Pre-Filter:*** shall be the first filter that addresses the incoming airflow. It shall be a minimum of 24" x 24" x 4" standard manufactured pleat filter for high capacity with 28 sq. ft. of media and a MERV-11 rating. The pressure drop of filter shall be .24" wg at 3000 cfm with clean filter.

2. ***Primary Filter:*** shall be a second filter that addresses the incoming airflow. It shall be a minimum of 24" x 24" x 12" standard manufactured HEPA style filter / high efficiency extended surface mini-pleat filter with 194 sq. ft. of media and a MERV- 16 rating. The pressure drop of the filter shall be .36" wg at 3000 cfm with clean filter.

3. ***Gas/Odor Adsorption Filter:*** shall be the third filter that addresses the incoming airflow and shall be a minimum of 24" x 24" x 12" overall and be filled with a combination blend of activated carbon purafil blend that is designed for adsorption of diesel exhaust gases and odors, i.e. Nitro Dioxide, Sulfur Dioxide and Benzene in their gas phase. The Carbon purafil blend shall be housed in a two part refillable housing that holds a total of 50 lbs. of media. The pressure drop of the filter shall be .74" wg at 3000 cfm. **Note:** Carbon filter elements that have throwaway housings will not be allowed due to environmental impact.

4. ***After Filter:*** shall be a fourth filter that addresses the incoming airflow and shall be a minimum of 24" x 24" x 2" standard manufactured pleat filter with 14 sq. ft. of media and a MERV-8 rating. The pressure drop of the filter shall be .24" wg at 3000 cfm clean filter. This shall be required to catch any carbon dust that may be blown off carbon media module.

5. ***PCO/UV Light Filter:*** The ACD's shall be equipped with a PCO/UV light system that will be UL listed and supply Advanced Hydrated Photo Catalytic Oxidation (AHPCO) for and area of no less than 3000 SF of area per unit. The PCO/ UV system shall reduce VOC's, mold, bacteria, viruses and aero allergens. The PCO/UV unit must be serviced from outside the ACD's cabinet and have LED service lights that will indicate the operating condition of the unit. The PCO/UV unit must have adjustable UV shield to direct the light path across airflow and to direct away from filters elements. The unit must not produce more then .05 ppm of ozone and be energy efficient with a power draw 45 watts or less at 24vac input power.

E. **Dirty Filter Alarm:** The ACD's shall be equipped with a pressure differential switch that activates an LED indicator light that can be viewed from floor mounted in the ACD's and on the Central Ventilation Controller (CVC) outlined below. This switch shall be hard wired to the control box and indicate when a filter needs to be changed due to a dirty filter condition based on total pressure drop across the unit. The pressure switch shall be adjustable from the outside of unit, with a range from 1

- 2.5" wg SP. Needle type pressure gauges mounted to the units will not be an accepted alternative to the indicator light system.

F. **HVAC Track:** The ACD's must be equipped with a HVAC track that will fit a HVAC coil to make the ACD's ready for future air conditioning option that will make the unit capable of upgrade to a AC split system of 5 tons. Track shall be on clean air side of filters and have no more the 500 fpm coil velocity.

G. **ACD Air Handling Blower:** the ACD's airflow blower shall be capable of producing a minimum of 3000 cfm at 1.58" wg with clean filters and maintain the air flow volume until 2.5" wg with dirty filter load is achieved. The Blower shall be direct drive one (1) horse power and be upgradable to a higher output blower to handle higher static pressures (5"wg) or airflows volumes to (3000 cfm) if one wishes to upgrade to HVAC option.

H. **ACD Electrical Supply and Controls:** The ACD's shall have electrical supply voltage of 120-208-240V, 1PH and have a Tag Out / Lock Out switch to turn off and kill power to the ACD's unit. The ACD's shall be controlled with an auto start control box that starts all the air cleaner devices when either the photo eyes, door activation switches, optional remote transmitters, or Co/No2 toxic gas monitors are activated. The control box shall have a motor starter with overload protection. The electrical system for the ACD's shall interface with a carbon monoxide detection system provided in this specification. The ACD's system and the carbon monoxide system must work together to start both the blowers of the air cleaner devices and the central exhaust fan in the facility bay.

I. **ACD Cabinet Weight with Filters:** the ACD's cabinet with filters installed shall weigh approx. 400 lbs. total hanging weight.

J. **Installation of System:** The installation and mounting of the system must be in accordance to all mechanical and electrical building codes. The hanging of ACD units shall not interfere with fire equipment, sprinklers, garage doors, or HVAC systems. The hanging of ACD units must be by steel strut, chain, or concrete anchors which are approved by building code.

K. **Replacement Filters:** The Contractor must show all manufacturers of filters used in the system with make, model, technical data, and test reports for replacement filers.

2.05 Exhaust Ventilation Controller:

A. Central Ventilation Controller (CVC): The purpose of the Central Ventilation controller is to control up to three different sets of blowers (blowers/filters) for the purpose of maintaining the highest air quality in the EMS/Firehouse, garage facility and living area. The CVC shall auto start on the opening of one of the apparatus bay doors, photo-eyes, or optional starting of any vehicle that is equipped with a transmitter and be running when the vehicle is returning to the station and prior to entry to the station. The CVC will also monitor external gas sensors and display a visual and audible alarm should a toxic threshold level of gases be detected. The system shall also have a remote alarm system that will email or text up to eight (8) persons, six (6) "Key Alarm Messages" that will be loss of power, toxic gas, dirty filters, fire / smoke, temperature, and exhaust fan flow.

B. Components: The control unit shall consist of a key-lockable NEMA4X fiberglass control enclosure which houses a 24VAC control transformer, microprocessor based circuit board, radio receiver, a backup battery and miscellaneous fuses, terminals, etc. Located on the outside of the enclosure shall be a self-adhesive membrane keypad/indicator overlay with all indicators and buttons, a stack light/alarm with yellow and red indicators and a 94db alarm horn. The control box will maintain UL508A approval and have a UL/ETL Seal.

C. Functionality: The system shall have the ability to monitor/control multiple system blowers and alarming functions.

D. Source capture fan control: The purpose of the fan is to ventilate vehicle exhaust gases to atmosphere, drawn directly from the vehicle exhaust pipe, via a source capture hose. Each vehicle shall have a radio transmitter in it or a pressure sensor located at each hose drop, which will activate when the vehicle is started. Upon sensing the vehicle being started, this blower will activate. The blower will operate continuously while the vehicle is running and for an adjustable number of minutes after the vehicle is turned off or leaves the vicinity (500' radius) of the control box. The adjustment will be via a potentiometer on the circuit board and shall be 1 to 5 minutes. There shall also be an elapsed time meter, located on the circuit board, which will log the runtime (in hours) of the fan blower unit only. This meter shall be 4 digits (up to 9999 hours) and resettable via a small pushbutton located next to the meter/display.

The receiver, located inside the control enclosure, shall be powered by 24VAC. There will be two wires from the receiver to our circuit board which signals the receiver has picked up an input from a vehicle transmitter.

There shall be a set of "Remote Start" terminal blocks on the circuit board which allows the fan to be started by a remote dry contact from any outside source. This functionality shall only be active while the fan is in AUTO mode and will start when the remote signal is received and will stop immediately upon losing this signal.

There shall also be an LED on the circuit board indicating when the blower is running.

There shall be one temperature sensor located inside the source capture work system, which will be hardwired back to the control box. The intent of this sensor is to monitor the temperature of the exhaust gases passing through the hose/ductwork. The maximum gas temperature will be recorded on a meter located on the circuit board and is resettable via a small push button located next to the display.

Operators on the control for the fan shall include a button which toggles through OFF/AUTO/ON and an indicator which indicates the blower is running.

E. General Ventilation Fan Control: A second "through the wall" blower shall draw air from within the facility to atmosphere. The purpose of this blower is threefold. First it will run the opening of one of the apparatus bay doors, photo-eyes, or optional starting of any vehicle that is equipped with a transmitter is present. The adjustable time-out period, however, will be independent of the source capture fan and the general ventilation fan will be via another potentiometer on the circuit board. The range of this time-out is 5 to 30 minutes.

This blower shall also be started by a dry contact input which will be provided by a thermostat. The intent is if it gets too hot in the building, the thermostat will activate general ventilation fan to draw the hot/humid air out of the building to meet code. This blower will stop immediately upon seeing the signal from the thermostat open.

The third function is to draw exhaust gases out of the building, as detected by CO/NO2 sensors (see below). When a "low level" or "danger level" of exhaust gases are detected, this blower will activate and continue to run for an adjustable number of minutes after the signal is removed. This range shall be the same 5 to 30 minutes described above.

There shall also be an elapsed time meter, located on the circuit board, which will log the runtime

(in hours) of the general ventilation fan blower unit only. This meter will be 4 digits (up to 9999 hours) and resettable via a small push button located next to the meter/display.

There will be a set of "Remote Start" terminal blocks on the circuit board which allows EF-2 to be started by a remote dry contact from any outside source. This functionality will only be active while general ventilation fan is in AUTO mode and will start when the remote signal is received and will stop immediately upon losing this signal.

There shall also be an LED indicator on the circuit board to signal when the blower is running.

Operators on the control for the general ventilation will include a button which toggles through OFF/AUTO/ON and an indicator which indicates the blower is running.

F. Air Cleaning Device Fan Control: The third blower(s) will be Air Cleaning Devices or filter units, mounted in bays or living area, which will circulate and filter/condition the air within the facility. There can be as many ACD units as the desires, but all will be controlled by one RUN signal from the circuit board.

The purpose of this unit is to filter and/or cool the air within the facility. This blower first shall run upon the opening of one of the apparatus bay doors, photo-eyes, or optional starting of any vehicle that is equipped with a transmitter is present. The adjustable time-out period, however, shall be independent of source capture fan and the general ventilation fan will be yet another potentiometer on the circuit board (for a total of 3). The range of this time-out is also 1 to 30 minutes.

There shall also be an elapsed time meter, located on the circuit board, which will log the runtime (in hours) of the ACD filter units only. This meter will be 4 digits (up to 9999 hours) and resettable via a small push button located next to the meter/display..

Control wiring for this blower shall require a 4 conductor cable which is a 24VAC "RUN" signal coming from the circuit board and two wires for a "Filter Dirty" signal going back to the circuit board. Both these signals shall be wired in parallel with like signals from filter unit to filter unit. Power wiring for the filter will come into the ACD Unit, through the contactor and then to the blower motor. The purpose of the dirty filter signal is to illuminate an indicator light on the control panel. It will not affect the functionality of the filter unit and all pressure switches will be wired in parallel. The purpose of this indicator is to alert the operator to inspect each filter unit for a dirty filter condition.

There shall be a set of "Remote Start" terminal blocks on the circuit board which allows EF-3 to be started by a remote dry contact from any outside source. This functionality will only be active while the ACD is in AUTO mode and will start when the remote signal is received and will stop immediately upon losing this signal.

There shall also be an LED indicator on the circuit board to signal when the blower should be running.

Operators on the control panel for the ACD will include a button which toggles through OFF/AUTO/ON and an indicator which indicates the blower is running. In addition, there shall be a Filter Start button that will start the filter units and it will run for the time period set with the potentiometer. The Filter Start button will only be functional when the OFF/AUTO/ON button is in the AUTO mode.

G. Smoke Detector Alarm: The exhaust ventilation controller is connected to a photoelectric smoke/heat alarm with ADA strobe or central fire alarm panel. If smoke or fire is detected the exhaust ventilation controller shall shut down all air cleaners, exhaust fan(s) and make up air fan(s)/louver(s) connected to the controller.

H. Toxic Gas Monitoring (CO / NO2): Separate gas monitoring devices shall be hardwired into the circuit board for the purpose of activating only the general ventilation fan (as described above) and to activate the yellow and/or red beacons and the alarm horn. The signals for the beacons and alarm horn will be a relay closure from the gas sensors, therefore a constant input, but the indicator lights and alarm horn on the stack light will flash/sound. The email/text alarm system will sent a message to the monitors for this signal.

I. Operation of the Beacon (Stack Light): A yellow light shall flash if a low level (25 ppm) of toxic gas is detected. A red light shall flash and alarm horn will sound if a high level (100 ppm) of toxic gas is detected.

J. Power Loss Indication: A battery backup system shall be incorporated into the control box which shall cause an alarm horn to activate. This will happen whenever a power loss is detected. The power loss alarm shall operate for a minimum of 10 minutes after losing power. The email/text alarm system will send a message to the monitors for this signal.

K. Fire/Smoke Detection: The controller shall have a fire / smoke detector to turn off the blowers in the event of a station fire. This shall meet NFPA /North Carolina Fire Code. The fire detector will also send an email/text alarm message to the monitors for this signal.

L. High Temperature: The controller shall have a thermostat that will read room temperature and start exhaust fans for cooling. The thermostat will also send an email/text alarm message to the monitors for this signal if the temp goes over a set point.

M. High Voltage and Control Wiring: The wiring must be done as per NFPA/NEC code and standards.

N. Equipment Warranty: The bidder shall guarantee all materials, equipment and workmanship for a minimum period as defined in the construction documents.

2.06 Toxic Gas:

A. Provide a complete installation of a toxic gas detection system including combo dual sensors that can monitor two different gases - (Co and No2).

B. The system shall include, but not be limited to, the following:

1. Future expandability
2. Display of toxic gas concentration
3. Ability to modify alarm set points
4. Automatic and manual fan start/stop
6. Display of alarm status

C. Combo unit(s) shall be powered by 24 V AC/DC. The combo unit shall be ETL LISTED Certified to CSA C22.2 No 61010-1, Conforms to UL Std. 61010-1. It shall meet the Uniform Building Code for enclosed garages and meets OSHA standards for CO and NO2 exposure. The units shall have Low-level meter capable of displaying from 0-200 ppm of CO and 0-20 ppm of NO2, and also have electable fan and alarm relay activation.

D. Units shall be capable of transmitting gas concentrations to a DDC system through its 4-20 mA output. For local activation of fans or louvers (or other equipment), the unit shall have DPDT relays 5 A, and .5A N.O. or N.C. alarm relay to warning devices or external controllers.

E. Base transmitter(s) shall be capable of operating within relative humidity ranges of 10-90% non-condensing and temperature ranges of 0° F to 125° F (-18° C to 52° C).

F. For local activation of audible alarms, the transmitter(s) shall have an on-board device able to generate an audible output of 85 dBA @ 10 ft (3m).

G. The Sensors shall be set for 25ppm Co (low alarm), 100ppm Co (high alarm) and .7ppm N02 (low alarm), and 2ppm No2 (high alarm).

2.07 Pipe Penetrations:

A. 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 noncombustible 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.

B. As appropriate to the penetration size and location, provide firestopping using one of the following:

- High-temperature non-shrink grout shall be installed in accordance with recommendations of ACI, CSI and the manufacturer's specifications.
- Fill openings with Thermofiber Safing insulation.
- Caulk full depth of wall or floor with 3M-fire barrier material - No. 25 caulk or 303 putty.

C. Penetrations through 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 f rom3/4inch 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 firewall or slab itself.

2.08 Sheet Metal Work:

A. Provide all ducts, dampers and accessories as indicated on the drawings and specified herein.

B. Duct sizes shown on drawings are actual sheet metal size s. Plans are generally diagrammatic and Contractor shall make take offs as required to install ducts in spaces provided, however, the Contractor shall secure the Owner's approval before re-routing or changing duct sizes.

C. Sheet metal work shall be constructed in accordance to S MACNA, Inc. Low Velocity Duct Construction Standards.

D. Dampers, volume (Manual). Provide the manually operated volume control dampers necessary for the proper balancing of the air handling system. They shall have an indicating device with lock to hold the damper in position for proper setting. Wye branch connections to have splitter dampers. All branch ducts to registers shall have a damper.

E. Ductwork: All low velocity ductwork shall be constructed of galvanized steel in accordance with Table 1 and Plates 5 through 15 of the low velocity duct standard. Galvanized steel shall be of lock

forming quality and shall have a galvanized coating of 1 1/4 ounces total for both sides of one (1) square foot of a sheet.

F. Flexible ductwork: All flexible ductwork with in the building envelope shall have a minimum R-value of 6.2. All flexible ductwork outside of the building envelope shall have a minimum R-value of 8.0.

G. Elbows, Radius: Shall be constructed in accordance with Plate 21, Figure B of the low velocity duct standard.

2.09 Grilles:

A. The diffuser, grilles, and registers shall be of type and size shown in the equipment schedule. A white finish shall be provide, unless noted otherwise. Provide with volume control dampers, square-to-round transitions, etc.

B. Use Price, Titus, Nailor, Carnes, J & J, Metal-Aire, or approved equivalent.

2.10 Insulation:

A. Duct Insulation.
1) All supply, return, and outside air intake duct shall be wrapped with 3" thick 0.75 lb/sf density fiberglass wrap with reinforced aluminum foil vapor barner. Use Owens-Corning or equal.

2) Ductwrap on ductwork outside of the building envelope shall have a minimum R-value of 8.0

2.11 Piping
A. Gas Piping
1) All gas piping shall be schedule 40 black steel installed in accordance with all codes. The M.C. shall coordinate gas pipe connection with equipment.
2) Gas piping routed below finished grade shall be polyethylene with tracer wirer.

3.0 EXECUTION

3.01 Electrical Connection 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 mechanical equipment shall be by this contractor.

B. Control wiring and control connections control for heating and air conditioning systems is by this Contractor.

3.02 Test and Balance:

A. Tests shall be made on all equipment and apparatus furnished under this contract for verification of performance of equipment and systems.

B. The Contractor shall indicate to the Engineer, at least five days prior to the scheduled time, when he will be prepared for a complete system checkout.

C. Operating conditions of all controls and major components shall be verified in the presence of the Engineer and the Owner's representative.

D. Heating and air conditioning system shall be balanced, adjusted and placed into service by personnel skilled as a result of training and experience in working with air distribution systems.

E. A certified independent test and balance contractor shall perform testing and balancing. The test and balance contractor shall be certified by National Environment Balancing Bureau (NEBB) or Associated Air Balance Council (AABC).

F. All necessary equipment, forms, reports, etc. required to perform the system testing and balancing shall be as recommended in the above named procedures.

G. The Contractor shall submit to the Engineer a letter stating the procedures, instruments, forms, etc. to be used for testing and balancing heating and air conditioning systems.

H. Final balancing data shall be submitted to the Engineer prior to final acceptance. After completion of the work, the Contractor shall state in a letter to the Engineer that the work conforms to plans and specifications. This Letter of Compliance is to be issued prior to final inspection and acceptance by the Owner.

I. A copy of the approved final balancing data should be included in the Maintenance and Operations Manuals.

J. After testing, all adjustable pitch motor pulleys shall be replaced with fixed pitch pulleys.

3.03 Painting:

A. Contractor shall paint all iron and steel not having a factory finish or galvanized finish used for support and hanging equipment throughout building. One coat of primer shall be used followed by one coat of oil base paint with colors selected by the Owner.

B. All painted equipment with damaged areas be painted to match original finish.

3.04 Clean-Up:

At the completion of all work, this Contractor shall be responsible for cleaning up all rubbish, leaving the system in perfect operating condition. He shall further clean up rubbish daily in such a manner that the job shall present a neat appearance. Work shall be accomplished to the satisfaction of the Owner.

3.05 Maintenance and Operating Manuals:

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.

3.06 As Built Drawings:

Contractor shall keep and maintain in good order a record of any deviations 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 transferable to as-built reproducible drawing.

3.07 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 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.

3.08 Labels:

The Contractor shall provide permanent phenolic labels on all mechanical equipment. Label all sensors and thermostats for equipment it is associated with. Label ceiling grid to identify location of mechanical equipment above finished ceilings. Label supply ductwork, return ductwork, exhaust ductwork and direction of flow arrows.

END OF SECTION 230000

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SECTION 260000 - ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 General Notes:

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 Electrical Contractor.

C. Contractors bidding on this section must possess a State of North Carolina Electrical Contractor's License. Each bidder shall show his license proposal.

D. Reference shall be made to the Architectural, Structural, Plumbing and HVAC 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.

1.2 Bidding:

The Electrical work shall be included under the General Contract.

1.3 Scope:

A. The work under this section of the specifications consists of providing all labor, equipment, supplies, and materials, and performing all operations, including trenching, backfilling, compaction, cutting, channeling and chasing necessary for the installation of a complete wiring system in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the contract.

B. The following gives a brief outline of the Electrical work which is further described in the body of the specifications and indicated on the accompanying drawings:

- Electrical panel and disconnect switches.
- Feeder conduits, conductors, and fittings as shown and specified.
- Lighting fixtures and lamps.
- Communication outlets (Data, Telephone and MATV).
- All power and lighting branch conduit, conductors, outlets, boxes, receptacles, switches, and circuit breakers as shown and specified.

- Electrical power connections complete to all equipment requiring electrical connections.
- Grounding
- Standby, diesel-fueled generator and automatic transfer switch.

C. Certified manufacturer's drawings and shop drawings shall be submitted for all equipment except the following for which lists of manufacturers and catalog numbers shall be submitted. Submit five (5) sets.

- Conduit
- Conduit fitting
- Wiring devices
- Wire
- Boxes

1.4 Applicable Specifications and Standards: The following standards shall be considered as minimum requirements for this project:

- The National Electrical Code.
- The National Electrical Safety Code.
- The North Carolina State Building Code.
- The Underwriter's Laboratories, Inc.
- The National Electrical Manufacturers Association.
- The Insulated Power Cable Engineers Association.

1.5 Drawings and Specifications:

A. The drawings accompanying these specifications and subsequent drawings or detail will form a part of the contract for this work.

B. The drawings are diagrammatic and indicate the extent and general arrangement of the outlets and equipment. These drawings shall be followed as closely as possible, but all measurements shall be verified at the job site. Do not scale drawings for location dimensions. Consult the architectural, structural, mechanical, plumbing and equipment

drawings and details for this project for exact location of equipment and before starting the work.

C. The drawings and specifications are supplementary, one to the other, and material and workmanship indicated, called for or implied by the one and not be the other shall be supplied and installed as if specifically 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.

E. Discrepancies shown on different drawings, between drawings and specifications or between plans and field conditions shall be promptly brought to the attention of the Engineer for a decision.

1.6 Codes, Permits and Inspections:

A. The entire installation shall comply with:

- All laws and ordinances applying to electrical installations.
- The requirements of the National Electrical Code (latest edition with applicable revisions) where such requirements do not conflict with the laws in effect.
- The regulations of the power company furnishing the electrical service.
- In the event of conflict between these codes, requirements, etc., the most stringent shall apply.

B. The Contractor shall give all required notices, obtain necessary permits, and pay all required fees.

C. After completion of the work, the Contractor shall furnish to the Owner a certificate of final inspection and approval from the electrical inspection department having jurisdiction.

1.7 Singular:

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.

1.8 Use of the Word "Provide":

Herein, where the work "Provide" is written in these specifications, provide shall be understood to mean provide complete in place, that is, "Furnish and Install".

1.9 Electric Service:

A. Voltage: Refer to electrical plans.

1.10 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 equivalent quality, capacity and character, may be substituted on the written approval of the engineer. Proposed substitutions with descriptive data shall be submitted to the engineer at least ten days before the Bid Date. The submissions, if approved by the engineer, will be issued in an addendum before the Bid Opening. 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 shall 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.

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.

1.11 Workmanship:

A. All work specified herein shall be executed in the best and most workmanlike manner by skilled mechanics. This Contractor shall cover and protect all work and materials throughout the course of the work. He shall be responsible for all damage done to, or caused by, this work until the building is completed and accepted by the Owner, and at completion shall leave the work clean.

B. This Contractor shall cooperate with all other contractors on the project and shall prosecute the work as fast as the progress of other work will allow. He shall consult with

the other trades and be responsible for the proper placing and fitting of this work in advance of, or in connection with other work.

1.12 Modifications:

A. Instructions that will modify the work will be ordered by the engineer in writing either before or after the signing of the contract. Only such instructions shall be accepted by this Contractor.

B. Slight relocations of outlets, devices and equipment shall be made by this Contractor as required, at no additional cost to the Owner, for proper coordination of all trades.

1.13 Locations and Measurements:

A. Outlets, devices, fixtures and appliances have been located and shown as accurately as possible on the drawings. The Contractor shall take necessary measurements in the field for exact locations and match his work to the building construction. The outlets for special appliances must be installed so they will be in the proper location when the appliances are installed. Necessary information for the proper installation of these special outlets shall be obtained from the Owner by a request in writing.

B. This Contractor shall furnish and place all metal sleeves necessary for electrical work at the time of or prior to building of the walls or pouring of slabs. He shall be responsible for the locations and sizes of these sleeves. The Contractor shall furnish and install all inserts and hangers required to support conduits, cables, pull boxes, etc. If the sleeves, hangers, inserts, etc. are improperly installed, this Contractor shall do all necessary cutting and patching at his own expense to rectify the errors.

1.14 Excavation and Backfill:

This Contractor shall do all excavation necessary for the installation of this work and shall backfill such excavation promptly. Backfill shall be thoroughly tamped with mechanical tamper in layers not exceeding six (6) inches. Rocks and rubbish are prohibited from trenches.

1.15 Cutting, Patching, and Repairing:

A. In new construction, the General Contractor will provide all openings in wall, floor and roof construction required by Electrical 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 this 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 engineer.

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 ensure 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.

E. If Electrical Contractor installs electrical work through exposed finish walls, ceiling, or floor after they are in place, the Electrical Contractor shall close excess openings around his work to match finish surfaces.

PART 2 PRODUCTS

2.1 Lighting Fixtures and Lamps:

A. Catalog number and names of manufacturers are used to convey the types, performance, and quality of fixtures to be supplied. Fixtures of other manufacturers may be acceptable provided they offer equal or superior performance and quality and are approved as substitutions. Approval of substitutions 10 days prior to Bid date required.

B. Catalog numbers given are not necessarily the total fixture specifications. The general description, type and number of lamps, pertinent details as to the quality and functional operation of the fixture as well as the catalog numbers are to be considered in determining the appearance, performance and quality intended. Any major discrepancies in any particular fixture specification should be reported to the engineer prior to submitting a proposal.

C. It is intended that a lighting fixture be provided for every lighting outlet shown. Any omission is in error and shall be brought to the attention of the engineer prior to submitting a proposal; otherwise, the fixture of intent selected by the engineer shall be furnished and installed at no additional cost to the contract.

D. 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. Fixtures shall be dimmable down to 10% minimum with standard 120 volt, electronic, low voltage dimmers unless otherwise specified on plan.

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 with the exception of high bay fixtures, optical design.

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.

E. Lay-in fixture lens shall be .125" or greater thick virgin acrylic prismatic.

F. Refer to drawings for fixture schedule.

2.2 Materials and Equipment:

A. All materials used in this work shall be new and listed by the Underwriter's Laboratories, Inc. in every case where a standard has been established for the particular type of the material to be installed. Materials and equipment furnished under this specification shall be the standard products of manufacturers regularly engaged in the manufacture of such equipment and shall be identical.

B. Electrical Metallic Tubing/Rigid steel conduit: General Electric Electro Galvanized Zinc-Coating.

C. EMT Fittings: Thomas & Betts - compression type or approved equal.

D. Rigid Fittings: Thread type.

E. Flexible Conduit: Liquid-tight flexible conduit shall be "Sealtight" type UA as manufactured by American Brass or approved equal.

F. PVC Conduit: Type 40, heavy wall rigid.

G. Insulated Bushings: Rigid conduit - 0-Z Type "A". EMT - Thomas & Betts - "Blue Throat" plastic insulated series or approved equal.

H. Insulated Grounding Bushing: 0-Z Type "B" or approved equal.

I. Pull and Junction Boxes: Pull boxes shall be fabricated from galvanized sheet steel, not less than 16 gauge thick, with covers held in place by corrosion-resistant machine screws. Boxes shall be furnished and installed where indicated on the plans or where necessary to facilitate cable pulling and splicing. Box size shall be as required by N.E.C. for the number

of conduits and conductors entering and leaving it. Where feeder splices are to be made, box shall be large enough to provide ample work space. Exposed boxes shall not have extra knockouts.

J. Outlet Boxes: All outlet boxes shall be galvanized steel, at least 2-1/8" deep and of sufficient size to accommodate devices noted. Boxes for fixtures shall have fixture studs in the center. If flexible connections are to be made, use "Greenfield" with appropriate fittings for ground continuity. Outlet boxes, for wiring devices in finished walls, shall be one-piece, standard, gang-type, of a size to accommodate number of devices noted. Boxes shall have tile rings to bring box openings flush with finished wall or not more than 1/16" back of same. Sheet steel boxes shall be as manufactured by Steel City, Raco, Appleton, Kilark, or approved equal. Exposed boxes shall not have extra knockouts.

K. Wiring devices shall per the symbol legend on the plans. Equivalent wiring devices shall be as manufactured by Hubbell, P&S and Leviton. Wiring device trim plates shall be as noted on the plans. See plan for additional information.

L. Wire and Cable:

- All wiring shall be of copper. Provide the AWG size shown on the drawings with insulation indicated below. Wiring for wet locations shall use conductor insulation rated for that use.

- Conductors shall conform to latest NEC requirements and meet ASTM specifications. Conductors shall be stranded except that sizes No. 10 and smaller shall be solid.

- Wire size, voltage rating, insulation type and manufacturer shall be clearly marked on the conductor jacket at regular intervals. Conductors with the following types of insulation shall be installed in locations indicated and/or shown on drawings. Conductors and cables shall be as manufactured by Senator Wire and Cable Co., Southwire Company, or the Okonite Co.

- Type THHN, or THWN2 for No. 10 and smaller branch circuits. (Circuits of 600 volts or less.)

- Type THHN or THWN2 for No. 8 and larger. (Circuits of 600 volts or less.)

M. Wire Connectors: Pressure connectors as manufactured by "O-Z" or Thomas and Betts for feeders; and wire nuts by Ideal Industries or "Scotch Lox" by Minnesota-Mining for branch circuits or approved equal.

N. Panelboards:

- All breakers shall be bolt-on type. Breakers shall be thermal magnetic tripped and shall have interrupting capacities required on the drawings. Panelboard shall have asymmetrical fault current rating equal to or greater than panels specified on drawings.

- Panelboards shall be provided with size and number of breakers as indicated on plans. Main breakers, where required, shall be top or bottom mounted. Side mounted main breakers or those occupying space which will limit panelboard construction to less than 42 branch circuit poles are precluded.

- Single pole breakers for lighting circuit, only, may be quick lag type, equipped with one operating handle, molded in one common case. External connections with internal trip devices for ganging quick lag breakers will not be permitted. All breakers to be thermal magnetic, temperature compensated type and shall be quick-make, quick-break type for manual and automatic operation. When panels are used for switching, breakers shall be specifically approved by Under-writers' Laboratory for such operation.

- Conductors in panelboards shall be grouped together and laced with plastic ties in a neat, substantial and approved manner.

- A neatly typed directory, properly identifying each circuit, shall be installed in each panelboard. A temporary running directory shall be maintained during construction.

- Branch circuits shall be connected in each panel board as indicated on drawings.

- All panels shall be marked with its designation and voltage by installing engraved plastic plates with pop rivets. Pressure sensitive plastic tape will not be permitted. Submit sample for approval.

- All NEMA 1 panel boards shall have a hinged trim (Door in Door).

- Panels shall be Square D or equivalent by ABB, Siemens, or Eaton. Refer to panel diagrams for required features.

O. Disconnects:

- Disconnects shall be furnished and installed at locations shown on plans. Refer to schedule on drawings for additional requirements. Disconnects shall be equipped with fusible poles, as indicated, with quick-break operating mechanism. All disconnects shall be equipped with full-cover interlock.

- All disconnects shall be provided with provisions for locking of handle in either "on" or "off" position by installation of pad lock as required. All disconnects shall be equipped with positive pressure fuse clips and shall have visible disconnecting blade switches. Disconnects to be furnished with factory-finished paint with appropriate knockouts for conduit connections.

- All disconnects shall be Square D heavy duty, or equivalent by ABB, Siemens, or Eaton.

- Fusetron, or equal, dual-element fuses shall be used for protection of motor driven equipment.

PART 3 EXECUTION

3.1 Wiring Methods: Wiring methods shall be:

A. Rigid Schedule 40 PVC for underground secondary service.

B. Electrical metallic tubing or MC cable for all systems run above floor.

C. Liquid-tight flexible conduit for short equipment connections and connections to motors or motor equipment.

D. Rigid PVC conduit for all systems run under floor or underground. 90 degree bends installed underground shall be galvanized RMC.

3.2 Installation Methods:

A. The installation shall comply with the latest issue of all national, state and local rules and ordinances. The requirements of the latest issue of the National Electrical Code shall be considered a minimum. The state and/or local requirements or the plans and/or specifications shall govern when they exceed the requirements of the National Electrical Code.

B. All work shall be concealed in walls, partitions, ceilings, and floors unless specifically indicated as being exposed. All conduits run overhead shall be run tight to bottom of joists.

C. In places where walls are masonry, conduits and boxes shall be installed in the walls as they are erected. Boxes shall be of such depth that conduit entrances may be made without excessive cutting of the masonry. Box openings shall be cut neatly to fit the outline of the boxes and the finish plates shall cover the entire cut opening.

D. Contractor is prohibited from installing electrical rough-ins in the air cavity between brick veneer and underlying wall. In the case that the electrical rough-in serves an exterior wall mounted device, the conduit must exit the underlying wall directly behind the device it serves.

E. Exposed conduit shall be installed with runs parallel or perpendicular to walls and ceilings with right angle turns utilizing outlet boxes or symmetrical bends.

F. Conduit installed underground shall have a minimum cover of two (2) feet. Joints in conduit installed underground or under floor shall be made watertight. Conduit under concrete floor slab shall be installed on top of subgrade before stone fill is placed.

G. Exposed conduits shall be securely fastened in place no more than six (6) feet centers for up through one (1) inch and eight (8) feet for all sizes larger than one (1) inch and hangers, supports or fastenings shall be provided at each elbow and at the end of each straight run

terminating at a box or cabinet. Horizontal and vertical conduit runs may be supported by one-hole malleable straps, clamp backs, or other approved device with suitable bolts, expansion shields where needed or beam clamps for mounting to building structure or special brackets. Adjustable hangers may be used to suspend conduits when separately located. Hangers shall be made of durable materials suitable for the application involved.

H. Conduit ends shall be cut square, threaded and reamed to remove burrs and sharp edges. Field threads shall be of same type and have same effective length as factory cut threads. Conduit joints shall be made with approved couplings. Bends and offsets shall be avoided where possible, but where necessary factory elbows shall be used for one (1) inch and larger. Other offsets and bends shall be made with an approved hickey or conduit bending machine. Conduit deformed or crushed in any way shall not be installed and bends with a radius of less than 3-1/2 inches will not be permitted.

I. Conduit shall be securely fastened to all sheet metal outlet, junction, cabinets and pull boxes with double galvanized locknuts and insulated bushings, care being observed to see that the full number of threads project through to permit the bushing to be drawn tight against the end of conduit, after the locknuts shall have been made up sufficiently tight to draw them into firm electrical contact with the box. Insulated bushings of fiber or plastic shall be used on one (1) inch conduit and larger.

J. During installation, conduit ends shall be capped or plugged to prevent the entrance of foreign matter. The Contractor shall exercise necessary precautions to prevent accumulation of water, dirt or concrete in the conduits during execution of the work. Conduits in which water or other foreign materials have been permitted to accumulate shall be cleaned thoroughly or the conduit run replaced where such accumulation cannot be removed by methods approved by the engineer.

K. No wires shall be installed until work which might cause damage to the wires or conduits has been completed. Conductors terminating at wired outlets shall extend at least eight (8) inches beyond the outlet to facilitate installation of wiring devices or fixtures.

L. All taps, splices, and joints for conductor’s size number eight (8) and larger shall be made by mechanical means. Connectors used shall have Underwriter's Laboratories approval for use at six hundred (600) volts. All conductors size number ten (10) and smaller shall be jointed by non-corrosive flux solder connections using the hot dip method except that ideal "wirenuts" or approved equal, as for example, 3M preinsulated (plastic covered) "Scotchlox", shall be used to connect fixture lead wires to their designated branch circuit in junction boxes. These splices shall be electrically and mechanically secure and installed equal to or exceeding the conductor capacity in each instance. All joints, splices, and taps and other sections or wiring requiring taping shall be taped with at least two (2) layers of approved gum rubber tape which shall be laid on with half lap followed by at least one (1) layer of friction of or plastic tape laid on with half lap. The intent of this specification is that the taping shall be neatly done and form a permanently secured insulation equal to that of the wire.

M. Minimum wire size for all branch circuits shall be No. 12 AWG.

N. Minimum size for conduit shall be 1/2 inch.

O. No wiring will be installed in the telephone conduit. Provide pull wires in each conduit.

P. Where more than one (1) device is installed at the same location and mounting height, a gang plate shall be used.

Q. Junction and/or pull boxes shall be furnished and installed where necessary to avoid excessive runs or too many bends between outlets.

R. Powdered soapstone or approved lubricants shall be used to facilitate pulling conductors into conduit.

S. The following color code shall be used for all conductors in feeder and branch circuits.

	120/208 V 3ph
Phase	Black
Phase	Red
Phase	Blue
Neutral	White
Ground	Green

Branch circuit conductors shall be factory color coded. Scotch tape of the proper color may be used to identify conductors No. 4 and larger. All feeders, sub-feeders to panels, motor starters and motors shall be completely phased out as to sequences left to right when facing equipment.

T. All motors with conduit connections shall be connected to conduit system with short length (not more than twenty-four (24) inches of flexible liquid-tight conduit.)

U. Circuits are shown schematically. Installation shall be as shown on drawings except by written permission of the engineer.

V. Conductors shall be continuous from outlet to outlet, and no splices shall be made except within outlet or junction boxes.

W. Conductors for branch circuits whose length from panel to center of load exceeds fifty feet shall be No. 10 AWG unless a larger size is shown on drawings.

X. All receptacles to be grounded to the raceway system with a No.12 green TW jumper connected to the bonding screw. Steel City Style G, grounding clips may be used on stamped steel boxes. Bonding jumper shall be installed as the device box is installed.

Y. A code gauge, green grounding conductor, (considered a non-current-carrying conductor), shall be pulled through the entire raceway system.

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Z. PVC conduit shall be UL labeled, shall be rated for 90 degrees C. wiring, and shall be assembled with solvent weld fittings. Bends shall be accomplished with equipment specifically intended for the purpose, and flame-type heating devices shall not be used. Any portion of the conduit, which has been scorched or deformed because of excessive heat, shall be rejected. PVC conduits shall not be run exposed in any locations.

AA. Armored cable (type AC) and metal-clad cable (type MC) are acceptable wiring methods subjected to the following restrictions:

a. See NEC 320 and 330 for restriction
b. Penetrations of rated walls shall be in accordance with approved UL penetration methods
c. Cable shall not be used for home run to panel board
d. Cable shall only be installed in concealed space and furred areas. Max length of each section in accessible concealed ceiling spaces shall not exceed 10ft.
e. Where required by NEC 517.13, cable shall be listed for the use

3.3 Electrical Connection of Equipment:

A. Electrical Contractor shall make power connections to all owner supplied equipment. Refer to detail on plans for connections to mechanical and plumbing equipment.

B. Control wiring for Heating and Air Conditioning Systems is by Heating and Air Conditioning Contractor.

3.4 Electrical Identification

A. 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:

- Blue surface with white core for 120/208-volt equipment.
- Black surface with white core for 277/480-volt equipment.
- Bright red surface with white core for all equipment related to fire alarm system.
- Dark red (burgundy) surface with white core for all equipment related to security.
- Green surface with white core for all equipment related to “emergency” systems.
- Orange surface with white core for all equipment related to telephone systems.
- Brown surface with white core for all equipment related to data systems.

- White surface with black core for all equipment related to paging systems.
- Purple surface with white core for all equipment related to TV systems.

B. Furnish and install self-adhesive plastic tape for all receptacle and wall switch cover plates indicating circuit numbers.

C. 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.

3.5 Painting:

A. Contractor shall paint all iron and steel not having a factory finish or galvanized finish used for support and hanging equipment throughout building. One coat of primer shall be used followed by one coat of oil base paint with colors selected by the Owner.

B. All painted equipment with damaged areas shall be painted to match original finish.

3.6 Clean-Up:

At the completion of all work, this Contractor shall be responsible for cleaning up all rubbish, leaving the system in perfect operating condition. He shall further clean up rubbish daily in such a manner that the job shall present a neat appearance. Work shall be accomplished to the satisfaction of the engineer.

3.7 Maintenance and Operating Manuals:

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.

3.8 As Built Drawings:

Contractor shall keep and maintain in good order a record of any deviations 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 transferable to as-built reproducible drawing.

3.9 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 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.

END OF SECTION 260000

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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/ft3 (600 kN-m/m3)).

2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
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.

B. Topsoil Type S4 – Athletic Fields:
   1. Imported borrow.
   2. Fertile, friable, natural loam surface soil or equivalent.
   3. Reasonably free of slag, cinders, stones, soil clods, sticks, roots, trash or other extraneous materials larger than 1-inch in diameter.
      a. Screening: Double screened.
   4. Free of Kudzu, quack grass, Johnson grass, nut sedge, poison ivy and other objectionable weed plants or plant parts.
   5. Acidity range (pH) of 5.5 to 7.5.
   6. Containing maximum 20% subsoil in admixture.

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/ft3 (600 kN-m/m3)).
3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).

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

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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/ft3 (600 kN-m/m3)).
   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/ft3 (2,700 kN-m/m3)).
   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

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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/ft3 (600 kN-m/m3)).
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/ft3 (600 kN-m/m3)).
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/ft3 (2,700 kN-m/m3)).
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/ft3 (600 kN-m/m3)).
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/ft3 (2,700 kN-m/m3)).
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 Local government 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 Local government, 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

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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/ft3 (600 kN-m/m3)).
   3. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   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

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SECTION 31 31 16
TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Soil-applied chemical treatment.

1.02 REFERENCE STANDARDS

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 2022.

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. Manufacturer's Instructions: Indicate caution requirement.

E. Executed warranty.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of type specified, with minimum 3 years of documented experience.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Installer Warranty: Provide 2-year warranty for termite control commencing on Date of Substantial Completion. Complete forms in Owner's name and register with installer.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MATERIALS

A. Soil-Applied Chemical Treatment:
   1. Toxicant: Comply with Title 7, United States Code, 136 through 136y.
   2. Color: Synthetically dyed for visual identification of treated soil.
   3. Diluent: Recommended by toxicant manufacturer.
   4. Mixes: Mix toxicant in accordance with manufacturer's instructions.
   5. Manufacturers:
      a. Bayer Environmental Science Corp; ____: www.bayer.com/en/agriculture/environmental-science/#sle.
      b. FMC Professional Solutions; ____: www.fmcprosolutions.com/#sle.
      c. Syngenta Professional Products; ____: www.syngentaprofessionalproducts.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that soil surfaces are unfrozen and dry to absorb toxicant, ready to receive treatment.

B. Verify final grading is complete; see Section 31 22 00.

C. Verify utility trenches are wide enough to receive application.

3.02 APPLICATION

A. Comply with manufacturer's written instructions.

B. Soil-Applied Chemical Treatment:
   1. Comply with requirements of U.S. EPA and applicable state and local codes.
   2. Spray-apply toxicant in accordance with manufacturer's instructions.
   3. Apply toxicant at the following locations:
      a. Building footprint immediately prior to finish grading work outside foundations.
      b. At interior and exterior sides of foundation walls.
         1) Apply toxicant immediately prior to finish grading.
      c. Soil within 10 feet (3 m) of building perimeter immediately prior to finish grading.
      d. Along utility conveyances from foundation to 10 feet (3 m) of building perimeter.

3.03 PROTECTION

A. Protect applications from damage after completion. Repair disturbances according to manufacturer's written instructions.

3.04 MAINTENANCE

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

END OF SECTION

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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 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 23 23 - Fill: Compacted fill under base course.
4. Section 31 37 00 - Riprap.
5. Section 32 12 16 - Asphalt Paving: Binder and finish asphalt courses.
6. Section 32 13 13 - Concrete Paving: Finish concrete surface course.
7. Section 32 91 19 - Landscape Grading: Topsoil fill at areas adjacent to aggregate base course.
8. Section 33 05 13 - Manholes and Structures.

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/ft3 (600 kN-m/m3)).

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/ft3 (2,700 kN-m/m3)).
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

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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 13 - Parking Bumpers: [Concrete] [Timber] [_____] bumpers.
6. Section 32 17 23 - Pavement Markings: Painted pavement markings, lines, and legends.
7. 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

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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 07 90 00 - Joint Protection: Sealant for joints.
   2. Section 09 90 00 - Painting and Coating: Pavement markings.
   3. Section 31 22 13 - Rough Grading: Preparation of site for paving.
   4. Section 31 23 23 - Fill: Compacted subbase for paving.
   5. Section 32 11 23 - Aggregate Base Courses: Base course.
   6. Section 32 12 16 - Asphalt Paving: Asphalt wearing course & curbs.
   7. Section 32 17 13 - Parking Bumpers: Pre-cast concrete parking bumpers.
   8. Section 32 91 19 - Landscape Grading: Preparation of subsoil at pavement perimeter.
   9. Section 33 05 13 - Manholes and Structures.

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 17 23

PAVEMENT MARKINGS

PART 37 GENERAL

37.1 SUMMARY

A. Section Includes:
   1. Traffic lines and markings.
   2. Legends.
   3. Paint.
   4. Glass beads.

B. Related Sections:
   1. Section 32 12 16 - Asphalt Paving.
   2. Section 32 13 13 - Concrete Paving.

37.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Traffic Lines and Markings:
   1. Basis of Measurement: By linear foot.
   2. Basis of Payment: Includes furnishing, installing, inspecting and maintaining pavement markings for minimum of 3 years, and related maintenance and protection of traffic.

B. Legends:
   1. Basis of Measurement: By each legend.
   2. Basis of Payment: Includes furnishing, installing, inspecting and maintaining pavement markings for minimum of 3 years, and related maintenance and protection of traffic.

37.3 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO M247 - Standard Specification for Glass Beads Used in Traffic Paint.

B. ASTM International:
   1. ASTM D34 - Standard Guide for Chemical Analysis of White Pigments.
   2. ASTM D126 - Standard Test Methods for Analysis of Yellow, Orange, and Green Pigments Containing Lead Chromate and Chromium Oxide Green.
   3. ASTM D562 - Standard Test Method for Consistency of Paints Using the Stormer Viscometer.
   4. ASTM D711 - Standard Test Method for No-Pick-Up Time of Traffic Paint.
   5. ASTM D713 - Standard Practice for Conducting Road Service Tests on Fluid Traffic Marking Materials.
   6. ASTM D969 - Standard Test Method for Laboratory Determination of Degree of Bleeding of Traffic Paint.

7. ASTM D1301 - Standard Test Methods for Chemical Analysis of White Lead Pigments.
8. ASTM D1394 - Standard Test Methods for Chemical Analysis of White Titanium Pigments.
9. ASTM D1475 - Standard test Method for Density of Liquid Coatings, Inks, and Related Products.
10. ASTM D1640 - Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature.
11. ASTM D2202 - Standard Test Method for Slump of Sealants.
12. ASTM D2371 - Standard Test Method for Pigment Content of Solvent-Reducible Paints.
13. ASTM D2621 - Standard Test Method for Infrared Identification of Vehicle Solids From Solvent-Reducible Paints.
14. ASTM D2743 - Standard Practices for Uniformity of Traffic Paint Vehicle Solids by Spectroscopy and Gas Chromatography.

37.4 PERFORMANCE REQUIREMENTS

A. Paint Adhesion: Adhere to road surface forming smooth continuous film one minute after application.

B. Paint Drying: Tack free by touch so as not to require coning or other traffic control devices to prevent transfer by vehicle tires within two minutes after application.

37.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit paint formulation for each type of paint.

C. Test Reports: Submit source and acceptance test results in accordance with AASHTO M247.

D. Manufacturer’s Installation Instructions: Submit instructions for application temperatures, eradication requirements, application rate, line thickness, type of glass beads, bead embedment and bead application rate, and any other data on proper installation.

E. Manufacturer’s Certificate: Certify Products meet or exceed NCDOT 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.
   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.

37.7 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 the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.

37.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing work of this section with minimum three years documented experience.

37.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Invert containers several days prior to use when paint has been stored more than 2 months. Minimize exposure to air when transferring paint. Seal drums and tanks when not in use.

C. Glass Beads. Store glass beads in cool, dry place. Protect from contamination by foreign substances.

37.10 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.

C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.

D. Do not apply paint when temperatures are expected to fall below 60 degrees F for 24 hours after application.

E. Volatile Organic Content (VOC). Do not exceed State or Environmental Protection Agency maximum VOC on traffic paint.

37.11 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish three year manufacturer's warranty for traffic paints.

37.12 MAINTENANCE SERVICE

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance service.

B. Furnish service and maintenance of traffic paints for three years from Date of Substantial Completion.

PART 38 PRODUCTS

38.1 PAINTED PAVEMENT MARKINGS

A. Furnish materials in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.
   1. Paint: Ready mixed, conventional and fast dry waterborne traffic paints, lead-free, non-toxic, NASSHTO Test Deck, minimum retroreflectance of 100 mcds, durability rating of 6 or more after in place for 9 months.
   2. Glass Beads: AASHTO M247, Type 1, coated to enhance embedment and adherence with paint.

38.2 EQUIPMENT

A. Continuous Longitudinal Line Application Machine: Use application equipment with following capabilities.
   1. Dual nozzle paint gun to simultaneously apply parallel lines of indicated width in solid or broken patterns or various combinations of those patterns.
   2. Pressurized bead-gun to automatically dispense glass beads onto painted surface, at required application rate.
   3. Measuring device to automatically and continuously measure length of each line placed, to nearest foot.
   4. Device to heat paint to 130 degrees F for fast dry applications.

B. Machine Calibration:
   1. Paint Line Measuring Device: Calibrate automatic line length gauges to maintain tolerance of plus or minus 25 feet per mile.
   2. Cycle Length/Paint Line Length Timer: Calibrate cycle length to maintain tolerance of plus or minus 6 inches per 40 feet; calibrate paint line length to maintain tolerance to plus or minus 3 inches per 10 feet.
   3. Paint Guns: Calibrate to simultaneously apply paint binder at uniform rates as specified with an allowable tolerance of plus or minus 1 mil.
   4. Bead Guns: Calibrate to dispense glass beads simultaneously at specified rate. Check guns by dispensing glass beads into gallon container for predetermined fixed period of time. Verify weight of glass beads.

C. Other Equipment:
   1. For application of crosswalks, intersections, stop lines, legends and other miscellaneous items by walk behind stripers, hand spray or stencil trucks, apply with equipment meeting requirements of this section. Do not use hand brushes or rollers. Optionally apply glass beads by hand.

38.3 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Test and analyze traffic paints in accordance with ASTM Standards, as applicable.

PART 39 EXECUTION

39.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Do not apply paint to concrete surfaces until concrete has cured for 28 days.

39.2 PREPARATION

A. Maintenance and Protection of Traffic:
   1. Provide short term traffic control in accordance with Section 01 50 00 - Temporary Facilities and Controls.
   2. Prevent interference with marking operations and to prevent traffic on newly applied markings before markings dry.
   3. Maintain travel lanes between 7: 00 AM to 9: 00 AM, and between 4: 00 PM and 6: 00 PM.
   4. Maintain access to existing properties requiring access.

B. Surface Preparation.
   1. Clean and dry paved surface prior to painting.
   2. Blow or sweep surface free of dirt, debris, oil, grease or gasoline.
   3. Spot location of final pavement markings as specified and as indicated on Drawings by applying pavement spots 25 feet on center.
   4. Notify Architect/Engineer after placing pavement spots and minimum 3 days prior to applying traffic lines.

39.3 EXISTING WORK

A. Remove existing markings in an acceptable manner. Do not remove existing pavement markings by painting over with blank paint. Remove by methods that will cause least damage to pavement structure or pavement surface. Satisfactorily repair any pavement or surface damage caused by removal methods.

B. Clean and repair existing or reinstalled lines and legends.

39.4 APPLICATION

A. Agitate paint for 1-15 minutes prior to application to ensure even distribution of paint pigment.

B. Dispense paint at ambient 130 degrees F to wet-film thickness of 15 mils, except dispense edge markings to wet-film thickness of 12 mils.

C. Apply glass beads at rate of 6 pounds per gallon of paint.

D. Apply markings to indicated dimensions at indicated locations.

E. Prevent splattering and over spray when applying markings.

F. Unless material is track free at end of paint application convoy, use traffic cones to protect markings from traffic until track free. When vehicle crosses a marking and tracks it or when splattering or over spray occurs, eradicate affected marking and resultant tracking and apply new markings.

G. Collect and legally dispose of residues from painting operations.

H. Install Work in accordance with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.

39.5 APPLICATION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation from Wet Film Thickness: 1 mil.

C. Maximum Variation from Wet Paint Line Width: Plus or minus 1/8 inch.

D. Maintain cycle length for skip lines at tolerance of plus or minus 6-inches per 40-feet and line length of plus or minus 3-inches per 10-feet.

E. Maximum Variation from Specified Application Temperature: Plus or minus 5 degrees F.

39.6 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 for incorrect location, insufficient thickness, line width, coverage, retention, uncured or discolored material, and insufficient bonding.

C. Repair lines and markings, which after application and curing do not meet following criteria:
   1. Incorrect Location: Remove and replace incorrectly placed patterns.
   2. Insufficient Thickness, Line Width, Paint Coverage, Glass Bead Coverage or Retention: Prepare defective material by acceptably grinding or blast cleaning to

remove substantial amount of beads and to roughen marking surface. Remove loose particles and debris. Apply new markings on cleaned surface in accordance with this Section.

3. Uncured or Discolored Material, Insufficient Bonding: Remove defective markings in accordance with this Section and clean pavement surface one foot beyond affected area. Apply new markings on cleaned surface in accordance with this Section.

D. Replace defective pavement markings as specified throughout 3 year warranted period. Replace markings damaged by anti-skid materials, studded tires, tire chains, chemical deicers, snow plowing or other loss of marking material regardless of cause. When markings are damaged by pavement failure or by Owner's painting, crack sealing, or pavement repair operations, Contractor is released from warranty requirements for damaged work.

E. A three member team will evaluate warranty provisions. Team will consist of one member from Owner, one member from Contractor, and third person who is mutually acceptable to Owner and Contractor. Any costs for third person will be equally shared between Owner and Contractor. At least once each year, beginning with year after acceptance, team shall:

1. Observe Owner taking readings by retroreflectometer, or review Owner records of such evaluation. The number of readings will be as large as necessary to ensure that minimum criteria are satisfied. Readings will be during period from March 15 through October, when pavement is clean and dry.
2. Determine color fade, discoloration or pigment loss based on visual color comparison between original sample plates with glass beads and in-place pavement markings.
3. Determine magnitude of material loss.

F. Prepare list of defective areas and areas requiring additional inspection and evaluation to decide where material may need replaced. Provide traffic control as necessary if markings require more detailed evaluation.

G. Replace failed or defective markings in entire section of defective markings within 30 days after notification when any of the following exists during warranty period:

1. Average retro reflectivity within any 528 foot section is less than 1225 mcd/m2/1x for white pavement markings and 100 mcd/m2/1x for yellow pavement markings.
2. Marking is discolored or exhibits pigment loss, and is determined to be unacceptable by three member team based on visual comparison with beaded color plates.
3. More than 15 percent of area of continuous line, or more than 15 percent of combined area of skip lines, within any 528 foot section of roadway is missing.

H. Replace pavement marking material under warranty using original or better type material. Continue warranty to end of original 3 year period even when replacement materials have been installed as specified.

I. When eradication of existing paint lines is necessary, eradicate by shot blast or water blast method. Do not gouge or groove pavement more than 1/16 inch during removal. Limit area of removal to area of marking plus 1 inch on all sides. Prevent damage to

transverse and longitudinal joint sealers, and repair any damage according to requirements in Section 32 13 13 or Section 32 12 16.

J. Maintain daily log showing work completed, results of above inspections or tests, pavement and air temperatures, relative humidity, presence of any moisture on pavement, and any material or equipment problems. Make legible entries in log in ink, sign and submit by end of each work day. Enter environmental data into log prior to starting work each day and at two additional times during day.

39.7 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect painted pavement markings from vehicular and pedestrian traffic until paint is dry and track free. Follow manufacturer's recommendations or use minimum of 30 minutes. Consider barrier cones as satisfactory protection for materials requiring more than 2 minutes dry time.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 40 GENERAL

40.1 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.

40.2 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.

40.3 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.

40.4 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.

40.5 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.

40.6 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.

40.7 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.

40.8 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.

40.9 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.

40.10 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 41 PRODUCTS

41.1 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.

41.2 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.

41.3 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.

41.4 PRIVACY SLATS

1. Privacy Slats: Vinyl strips, flat configuration, sized to fit fence fabric, color (as per Architect).

41.5 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 42 EXECUTION

42.1 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.

42.2 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.

42.3 PRIVACY SLATS

A. Install slat inserts in pattern woven through fence fabric as instructed by Architect.

B. Fasten slats according to manufacturers instructions.

42.4 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**

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SECTION 32 31 19
DECORATIVE METAL FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Decorative aluminum fences.

1.02 PRICE AND PAYMENT PROCEDURES

A. Alternates: See Section 01 23 00 - Alternates, for product alternatives affecting this section.

1.03 REFERENCE STANDARDS

A. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2025.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

C. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets; 2016 (Reapproved 2023).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section; require attendance by affected installers.

1.05 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. Shop Drawings:
   1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.
   2. Foundation details, concrete design mix and reinforcing schedule for anti-ram barrier system.

D. Samples: Submit two samples of fence panels, slat infill, 12 inch (____ mm) by 3.5 inch (____ mm) in size illustrating construction and colored finish.

E. Manufacturer's Installation Instructions: Indicate installation requirements, post foundation anchor bolt templates, and _____.

F. Manufacturer's Warranty.

1.06 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.

1.07 DELIVERY, STORAGE AND HANDLING

A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

1.08 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 Substantial Completion.

PART 2 PRODUCTS

2.01 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.

2.02 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: per drawings.
      a. Panel Style: PRIVACY FENCE W/ SLATS.
      b. Attach panels to posts with manufacturer's standard panel brackets and recommended fasteners.
      c. Posts: Aluminum extrusions; 2-1/2 inches (63 mm) square.
      d. Rails: Extruded aluminum channels.
      e. Pickets: Extruded aluminum tubes.
         1) Style: Flush top rail.
      f. Fasteners: Manufacturer's standard stainless steel bolts, screws, and washers; factory finish fasteners to match fence.

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 of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Set fence posts in accordance with the manufacturer recommended spacing.

C. When cutting rails immediately seal the exposed surfaces by:
   1. Removing metal shavings from cut area.
   2. Apply zinc-rich primer to thoroughly cover cut edge and drilled hole; allow to dry.
   3. Apply two coats of custom finish spray paint matching fence color.
   4. Failure to seal exposed surfaces in accordance with manufacturer's instructions will negate manufacturer's warranty.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6.3 mm).

3.05 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.

C. Post Settings: Randomly inspect three locations against design for:
   1. Hole diameter.
   2. Hole depth.
   3. Hole spacing.

D. Fence Height: Randomly measure fence height at three locations or at areas that appear out of compliance with design.

3.06 CLEANING

A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

B. Clean fence with mild household detergent and clean water rinse well.

C. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up paint color to factory-applied finish.

3.07 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION

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SECTION 32 31 23
PLASTIC FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Posts, rails, and frames.

B. Plastic pickets.

C. Plastic filler panels.

D. Concrete.

E. Manual gates with related hardware.

1.02 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2026.

C. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2024.

D. ASTM D1784 - Standard Classification System and Basis for Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds; 2025.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on fence panels, posts, accessories, fittings and hardware.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

D. Manufacturer's Installation Instructions: Indicate installation requirements and post foundation anchor bolt templates.

E. Manufacturer's qualification statement.

F. 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 of documented experience.

B. Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

1.05 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Fencing manufacturers standard warranty for applications indicated.

C. Finish Warranty: Provide 15-year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Plastic Fences and Gates:
   1. Southern Vinyl Manufacturing, LLC: www.svmllc.com.
      a. Z56 Solid Basis of Design or approved substitution.
   2. CertainTeed Corporation: www.certainteed.com/fence/#sle.
   3. PlyGem: www.plygem.com/#sle.

4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PLASTIC FENCES AND GATES

A. PVC Posts, Rails, and Pickets: High-impact, UV-resistant, rigid polyvinyl chloride, complying with ASTM D1784, Class 14344B.
   1. Fence Style: Semi-private.
      a. Fence Height: 7 feet (2.1 m).
      b. Color: As selected by Architect from manufacturers full range.
      c. Finish: Smooth.
   2. Line and Corner Posts: 5 by 5 inches (127 by 127 mm), minimum; 0.135-inch (3.4 mm) wall thickness, 3/8-inch (9.5 mm) corner radius.
      a. Provide internal reinforcing for rigid installation.
   3. Rails: 1-1/2 by 3-1/2 inches (_____ by _____ mm), minimum; 0.090-inch (2.3 mm) wall thickness, 5/16-inch (7.9 mm) corner radius.
   4. Pickets: 7/8 by 6 inches (22 by 150 mm), minimum, tongue and groove; 0.050-inch (1.3 mm) wall thickness, 3/16-inch (4.8 mm) corner radius.
      a. Picket Spacing: Full privacy.
   5. Post Caps: Match cross section of post; 0.095-inch (2.4 mm) wall thickness, pyramid configuration.
      a. Secure in place with color match screws.
   6. Stiffener Channels: ASTM A36/A36M, galvanized steel with predrilled holes for drainage; sized to fit within PVC rails.
   7. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
      a. Galvanized in accordance with ASTM A767/A767M, Class I.

B. Fasteners: Manufacturer's standard stainless steel fasteners.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify that areas are clear of obstructions or debris.

3.02 INSTALLATION

A. Install framework, pickets, fence panels, accessories and gates in accordance with manufacturer's instructions.

B. Set intermediate, terminal, and gate posts plumb, in concrete footings with top of footing 2 inches (51 mm) above finish grade. Slope top of concrete for water runoff.
   1. Install internal reinforcing or post for rigid installation.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/8 inch (3 mm).

B. Maximum Offset From True Position: 1/4 inch (6 mm).

3.04 CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.

B. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

C. Clean fence with mild household detergent and clean water; rinse well.

D. Remove mortar from exposed posts and other fencing material.

E. Touch up scratched surfaces using materials recommended by manufacturer. Match touched-up finish to factory-applied finish.

END OF SECTION

SECTION 32 84 00

PLANTING IRRIGATION

PART 43 GENERAL

43.1 SUMMARY

A. Section Includes:
   1. Trenching.
   2. Pipe and fittings.
   3. Valves.
   4. Outlet heads and accessories.
   5. Control system.

B. Related Sections:
   1. Section 26 05 03 - Equipment Wiring Connections: Power supply connections.
   2. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
   3. Section 26 05 33 - Raceway and Boxes for Electrical Systems.
   4. Section 31 23 17 - Trenching: Excavating and backfilling for irrigation piping.
   5. Section 31 23 23 - Fill: Backfilling utility structures.
   6. Section 32 91 19 - Landscape Grading.

43.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Piping:
   1. Basis of Measurement: By the linear foot.
   2. Basis of Payment: Includes trenching, placing pipe and fittings, valves, control box, conduit and wiring, and accessories.

B. Sprinkler Heads:
   1. Basis of Measurement: By each.
   2. Basis of Payment: Includes sprinkler head and fittings.

43.3 REFERENCES

A. ASTM International:
   1. ASTM B32 - Standard Specification for Solder Metal.
   2. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
   3. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
   4. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
   5. ASTM D2241 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
   6. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.

B. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

C. American Society of Irrigation Consultants:
1. ASIC Guideline 100-2002 (January 2, 2002) For Earth Grounding Electronic Equipment in Irrigation Systems.

43.4 SYSTEM DESCRIPTION

A. Underground Irrigation System: Per Civil Drawings.

B. Source Power: Per Civil Drawings

C. Low Voltage Controls: Per Civil Drawings

43.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate piping layout to water source, location of sleeves under pavement, location and coverage of sprinkler heads, components, plant and landscaping features, site structures, schedule of outlets and fittings to be used.

C. Product Data: Submit component and control system and wiring diagrams.

D. Samples: Submit one outlet of each type, with housing. Accepted samples may not be used in the Work.

43.6 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 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.

43.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Provide an as-built survey tied to state plain coordinates for the locations of all equipment.

C. Operation and Maintenance Data:
   1. Submit instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.
   2. Submit schedule indicating length of time each valve is required to be open to deliver determined amount of water.

43.8 QUALITY ASSURANCE

A. Sustainable Design Requirements:

   1. Recycled Content Materials: Furnish materials with recycled content, where available.
   2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.

B. Perform Work in accordance with Local government, NCDENR – Public Water Supply Section and NCDOT Manual of Specifications, Latest Edition.

43.9 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.

43.10 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene one week prior to commencing Work of this section

43.11 FIELD MEASUREMENTS

A. Verify field measurements on shop drawings.

43.12 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate the Work with site backfilling, landscape grading and delivery of plant life.

43.13 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for extra materials.

B. Furnish the following:
   1. Six sprinkler heads of each type and size.
   2. Two valve keys for manual valves.
   3. Six valve box keys.

4. Two keys for valve markers.
5. Two wrenches for each type head core and for removing and installing each type head.

PART 44 PRODUCTS

44.1 PIPE MATERIALS

A. PVC Pipe: ASTM D2241, SDR 21 or 26; 200 psi pressure rated; solvent welded sockets.

B. Fittings: Type and style of connection to match pipe.

C. Solvent Cement: ASTM D2564 for PVC pipe and fittings

D. Sleeve Material: PVC.

44.2 OUTLETS

A. Manufacturers:
   1. Hunter Industries, Inc.
   2. Rain Bird Corporation
   3. The Toro Company
   4. Approved Equal.
   5. Substitutions: Section 01 60 00 - Product Requirements.

B. Outlets: Brass construction.

C. Rotary Type Sprinkler Head: Pop-up type with screens; fully adjustable for flow and pressure; size as indicated on Drawings; with letter or symbol designating degree of arc and arrow indicating center of spray pattern.

D. Spray Type Sprinkler Head: Pop-Up head with full circle or half circle pattern.

E. Emitter: Adjustable outlet, non-clogging, with two trickle tubes.

F. Bubbler: Adjustable outlet.

G. Quick Coupler

44.3 MANUAL VALVES

A. Manufacturers:
   1. American Valve
   2. FMC Crosby Valve
   3. Red-White Valve Corp.
   4. Substitutions: Section 01 60 00 - Product Requirements

B. Ball Valves: Bronze construction, inside screw with threaded ends.

C. Backflow Preventers: Brass body construction, reduced pressure zone (RPZ) type.

D. Valve Box and Cover

E. Drain Valve

44.4 CONTROLS AND CONTROL VALVES

A. Manufacturers:
   1. Hunter Industries, Inc.
   2. Rain Bird Corporation
   3. The Toro Company
   4. Substitutions: Section 01 60 00 - Product Requirements.

B. Controller: Automatic controller, microprocessor solid state control with visible readout display, temporary override feature to bypass cycle for inclement weather, timer for 6 station system, programmable for 7 days in quarter hour increments, with automatic start and shutdown.

C. Controller Housing: NEMA 250 Type 3R; weatherproof, watertight, with lockable access door.

D. Valves: Hydraulic; normally open; hydraulic tubing, including required fittings and accessories.

E. Wire Conductors: Color-coded copper conductor, direct burial type.

F. Rain Sensors

44.5 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics: In accordance with Section 26 05 03.

B. Disconnect Switch: Factory mount disconnect switch in control panel.

PART 45 EXECUTION

45.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify location of existing utilities.

C. Verify required utilities are available, in proper location, and ready for use.

45.2 PREPARATION

A. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, and structures.

B. Layout and stake locations of system components.

C. Review layout requirements with other affected work. Coordinate locations of sleeves [under paving] to accommodate system.

45.3 TRENCHING

A. Trench in accordance with Section 31 23 17.

B. Trench Size:
   1. Minimum Width: 6 inches.
   2. Minimum Depth of Installed Supply Piping: the greater of 36 inches or 18 inches below freeze line.
   3. Minimum Depth of Installed Branch Piping: the greater of 24 inches or 18 inches below freeze line.
   4. Minimum Depth of Installed Outlet Piping: the greater of 36 inches or 18 inches below freeze line.

C. Trench to accommodate grade changes.

D. Maintain trenches free of debris, material, or obstructions damaging to pipe.

45.4 INSTALLATION

A. Connect to utilities.

B. Set outlets and box covers at finish grade elevations.

C. Provide for thermal movement of components in system.

D. Slope piping for self drainage to drainage pit.

E. Use threaded nipples for risers to each outlet.

F. Install control wiring in accordance with Section 26 05 19. Provide 10 inch expansion coil at each control valve, and at 100 ft intervals. Bury wire tubing beside pipe. Mark valves with neoprene valve markers containing locking device. Set valve markers in 200 psi PVC pipe risers exiting from top of valve to finish grade.

G. After piping is installed, but before outlets are installed and backfilling commences, open valves and flush system with full head of water.

H. Coordinate pipe installation and conduit installation.

45.5 BACKFILLING

A. Backfill with fill in accordance with Section 31 23 17.

B. Install 3 inch sand cover over piping.

C. Protect piping from displacement.

45.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Prior to backfilling, test system for leakage for whole system to maintain 100 psi pressure for one hour.

C. System is acceptable when no leakage or loss of pressure occurs and system self drains during test period.

D. Provide a complete “Spring Season” start-up and a complete “Fall Season” shutdown.

45.7 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Adjust control system to achieve time cycles required

C. Adjust head types for full water coverage as directed by Architect/Engineer.

45.8 DEMONSTRATION AND TRAINING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Instruct Owner's personnel in operation and maintenance of system, including adjusting of sprinkler heads. Use operation and maintenance material as basis for demonstration.

45.9 SCHEDULES

A. Baseball Field, Football Field, Soccer Field, Softball Field, Field 1 and Field 2 are the only areas to receive Irrigation Systems.

B. Install heads based upon layouts included in Plan Set.

END OF SECTION

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SECTION 32 91 13

SOIL PREPARATION

PART 46 GENERAL

46.1 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.

46.2 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.

46.3 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.

46.4 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.

46.5 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.

46.6 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate with installation of underground sprinkler system piping and watering heads.

PART 47 PRODUCTS

47.1 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.

****** [OR] ******

B. Topsoil: Excavated from site and free of weeds.

47.2 ACCESSORIES

A. Edging: Galvanized steel.

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 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.

48.3 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 49 GENERAL

49.1 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.

49.2 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.

49.3 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.

49.4 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.

49.5 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 50 PRODUCTS

50.1 MATERIAL

A. Topsoil: Fill as specified in Section 32 93 00.

PART 51 EXECUTION

51.1 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.

51.2 PREPARATION

A. Protect landscaping and other features remaining as final Work.

B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

51.3 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.

51.4 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.

51.5 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Top of Topsoil: Plus or minus 1/2 inch.

51.6 PROTECTION OF INSTALLED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Prohibit construction traffic over topsoil.

51.7 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

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SECTION 32 92 19

SEEDING

PART 52 GENERAL

52.1 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.

52.2 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.

52.3 REFERENCES

A. ASTM International:
1. ASTM C602 - Standard Specification for Agricultural Liming Materials.

52.4 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.

****** [OR] ******

B. Weeds: Vegetative species other than specified species to be established in given area.

52.5 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.

52.6 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.

52.7 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.

52.8 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.

52.9 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.

52.10 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.

52.11 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 Substantial Completion.

PART 53 PRODUCTS

53.1 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

53.2 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.

53.3 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 54 EXECUTION

54.1 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.

54.2 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.

54.3 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.

54.4 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.

54.5 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.

54.6 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.

54.7 SCHEDULE

A. Front Seeded Area: Grass seed mixture specified, 3 inch top soil.

B. Rear Seeded Area: Grass seed mixture specified except substitute Clover for Kentucky Blue Grass, 2 inch top soil.

END OF SECTION

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SECTION 32 92 23

SODDING

PART 55 GENERAL

55.1 SUMMARY

A. Section Includes:
   1. Preparation of subsoil.
   2. Placing topsoil.
   3. Fertilizing.
   4. Sod installation.
   5. Maintenance.

B. Related Sections:
   1. Section 31 23 17 - Trenching: Rough grading over cut.
   2. Section 31 23 23 - Fill: Rough grading of site.
   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 and Soil Supplements.
   7. Section 32 93 00 - Plants.

55.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Sodded Areas:
   1. Basis of Measurement: By square yard.
   2. Basis of Payment: Includes preparation of subsoil, topsoil, placing topsoil, sodding, watering and maintenance to one year from substantial completetion.

55.3 REFERENCES

A. ASTM International:
   1. ASTM C602 - Standard Specification for Agricultural Liming Materials.

B. Turfgrass Producers International:
   1. TPI - Guideline Specifications to Turfgrass Sodding.

55.4 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

55.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data for sod grass species, fertilizer, mulch, and other accessories.

C. Submit minimum 10 oz sample of topsoil proposed. Forward sample to approved testing laboratory in sealed containers to prevent contamination.

D. Test Reports: Indicate topsoil nutrient and pH levels with recommended soil supplements and application rates.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

55.6 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.

55.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Operation and Maintenance Data: Submit maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

55.8 QUALITY ASSURANCE

A. Sod: Root development capable of supporting its own weight without tearing, when suspended vertically by holding upper two corners.

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.

55.9 QUALIFICATIONS

A. Sod Producer: 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.

55.10 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Deliver sod in rolls. Protect exposed roots from dehydration.

C. Do not deliver more sod than can be laid within 24 hours.

55.11 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate with installation of underground sprinkler system piping and watering heads.

55.12 MAINTENANCE SERVICE

A. Section 01 70 00 - Execution and Closeout Requirements: Maintenance service.

B. Maintain sodded areas for twelve months from Date of Substantial Completion.

PART 56 PRODUCTS

56.1 SOD

A. Sod Growers:
   1. Approved Gowers.

   2. Substitutions: Section 01 60 00 - Product Requirements.

B. Sod: Approved grade; cultivated grass sod; type indicated in plant schedule on Drawings; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft.

56.2 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.

56.3 ACCESSORIES

A. Fertilizer: Commercial grade; recommended for grass, with fifty percent of elements derived from organic sources; of proportion necessary to eliminate deficiencies of topsoil [to the following proportions: nitrogen 8 percent, phosphoric acid 8 percent, soluble potash 8 .

B. Lime: ASTM C602, Class T agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.

C. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.

D. Wood Pegs: Softwood, sufficient size and length to anchor sod on slope.

E. Wire Mesh: Interwoven hexagonal plastic mesh of 2 inch size.

F. Edging: Galvanized steel.

G. Herbicide: As needed.

56.4 HARVESTING SOD

A. Machine cut sod in accordance with TPI.

B. Cut sod in area not exceeding 1 sq yd, with minimum 1/2 inch and maximum 1 inch topsoil base.

56.5 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 sod grass species as result of testing.

D. 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.

PART 57 EXECUTION

57.1 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.

57.2 PREPARATION OF SUBSOIL

A. Prepare sub-soil and eliminate uneven areas and low spots.

B. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

C. Remove foreign materials and undesirable plants and their roots. Do not bury foreign material beneath areas to be sodded.

D. Remove contaminated subsoil.

E. Scarify sub-soil to depth of 4 inches where topsoil is to be placed.

F. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

57.3 PLACING TOPSOIL

A. Spread topsoil to minimum depth of 4 inches over area to be sodded.

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 sodded areas in straight lines to consistent depth.

57.4 FERTILIZING

A. Apply lime at application rate recommended by soil analysis.

B. Apply fertilizer at application rate recommended by soil analysis.

C. Apply fertilizer after smooth raking of topsoil and prior to installation of sod.

D. Apply fertilizer no more than 48 hours before laying sod.

E. Mix fertilizer thoroughly into upper 4 inches of topsoil.

F. Lightly water soil to aid dissipation of fertilizer.

57.5 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod within 24 hours after harvesting to prevent deterioration.

C. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Lay smooth. Align with adjoining grass areas.

E. Place top elevation of sod 1/2 inch below adjoining edging, paving, curbs.

F. On slopes 3:1 and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. When using “big roll”, lay sod parallel to slope. Drive pegs flush with soil portion of sod.

G. Do not place sod when temperature is lower than 32 degrees F.

H. Prior to placing sod, on slopes exceeding 3:1, place wire mesh over topsoil. Securely anchor wire mesh in place with wood pegs sunk firmly into ground.

I. Water sodded areas immediately after installation. Saturate sod to [4] [_____] inches of soil.

J. After sod and soil have dried, roll sodded areas to bond sod to soil and to remove minor depressions and irregularities.

K. Roll before first watering.

57.6 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.

B. Neatly trim edges and hand clip where necessary.

C. Immediately remove clippings after mowing and trimming.

D. Water to prevent grass and soil from drying out.

E. Roll surface to remove or irregularities.

F. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.

G. Immediately replace sod on areas showing deterioration or bare spots.

H. Protect sodded areas with warning signs during maintenance period.

57.7 SCHEDULE

A. Front Sodded Area: Sod type specified, 3 inch top soil.

B. Rear Sodded Area: Sod grass mixture specified except substitute Clover for Kentucky Blue Grass, 2 inch top soil.

END OF SECTION

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SECTION 32 93 00

PLANTS

PART 58 GENERAL

58.1 SUMMARY

A. Section Includes:
   1. Preparation of subsoil and topsoil.
   2. Topsoil bedding.
   3. Trees, plants, and ground cover.
   4. Mulch.
   5. Fertilizer.
   6. Pruning.
   7. Maintenance.

B. Related Sections:
   1. Section 31 23 17 - Trenching: Rough grading over trench cut.
   2. Section 31 23 23 - Fill: Rough grading of site.
   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 and Soil Supplements.
   7. Section 32 92 23 - Sodding.

C. 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].

58.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Plants:
   1. Basis of Measurement: By each.
   2. Basis of Payment: Includes [preparation of [subsoil] [topsoil],] [placing topsoil,] planting, watering and maintenance to specified time period.

58.3 REFERENCES

A. American National Standards Institute:

1. ANSI A300 - Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices.
2. ANSI Z60.1 - Nursery Stock.

B. Forest Stewardship Council:
   1. FSC Guidelines - Forest Stewardship Council Guidelines.

58.4 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

58.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit list of plant material sources, data for fertilizer and other accessories.

C. Submit minimum 10 oz sample of topsoil proposed. Forward sample to testing laboratory in sealed containers to prevent contamination.

58.6 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 and origin for salvaged and reused products.
      b. Certify source for local and regional materials and distance from Project site.
      c. Certify lumber is harvested from Forest Stewardship Council Certified well managed forest.

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. Local and regional products.
      d. Certified wood products.

58.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Operation and Maintenance Data: Include pruning objectives, types and methods; types, application frequency, and recommended coverage of fertilizer.

58.8 QUALITY ASSURANCE

A. Tree Pruning: ANSI A300 Pruning Standards for Woody Plants.

B. Sustainable Design Requirements:

1. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.

2. Certified Wood Materials: Furnish wood materials certified in accordance with FSC Guidelines.

C. Perform Work in accordance with Local government and NCDOT Manual of Specifications, Latest Edition.

D. Maintain one copy of each document on site.

58.9 QUALIFICATIONS

A. Nursery: Company specializing in growing and cultivating plants with three years documented experience.

B. Installer: Company specializing in installing and planting plants with three years documented experience.

C. Tree Pruner: Company specializing in performing work of this section with minimum three years documented experience.

D. Maintenance Services: Performed by installer.

58.10 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.

58.11 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

C. Protect and maintain plant life until planted.

D. Deliver plant life materials immediately prior to placement. Keep plants moist.

E. Plant material damaged as a result of delivery, storage or handling will be rejected.

58.12 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees F.

C. Do not install plant life when wind velocity exceeds 30 mph.

58.13 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Install plant life after and coordinate with installation of underground irrigation system piping and watering heads specified in Section 32 84 00.

58.14 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish one year manufacturer warranty for trees, plants, and ground cover.

58.15 MAINTENANCE SERVICE

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance service.

B. Maintain plant life for twelve months after Date of Substantial Completion.

C. Maintenance includes:
   1. Cultivation and weeding plant beds and tree pits.
   2. Applying herbicides for weed control. Remedy damage resulting from use of herbicides.
   3. Remedy damage from use of insecticides.
   4. Irrigating sufficient to saturate root system.
   5. Pruning, including removal of dead or broken branches.
   6. Disease control.
   7. Maintaining wrapping, guys, [turnbuckles,] and stakes. [Adjust turnbuckles to keep guy wires tight.] Repair or replace accessories when required.
   8. Replacement of mulch.

PART 59 PRODUCTS

59.1 TREES, PLANTS, AND GROUND COVER

A. Planting Stock:
   1. Species: In accordance with Standardized Plant Names, official code of American Joint Committee on Horticulture Nomenclature.
   2. Identification: Label individual plants or each bundle of plants when tied in bundles.
   3. 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.
   4. Trees: Furnish with reasonably straight trunks, well balanced tops, and single leader.
   5. Deciduous plants: Furnish in dormant state, except those specified as container grown.

B. Trees, Plants and Ground Cover: Species and size identifiable in plant schedule, grown in climatic conditions similar to those in locality of the Work.

59.2 SOIL MATERIALS

A. Topsoil: As specified in Section 32 05 13

59.3 SOIL AMENDMENT MATERIALS

A. When soil tests indicate soil amendment, apply soil conditioners or fertilizers to amend soil to specified conditions.
   1. Tree Fertilizer: Containing fifty percent of elements derived from organic sources; of proportion necessary to eliminate deficiencies of topsoil as indicated in analysis.

B. 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.

C. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.

D. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

E. Water: Clean, fresh, and free of substances or matter capable of inhibiting vigorous growth of plants.

F. Herbicide: As Needed.

G. Pesticide: As Needed.

59.4 MULCH MATERIALS

A. Mulching Material: Composted, shredded hardwood bark, dark brown in color.

59.5 ACCESSORIES

A. Wrapping Materials: Burlap.

B. Stakes: Softwood lumber, pointed end.

C. Cable, Wire, Eye Bolts: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

D. Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches.

E. Decorative Cover: Smooth gravel] 1inch minimum and 3 inch maximum size.

F. Membrane: 20 mil thick, black polyethylene.

G. Wrapping: Waterproof fabric

H. Tree Protectors: Plastic with galvanized rings.

59.6 PLANT SOIL MIX

A. Plant Soil Mix: Uniform mixture of 1 part peat and 3 parts topsoil by volume.

59.7 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Test and analyze [imported] [existing] topsoil.

C. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt and organic matter; and pH value.

D. Provide recommendation for fertilizer and soil amendment application rates for specified planting as result of testing.

E. 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.

PART 60 EXECUTION

60.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify prepared subsoil and planters are ready to receive work.

C. Saturate soil with water to test drainage.

D. Verify required underground utilities are available, in proper location, and ready for use.

60.2 PREPARATION OF SUBSOIL

A. Prepare subsoil to eliminate uneven areas. Maintain 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 subsoil.

C. 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.

D. Dig pits and beds three times wider than plant root system.

60.3 PLACING TOPSOIL

A. Spread topsoil to minimum depth of 6 inches over area to be planted. Rake 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 topsoil into pits and beds intended for plant root balls, to minimum thickness of 6.

60.4 FERTILIZING

A. Apply starter fertilizer.

B. Apply after initial raking of topsoil.

C. Mix thoroughly into upper 2 inches of topsoil.

D. Lightly water soil to aid dissipation of fertilizer.

60.5 PLANTING

A. Place plants for best appearance for review and final orientation by Architect/Engineer.

B. Set plants vertical.

C. Remove non-biodegradable root containers.

D. 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.

E. Place bare root plant materials so roots lie in natural position. Backfill soil mixture in 6 inch layers. Maintain plant life in vertical position.

F. Saturate soil with water when pit or bed is half full of topsoil and again when full.

60.6 PLANT RELOCATION AND RE-PLANTING

A. Relocate plants as directed by Architect/Engineer.

B. Ball or pot removed plants when temporary relocation is required.

C. 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.

D. Place bare root plant materials so roots lie in natural position. Backfill soil mixture in 6 inch layers. Maintain plant materials in vertical position.

E. Saturate soil with water when pit or bed is half full of topsoil and again when full.

60.7 INSTALLATION OF ACCESSORIES

A. Place stone here indicated on Drawings

B. Wrap deciduous shade and flowering tree trunks and place tree protectors.

60.8 PLANT SUPPORT

A. 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

60.9 TREE PRUNING

A. When pruning trees is required, lightly prune trees in accordance with ANSI A300 Maintenance Pruning Type: Crown Cleaning.

60.10 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirement 01 70 00 - Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.

B. Plants will be rejected when ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

60.11 SCHEDULE

A. Plant Schedule:

See Civil Drawings for Plant Schedule.

END OF SECTION

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SECTION 33 05 13

MANHOLES AND STRUCTURES

PART 61 GENERAL

61.1 SUMMARY

A. Section Includes:
1. Monolithic concrete manholes and structures with masonry transition to cover frame, covers, anchorage, and accessories.
2. Modular precast concrete manhole and structures with tongue-and-groove joints with masonry transition to cover frame, covers, anchorage, and accessories.
3. Monolithic FRP manholes and structures with transition to cover frame, covers, anchorage, and accessories.
4. Masonry manholes and structures with masonry transition to cover frame, covers, anchorage, and accessories.
5. Bedding and cover materials.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork: Soil for backfill in trenches.
2. Section 31 05 16 - Aggregates for Earthwork: Aggregate for backfill in trenches.
3. Section 31 23 16 - Excavation: Excavating for manholes and structures.
4. Section 31 23 23 - Fill: Backfilling after manhole and structure installation.
5. Section 33 05 16 - Utility Structures.
6. Section 33 71 19 - Electrical Underground Ducts and Manholes.

61.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Manhole:
1. Basis of Measurement: By each unit.
2. Basis of Payment: Includes excavating, concrete base pad, concrete manhole sections, cover frame and cover, to indicated depth, and forming and sealing pipe inlets and outlets.

61.3 REFERENCES

A. American Concrete Institute:
1. ACI 318 - Building Code Requirements for Structural Concrete.
2. ACI 530/530.1 - Building Code Requirements for Masonry Structures and Specifications for Masonry Structures.

B. ASTM International:
1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A536 - Standard Specification for Ductile Iron Castings.
4. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

5. ASTM C55 - Standard Specification for Concrete Brick.
6. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
7. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
8. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
9. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
10. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
11. ASTM D3753 - Standard Specification for Glass-Fiber-Reinforced Polyester Manholes.

61.4 DESIGN REQUIREMENTS

A. Equivalent Strength: Based on structural design of reinforced concrete as outlined in ACI 318.

B. Design of Lifting Devices for Precast Components: In accordance with ASTM C913.

C. Design of Joints for Precast Components: In accordance with ASTM C913; maximum leakage of 0.025 gallons per hour per foot of joint at 3 feet of head.

61.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate manhole locations, elevations, piping and sizes and elevations of penetrations.

C. Product Data: Submit cover and frame construction, features, configuration and dimensions.

61.6 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 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.

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 the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications*, latest editions.

61.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

61.9 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Comply with precast concrete manufacturer's instructions for unloading, storing and moving precast manholes.

C. Store precast concrete manholes to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.

D. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

61.10 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Cold Weather Requirements: ACI 530.

PART 62 PRODUCTS

62.1 MANHOLES

A. Manholes must be constructed 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.

62.2 FRAMES AND COVERS

A. Frames and covers must be constructed 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.

62.3 COMPONENTS

A. Manhole components must be constructed 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.

62.4 CONFIGURATION

A. Manhole dimensions and configurations must be constructed 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.

62.5 BEDDING AND COVER MATERIALS

A. Manhole bedding and cover materials must be constructed 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.

PART 63 EXECUTION

63.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify items provided by other sections of Work are properly sized and located.

C. Verify built-in items are in proper location, and ready for roughing into Work.

D. Verify correct size of manhole excavation.

63.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

B. Do not install structures where site conditions induce loads exceeding structural capacity of structures.

C. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

63.3 INSTALLATION

A. Excavation and Backfill:
   1. Excavate for manholes [and structures] in accordance with Section 31 23 16 in location and to depth shown. Provide clearance around sidewalls of structure for construction operations.
   2. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes [and structures] in dry trench.
   3. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor structure to avoid flotation.

B. Place base pad, trowel top surface level.

C. Install manholes supported at proper grade and alignment on crushed stone bedding as shown on Drawings.

D. Backfill excavations for manholes in accordance with Section 31 23 16 and Section 31 23 23.

E. Form and place manhole cylinder plumb and level, to correct dimensions and elevations.

F. Cut and fit for pipe.

G. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour to form continuous drainage channel as indicated on Drawings.

H. Set cover frames and covers level without tipping, to correct elevations.

I. Coordinate with other sections of Work to provide correct size, shape, and location.

63.4 FRAME AND COVER INSTALLATION

A. Set frames using mortar and masonry. Install radially laid concrete brick with 1/4 inch thick vertical joints at inside perimeter. Lay concrete brick in full bed of mortar and completely fill joints. Where more than one course of concrete brick is required, stagger vertical joints.

B. Set frame and cover 2 inches above finished grade for manholes [and structures] with covers located within unpaved areas to allow area to be graded away from cover beginning 1 inch below top surface of frame.

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. Test cast-in-place concrete in accordance with Section 03 30 00.

C. Vertical Adjustment of Existing Manholes:
   1. Where required, adjust top elevation of existing manholes to finished grades shown on Drawings.

2. Reset existing frames, grates and covers, carefully removed, cleaned of mortar fragments, to required elevation in accordance with requirements specified for installation of castings.
3. Remove concrete without damaging existing vertical reinforcing bars when removal of existing concrete wall is required. Clean vertical bars of concrete and bend into new concrete top slab or splice to required vertical reinforcement, as indicated Drawings.

D. Clean and apply sand-cement bonding compound on existing concrete surfaces to receive cast-in-place concrete in accordance with Section 03 30 00.

END OF SECTION

SECTION 33 05 16

UTILITY STRUCTURES

PART 64 GENERAL

64.1 SUMMARY

A. Section includes precast concrete utility structures:
1. Drainage system catch basins.
2. Drainage system inlets.
3. Drainage system junction boxes.
4. Drainage system sedimentation chambers.
5. Drainage system retention/diversion structures.
6. Sanitary sewer lift station pits.
7. Sanitary sewer lift station valve chambers.
8. Sanitary drain field dosing chambers.
9. Knock out boxes.
10. Single cell and multiple cell box culverts.
11. Oil water separators.
12. Grease interceptors.
13. Acid retention basins.
14. Triturator pits.
15. Irrigation well pits.
16. Valve pits.
17. End walls.
18. Pipe ends.
19. Frames and covers.
20. Access hatches.

B. Related Sections:
1. Section 31 23 16 - Excavation: Excavating for structures and foundation slabs.
2. Section 31 23 23 - Fill: Backfilling after structure installation.
3. Section 33 31 00 - Sanitary Utility Sewerage Piping: Piping connections to structures.
4. Section 33 31 13 - Public Sanitary Utility Sewerage Piping: Piping connections to structures.
5. Section 33 41 00 - Storm Utility Drainage Piping: Piping connections to structures.
6. Section 33 41 13 - Public Storm Utility Drainage Piping: Piping connections to structures.
7. Section 33 42 13 - Pipe Culverts.
8. Section 33 71 19 - Electrical Underground Ducts and Manholes: Electrical and communications utility structures.

64.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Precast Concrete Utility Structures:
   1. Basis of Measurement: By each complete structure.
   2. Basis of Payment: Includes excavating, concrete foundation slab, concrete structure sections, cover frame and cover, to indicated depth, forming and sealing pipe inlets and outlets.

64.3 REFERENCES

A. American Association of State Highway Transportation Officials:
   1. AASHTO M306 - Drainage Structure Castings.
   2. AASHTO S99-HB - Standard Specifications for Highway Bridges.

B. American Concrete Institute:
   1. ACI 318 - Building Code Requirements for Structural Concrete.
   2. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
   3. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete.

C. ASTM International:
   1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
   2. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
   3. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
   4. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   5. ASTM A185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
   6. ASTM A496 - Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
   7. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
   8. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   9. ASTM A706/A706M - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
   10. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
   11. ASTM A775/A775M - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
   12. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.
   13. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.
   14. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   15. ASTM C33 - Standard Specification for Concrete Aggregates.
   16. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

17. ASTM C138 - Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete.
18. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
19. ASTM C150 - Standard Specification for Portland Cement.
20. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
21. ASTM C192/C192M - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
22. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
23. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
24. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
25. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
26. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
27. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
28. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
29. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
30. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Section Precast Concrete Water and Wastewater Structures.
31. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
32. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
33. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
34. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
35. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
36. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
37. ASTM C1244 - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.
38. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
39. ASTM C1433 - Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers.
40. ASTM C1504 - Standard Specification for Manufacture of Precast Reinforced Concrete Three-Sided Structures for Culverts, Storm Drains, and Sewers.

D. American Welding Society:
   1. AWS D1.1 - Structural Welding Code - Steel.
   2. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

E. Federal Aviation Administration:
   1. FAA AC 150/5320-6 - Airport Pavement Design and Evaluation.
   2. FAA AC 150/5370-10A - Standards for Specifying Construction for Airports.

F. National Precast Concrete Association:
   1. NPCA Quality Control Manual for Precast Plants.
   2. NPCA Plant Certification Program.

G. SSPC: The Society for Protective Coatings:
   1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).

64.4 DESIGN REQUIREMENTS

A. Design structures for minimum loads in accordance with ASTM C857 and ASTM C890.
   1. Roof Live Load: Comply with the following loading conditions, including impact load.
      a. Heavy Traffic: ASTM C857; AASHTO S99-HB; HS20-44, maximum 16,000 lb each wheel.
      b. Medium Traffic: ASTM C857; A-12, AASHTO S99-HB; HS15-44, maximum 12,000 lb each wheel.
      c. Light Traffic: ASTM C857; A-8, AASHTO S99-HB; HS10, maximum 8,000 lb each wheel.
      d. Walkway Traffic: ASTM C857; A-0.3, maximum 300 psf.
   2. Dead Loads: Actual weight of materials producing static load.

64.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:
   1. Indicate structure locations, elevations, sections, piping, sizes and elevations of penetrations.
   2. Indicate design, construction and installation details, typical reinforcement and additional reinforcement at openings.

C. Product Data:
   1. Submit data for frames and covers, steps, component construction, features, configuration, and dimensions.

D. Design Data:
   1. Submit concrete mix design for each different mix.

E. Manufacturer’s Certificate: Certify all Products meet or exceed specified requirements.

64.6 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 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.

64.7 QUALITY ASSURANCE

A. Obtain precast concrete utility structures from single source.

B. Perform structural design in accordance with ACI 318.

C. Perform Work in accordance with NPCA Quality Control Manual for Precast Plants.

D. Conform to the following for material and fabrication requirements:
1. Single Cell Box Culverts: ASTM C1433.
2. Three Sided Structures: ASTM C1504.
3. Other Structures: ASTM C913.

E. Perform welding in accordance with the following:
1. Structural Steel: AWS D1.1.
2. Reinforcing Steel: AWS D1.4.

F. 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.

G. 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.

64.8 QUALIFICATIONS

A. Manufacturer: Certified by NPCA Plant Certification Program prior to and during Work of this section.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

C. Welders: AWS qualified within previous 12 months.

64.9 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Comply with precast concrete manufacturer's instructions for unloading, storing and moving precast structures. Lift structures from designated lifting points.

C. Do not deliver products until concrete has cured 5 days or attained minimum 75 percent of specified 28 day compressive strength.

D. Store precast concrete structures to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.

E. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

PART 65 PRODUCTS

65.1 PRECAST CONCRETE UTILITY STRUCTURES

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. Precast Concrete Utility Structures: Reinforced precast concrete.

C. Foundation Slab: Cast-in-place or Precast concrete of type specified in Section 03 30 00, leveled top surface.

65.2 CONCRETE MATERIALS

A. Cement: ASTM C150, Portland type.

B. Fine and Coarse Aggregates: ASTM C33, except gradation requirements do not apply.

C. Water: Clean and not detrimental to concrete.

65.3 ADMIXTURES

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. Air Entrainment: ASTM C260.

C. Chemical Admixtures: ASTM C494/C494M.

65.4 CONCRETE REINFORCEMENT

1. All reinforcement wire mesh and rebar must be in compliance with and installed 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.

65.5 FRAMES AND COVERS

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.

65.6 ACCESS HATCHES

1. 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.

65.7 ACCESSORIES

A. All joint materials, steps, membrane curing compound and other necessary appurtenances must conform with the NCDOT *Standard Specifications for Roads and Structures* and its subsequent revisions & additions entitled, *Supplemental Specifications* and *Roadway English Standard Drawings*, latest editions.

65.8 CONCRETE MIX

A. Select proportions for normal weight concrete in accordance with ACI 318 and ACI 211.1.

B. Provide concrete to the following criteria:
   1. Compressive Strength: 4,000 psi at 28 days.
   2. Water Cement Ratio:
      a. Concrete Exposed to Freezing and Thawing: Maximum 0.45 percent by mass.
      b. Watertight Concrete Not Exposed to Freezing and Thawing: Maximum 0.45 percent by mass.
      c. Concrete Exposed to Corrosive Conditions: 0.40 percent by mass.
   3. Air Content:

Maximum Aggregate Size inches	Air Content, Percent	
	Severe Exposure	Moderate Exposure
3/8 inches	6.0 to 9.0	4.5 to 7.5
1/2 inches	5.5 to 8.5	4.7 to 7.0
3/4 inches	4.5 to 7.5	3.5 to 6.5

1 inches	4.5 to 7.5	3.0 to 6.0
1-1/2 inches	4.5 to 7.0	3.0 to 6.0

C. Admixtures: Include admixture types and quantities indicated in concrete mix designs approved through submittal process.
   1. Do not use calcium chloride.

65.9 FABRICATION

A. Fabricate precast concrete utility structures in accordance with ACI 318 and NPCA Quality Control Manual for Precast Plants.

B. Fabricate precast concrete utility structures to size, configuration and openings as indicated on Drawings.

C. Construct forms to provide uniform precast concrete units with consistent dimensions.

D. Clean forms after each use.

E. Install reinforcing by tying or welding to form rigid assemblies. Position reinforcing to maintain minimum 1/2-inch cover. Secure reinforcement to prevent displacement when placing concrete.

F. Position and secure embedded items to prevent displacement when placing concrete.

G. Deposit concrete in forms. Consolidate concrete without segregating aggregate.

H. Provide initial curing by retaining moisture using one of the following methods:
   1. Cover with polyethylene sheets.
   2. Cover with burlap or other absorptive material and keep continually moist.
   3. Apply curing compound in accordance with manufacturer's instructions.

I. Provide final curing in accordance with manufacturer's standard.

J. Remove forms without damaging concrete.

65.10 CONCRETE FINISHES

A. Formed Surfaces Not Exposed to View: As formed.

B. Unformed Surfaces: Finish with vibrating screed or hand float.
   1. Permitted: Color variations, minor indentations, chips, and spalls.
   2. Not Permitted: Major imperfections, honeycomb, or other defects.

65.11 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection and analysis requirements.

B. Perform the following tests for each 150 cy of concrete placed, with minimum one set of tests each week.

1. Slump: ASTM C143/C143M.
2. Compressive Strength: [[ASTM C31/C31M] [ASTM C192/C192M]] and ASTM C39/C39M.
3. Air Content: ASTM C231 or ASTM C173.
4. Unit Weight: ASTM C138.

C. Visually inspect completed precast structures for defects.
1. Repair defects affecting exposed to view surfaces to achieve uniform appearance.
2. Repair honeycomb by removing loose material and applying grout to produce smooth surface flush with adjacent surface.
3. Repair major defects only when permitted by Architect.

D. Make test results available to Architect Engineer upon request.

65.12 FINISHING - STEEL

A. Galvanizing: ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.

PART 66 EXECUTION

66.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify items provided by other sections of Work are properly sized and located.

C. Verify correct size and elevation of excavation.

D. Verify subgrade [and bedding] is properly prepared, [compacted] and ready to receive Work of this section.

66.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

B. Do not install structures where site conditions induce loads exceeding structural capacity of structures.

C. Inspect precast concrete structures immediately prior to placement in excavation to verify are internally clean and free from damage. Remove and replace damaged units.

66.3 INSTALLATION

A. Install underground precast utility structures in accordance with ASTM C891.

B. Lift precast concrete structures at lifting points designated by manufacturer.

C. When lowering structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and structure remains clean.

D. Install cast-in-place concrete foundation slab in accordance with Section 03 30 00, trowel top surface level.

E. Install precast concrete utility structures to elevation and alignment indicated on Drawings.

F. Assemble multi-section structures by lowering each section into excavation.
   1. Clean joint surfaces.
   2. Install watertight joint seals in accordance with manufacturer's instructions.

G. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with grout.

H. Connect pipe to structure and seal watertight. Cut pipe flush with interior of structure.

I. Grout base to achieve slope to exit piping. Trowel smooth. Contour as indicated on Drawings.

J. Paint interior with 2 coats of bituminous interior coating at rate of 120 square feet per gallon for each coat.

K. Set frame and cover and access hatch level without tipping, to elevations indicated on Drawings.
   1. Set cover and access hatch 2 inches above finished grade for structures located within unpaved areas to allow area to be graded away from cover beginning 1-inch below top surface of frame.
   2. Connect drain from access hatch frame to storm drainage system.

L. Touch up damaged galvanized coatings.

Backfill excavations for structures in accordance with Section 31 23 23.

M. 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

66.4 FIELD QUALITY CONTROL

A. Section [01 40 00 - Quality Requirements] [01 70 00 - Execution and Closeout Requirements]: Field inspecting, testing, adjusting, and balancing.

66.5 PERFORM EXFILTRATION TEST IN ACCORDANCE WITH SECTION 33 01 32.

END OF SECTION

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SECTION 33 05 17

PRECAST CONCRETE VALVE VAULTS AND METER BOXES

PART 67 GENERAL

67.1 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.

67.2 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.

67.3 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/ft3 (600 kN-m/m3)).
15. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
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)

67.4 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.

67.5 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.

67.6 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

67.7 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.

67.8 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.

67.9 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.

67.10 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.

67.11 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.

67.12 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate work with Local government's utilities within construction area.

PART 68 PRODUCTS

68.1 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.

68.2 BEDDING MATERIALS

A. Aggregate Bedding Material: As specified in Section 31 05 16.

68.3 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 69 EXECUTION

69.1 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.

69.2 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.

69.3 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.

69.4 CONNECTING PIPING

A. Connect piping.

69.5 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.

69.6 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.

END OF SECTION

SECTION 33 12 00

WATER UTILITY DISTRIBUTION EQUIPMENT

PART 70 GENERAL

70.1 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.

70.2 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.

70.3 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] [_____].

70.4 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.

70.5 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.

70.6 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..

70.7 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.

70.8 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.

70.9 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.

70.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

70.11 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five year manufacturer’s warranty for backflow preventer assemblies.

70.12 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 71 PRODUCTS

71.1 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.

71.2 VALVE VAULT

A. Valve Vault: Precast concrete, as specified in Section 33 05 17.

71.3 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.

71.4 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.

71.5 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.

71.6 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.

71.7 ACCESSORIES

A. Underground Pipe Markers: Trace wire.

PART 72 EXECUTION

72.1 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.

72.2 PREPARATION

A. Remove scale and dirt, on inside and outside, before assembly.

72.3 INSTALLATION - VALVE VAULT

A. Refer to Section 33 05 17.

72.4 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.]

72.5 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-feet 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.

72.6 INSTALLATION - INTERIOR PIPING SYSTEMS

A. Install Work in accordance with Local government Standards.

72.7 INSTALLATION - BACKFLOW PREVENTER ASSEMBLIES

A. Install Work in accordance with Local government Standards.

72.8 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.

72.9 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 73 GENERAL

73.1 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

73.2 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.

73.3 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/ft3 (600 kN-m/m3)).
   6. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   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.

73.4 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.

73.5 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.

73.6 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.

73.7 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.

73.8 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 74 PRODUCTS

74.1 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].

74.2 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.

74.3 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.

74.4 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.

74.5 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.

74.6 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.

74.7 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”.

74.8 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.

74.9 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.

74.10 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 75 EXECUTION

75.1 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.

75.2 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.

75.3 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.

75.4 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.

75.5 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.

75.6 INSTALLATION - CURB STOP ASSEMBLY

A. Set curb stops on compacted soil.

B. Install Work in accordance with Local government Standards.

75.7 INSTALLATION - WATER METERS

A. Install Work in accordance with Local government Standards.

75.8 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.

75.9 SERVICE CONNECTIONS

A. Install Work in accordance with Local government Standards.

75.10 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.

75.11 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 33 13 00.

75.12 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

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SECTION 33 12 16

WATER UTILITY DISTRIBUTION VALVES

PART 76 GENERAL

76.1 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.

76.2 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.

76.3 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

76.4 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.

76.5 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.

76.6 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.

76.7 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.

76.8 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.

76.9 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.

76.10 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.

76.11 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.

76.12 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate work with the Local Government.

C.

76.13 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 77 PRODUCTS

77.1 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.

77.2 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.

77.3 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".

77.4 ACCESSORIES

A. Concrete for Thrust Restraints: 3,000 PSI Concrete @ 28 Days

PART 78 EXECUTION

78.1 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.

78.2 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.

78.3 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.

78.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 33 13 00.

78.5 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 79 GENERAL

79.1 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.

79.2 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.

79.3 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

79.4 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.

79.5 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.

79.6 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.

79.7 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.

79.8 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.

79.9 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.

79.10 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.

79.11 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.

79.12 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 80 PRODUCTS

80.1 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.

80.2 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 81 EXECUTION

81.1 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.

81.2 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.

81.3 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.

81.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 33 13 00.

81.5 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

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SECTION 33 13 00

DISINFECTING OF WATER UTILITY DISTRIBUTION

PART 82 GENERAL

82.1 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.

82.2 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.

82.3 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.

82.4 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.

82.5 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.

82.6 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C651 and in accordance with Local government Standards.

82.7 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 83 PRODUCTS

83.1 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 84 EXECUTION

84.1 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.

84.2 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.

84.3 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

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SECTION 33 31 00

SANITARY UTILITY SEWERAGE PIPING

PART 85 GENERAL

85.1 SUMMARY

A. Section Includes:
1. Sanitary sewage pipe.
2. Underground pipe markers.
3. Manholes.
4. Bedding and cover materials.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: Concrete type for manhole base pad construction.
2. Section 22 13 00 - Facility Sanitary Sewerage: Product and execution requirements for sanitary waste and vent piping at building.
3. Section 31 05 13 - Soils for Earthwork: Soils for backfill in trenches.
4. Section 31 05 16 - Aggregates for Earthwork: Aggregate for backfill in trenches.
5. Section 31 23 16 - Excavation: Product and execution requirements for excavation and backfill required by this section.
6. Section 31 23 17 - Trenching: Execution requirements for trenching required by this section.
7. Section 31 23 23 - Fill: Requirements for backfill to be placed by this section.

85.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Pipe and Fittings:
1. Basis of Measurement: By the linear foot.
2. Basis of Payment: Includes hand trimming excavation, bedding, pipe and fittings, connection to building service piping and to municipal sewer.

B. Cleanout:
1. Basis of Measurement: By the linear foot for nominal depth of 2 feet.
2. Basis of Payment: Includes hand trimming excavating, foundation pad, unit installation with accessories, connection to sewer piping.

85.3 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 A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
2. ASTM A746 - Standard Specification for Ductile Iron Gravity Sewer Pipe.

3. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
4. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
5. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
6. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
7. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
8. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
9. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
10. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
11. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
12. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
13. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
14. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
15. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
16. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
17. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
18. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
19. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
20. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

85.4 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

85.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data indicating pipe material and accessories used.

C. Manufacturer’s Installation Instructions: Indicate special procedures required to install Products specified.

D. Manufacturer’s Certificate: Certify Products meet or exceed specified requirements.

85.6 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 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.

85.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

85.8 QUALITY ASSURANCE

A. Sustainable Design Requirements:
   1. Recycled Content Materials: Furnish materials with recycled content [including:] [.]

B. Perform Work in accordance with Local government Standards.

85.9 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.

85.10 FIELD MEASUREMENTS

A. Verify field measurements and elevations are as shown on Drawings.

85.11 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate the Work with termination of sanitary sewer connection outside building, connection to municipal sewer utility service and trenching.

PART 86 PRODUCTS

86.1 SANITARY SEWAGE PIPE

A. Ductile Iron Pipe and Polyvinyl Chloride pipe must conform to Local government Standards in construction quality and installation

86.2 UNDERGROUND PIPE MARKERS

A. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Sewer" in large letters.

86.3 MANHOLES

A. Manholes to be constructed in accordance with NCDOT and Local government Standards..

86.4 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: Soil, as specified in Section 31 05 13. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

PART 87 EXECUTION

87.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify [trench cut] [excavation base] is ready to receive work and excavations, dimensions, and elevations are as indicated on [layout] drawings.

87.2 PREPARATION

A. Correct over excavation with coarse aggregate.

B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

87.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 23 17.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

87.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

B. Lay pipe to slope gradients noted on [layout] drawings; with maximum variation from indicated slope of 1/8-inch in 10 feet.

C. Install bedding at sides and over top of pipe to minimum compacted thickness of 12 inches.

D. Refer to Section 31 23 17 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

E. Connect to building sanitary sewer outlet and municipal sewer system.

F. 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.

G. Install site sanitary sewage system piping to 5 feet of building. Connect to building sanitary waste system.

H. Install Work in accordance with Local government Standards.

87.5 INSTALLATION - MANHOLES

A. Install Work in accordance with Local government Standards.

87.6 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 test on site sanitary sewage system in accordance with Local government Standards.

C. Compaction Testing: In accordance with AASHTO T180.

D. When tests indicate Work does not meet specified requirements, remove work, replace and retest.

87.7 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 33 41 00

STORM UTILITY DRAINAGE PIPING

PART 88 GENERAL

88.1 SUMMARY

A. Section Includes:
1. Storm drainage piping.
2. Accessories.
3. Underground pipe markers.
4. Catch basins and plant area drains.
5. Cleanouts.
6. Bedding and cover materials.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: Concrete type for [catch basin] [cleanout] base pad construction.
2. Section 04 05 03 - Masonry Mortaring and Grouting: Mortar and grout.
3. Section 22 14 00 - Facility Storm Drainage: Product and execution requirements for storm drainage piping within 5 feet (1500 mm) of building.
4. Section 31 05 13 - Soils for Earthwork: Soils for backfill in trenches.
5. Section 31 05 16 - Aggregates for Earthwork: Aggregate for backfill in trenches.
6. Section 31 23 16 - Excavation: Product and execution requirements for excavation and backfill required by this section.
7. Section 31 23 17 - Trenching: Execution requirements for trenching required by this section.
8. Section 31 23 23 - Fill: Requirements for backfill to be placed by this section.
9. Section 33 05 13 - Manholes and Structures.
10. Section 33 46 00 - Subdrainage: Termination of subdrainage tile system for connection to Work of this Section.

88.2 UNIT PRICE - BASIS OF MEASUREMENT

A. Pipe and Fittings:
1. Basis of Measurement: By the linear foot.
2. Basis of Payment: Includes excavating, bedding, pipe and fittings, granular cover, connecting to building service piping and to municipal sewer.

B. Catch Basin and Cleanout:
1. Basis of Measurement: By each unit for a nominal depth of four feet.
2. Basis of Payment: Includes excavating, bedding, foundation pad, unit installation with accessories, connecting to sewer piping.

88.3 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 A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
2. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
3. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
4. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
5. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
6. ASTM C924 - Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
7. ASTM C969 - Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
8. ASTM C1103 - Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
9. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
10. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
11. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
12. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
13. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
14. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
15. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
16. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
17. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
18. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
19. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
20. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

88.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data indicating pipe and pipe accessories.

C. Manufacturer's Installation Instructions: Submit special procedures required to install Products specified.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

88.5 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.
   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.

88.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents:
1. Accurately record actual locations of pipe runs, connections, catch basins, cleanouts, and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

88.7 QUALITY ASSURANCE

A. Sustainable Design Requirements:
1. Recycled Content Materials: Furnish materials with recycled content.

B. Perform Work in accordance with Local government Standard.

88.8 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.

88.9 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate the Work with termination of storm sewer connection outside building, trenching, connection to foundation drainage system, and municipal sewer utility service.

PART 89 PRODUCTS

89.1 STORM DRAINAGE PIPING

A. Reinforced Concrete Pipe: ASTM C76.
   1. Fittings: Reinforced concrete.
   2. Joints: ASTM C443, rubber compression gasket.

89.2 ACCESSORIES

A. Filter Fabric: Non-biodegradable, non-woven.

B. Grout: Specified in Section 03 30 00 and Section 04 05 03.

89.3 UNDERGROUND PIPE MARKERS

A. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Storm Sewer Service” in large letters.

89.4 CATCH BASINS AND PLANT AREA DRAINS

A. Catch Basin Lid and Frame:
   1. Construction: Cast iron construction, hinged lid.
   2. Lid Design: Linear grill.
   3. Nominal Lid and Frame Size: 24 x 36 inch.

B. Shaft Construction and Cone Top Section: Reinforced precast concrete pipe sections, lipped male/female joints.

C. Base Pad: Cast-in-place concrete of type specified in Section 03 30 00.

89.5 CLEANOUTS

A. Cleanout Lid and Frame:
   1. Construction: Cast iron construction, hinged lid.
   2. Lid Design: Linear grill.

B. Shaft Construction and Cone Top Section: Reinforced precast Concrete pipe sections, lipped male/female joints.

C. Base Pad: Cast-in-place concrete of type specified in Section 03 30 00.

89.6 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: Soil, as specified in Section 31 05 13. Subsoil with no rocks over 6 inches in diameter, frozen earth or foreign matter.

PART 90 EXECUTION

90.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify trench cut excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

90.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with coarse aggregate.

B. Remove large stones or other hard matter, which could damage piping or impede consistent backfilling or compaction.

90.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 23 17 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

90.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

B. Lay pipe to slope gradients noted on drawings with maximum variation from indicated slope of 1/8 inch in 10 feet.

C. Install aggregate at sides and over top of pipe. Install top cover to minimum compacted thickness of 12 inches, compact to 95 percent.

D. Refer to Section 31 23 23 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

E. Refer to Section 33 05 13 for manhole requirements.

F. Connect to municipal storm sewer outlets through installed sleeves.

G. Install trace wire continuous over top of pipe buried 6 inches below finish grade coordinate with Section 31 23 23

H. Connect to subdrainage tile system piping. Refer to Section 33 46 00.

I. Install Work in accordance with Local government Standards.

90.5 INSTALLATION - CATCH BASINS AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place Cast-In-Place Concrete base pad, with provision for storm sewer pipe end sections.

C. Level top surface of base pad; sleeve concrete shaft sections to receive storm sewer pipe sections.

D. Establish elevations and pipe inverts for inlets and outlets as indicated on Drawings.

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

90.6 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 prior to [and immediately after] placing aggregate cover over pipe.

C. Compaction Testing: In accordance with AASHTO T180.

D. When tests indicate work does not meet specified requirements, remove work, replace and retest.

90.7 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
   1. Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.

C. Repair or replace pipe that is damaged or displaced from construction operations.

END OF SECTION

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SECTION 33 42 13

PIPE CULVERTS

PART 91 GENERAL

91.1 SUMMARY

A. Section Includes:
1. Corrugated steel pipe culvert.
2. Concrete pipe culvert.
3. Joints and accessories.
4. Bedding.
5. Slope protection at pipe end.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: Concrete grout fill to adjacent construction.
2. Section 31 05 16 - Aggregates for Earthwork.
3. Section 31 23 17 – Trenching
4. Section 31 23 16 - Excavation: Excavating for culvert piping.
5. Section 31 32 14 - Cement Soil Stabilization.
6. Section 31 32 15 - Lime Soil Stabilization.
7. Section 31 37 00 - Riprap.

91.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Pipe Culvert:
1. Basis of Measurement: By linear foot and diameter in inches.
2. Basis of Payment: Includes hand trimming excavating; removing soft subsoil, bedding fill, compacting; pipe, fittings and accessories assembled; repair of damaged coating.

91.3 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO M294 - Specification for Corrugated Polyethylene Pipe, 305- to 915-mm (12- to 36-In.) Diameter.
2. AASHTO T99 - Standard Specification for the Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 in.) Drop.
3. 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 A929/A929M - Standard Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe.
2. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.

3. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
4. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
5. ASTM C506 - Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe.
6. ASTM C507 - Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe.
7. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
8. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft3 (2,700 kN-m/m3)).
9. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
10. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

91.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on pipe, fittings and accessories.

C. Manufacturer’s Installation Instructions: Submit special procedures required to install Products specified.

91.5 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.
      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.

91.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents:
   1. Accurately record actual locations of pipe runs, connections, and invert elevations.
   2. [Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.]

C. Operation and Maintenance Data: Procedures for submittals.

91.7 QUALITY ASSURANCE

A. Sustainable Design Requirements:
   1. Recycled Content Materials: Furnish materials with recycled content [including:] [.]
   2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site [including:] [.]

B. Perform Work in accordance with [[State] [Municipality] of [_____] [Highways] [Public Work's] standard.]

91.8 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene one week prior to commencing Work of this section.

PART 92 PRODUCTS

92.1 CONCRETE CULVERT PIPE

A. Reinforced Circular Concrete Pipe: ASTM C76.
   1. Bell and spigot end joints:
   2. Shape: Circular.

B. Reinforced Concrete Pipe Joint Device: ASTM C443, rubber compression gasket joint.

92.2 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 05 16.

B. Cover: As specified in Section 31 05 16.

92.3 ACCESSORIES

A. Geotextile Fabric: Non-biodegradable, non-woven.

B. Fill at Pipe Ends: Concrete grout fill as specified in Section 03 30 00.

C. End of Culvert Gratings

PART 93 EXECUTION

93.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify trench cut excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

93.2 PREPARATION

A. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

93.3 EXCAVATION AND BEDDING

A. Excavate culvert trench to 12 inches below pipe invert, for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

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. Maintain optimum moisture content of bedding material to attain required compaction density.

D. Place filter fabric over compacted bedding.

93.4 INSTALLATION - PIPE

A. Lift or roll pipe into position. Do not drop or drag pipe over prepared bedding.

B. Shore pipe to required position; retain in place until after compaction of adjacent fills. Ensure pipe remains in correct position and to required slope.

C. Repair surface damage to pipe protective coating with two coats of compatible bituminous paint coating.

D. Install cover at sides [and over top of pipe]. [Install top cover to minimum compacted thickness of 12 inches.

E. Maintain optimum moisture content of bedding material to attain required compaction density.

F. Place filter fabric over compacted cover.

G. Install culvert end gratings.

H. Refer to Section 31 23 23 and Section 31 23 17 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

93.5 PIPE ENDS

A. Place fill at pipe ends, as indicated on Drawings.

93.6 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Lay pipe to alignment and slope gradients noted on [Drawings]; with maximum variation from indicated slope of 1/8 inch in 10 feet.

C. Maximum Variation From Intended Elevation of Culvert Invert: ½ inch.

D. Maximum Offset of Pipe From Indicated Alignment: 1 inch.

E. Maximum Variation in Profile of Structure From Intended Position: 1 percent.

93.7 FIELD QUALITY CONTROL

A. Section [01 40 00 - Quality Requirements] [01 70 00 - Execution and Closeout Requirements]: Field inspecting, testing, adjusting, and balancing.

B. Request inspection prior to [and immediately after] placing aggregate cover over pipe.

C. Compaction Testing: In accordance with AASHTO T99 and AASHTO T180.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

93.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Protect pipe and bedding from damage or displacement until backfilling operation is in progress.

END OF SECTION

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SECTION 33 46 00

SUBDRAINAGE

PART 94 GENERAL

94.1 SUMMARY

A. Section Includes:
   1. Building perimeter drainage system.
   2. Retaining wall drainage system.
   3. Slab-on-grade drainage system.
   4. Filter aggregate and fabric.
   5. Bedding.

B. Related Sections:
   1. Section 05 50 00 - Metal Fabrications: Access covers and frames to cleanouts in weep drainage system.
   2. Section 22 40 00 - Plumbing Fixtures.
   3. Section 31 05 13 - Soils for Earthwork.
   4. Section 31 05 16 - Aggregates for Earthwork.
   5. Section 31 23 16 - Excavation: Excavating for site subdrainage system piping and surrounding filter aggregate.
   6. Section 31 23 23 - Fill: Backfilling over filter aggregate, up to subgrade.
   7. Section 33 31 00 - Sanitary Utility Sewerage Piping: Effluent discharge.
   8. Section 33 41 00 - Storm Utility Drainage Piping: Connection to weep drainage system.

94.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Pipe and Fittings:
   1. Basis of Measurement: By linear foot.
   2. Basis of Payment: Includes hand trimming excavating, bedding, pipe and fittings, filter aggregate, filter fabric, connecting to municipal storm sewer.

94.3 REFERENCES

A. ASTM International:
   1. ASTM C412 - Standard Specification for Concrete Drain Tile.
   2. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

94.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate dimensions, layout of piping, high and low points of pipe inverts, and gradient of slope between corners and intersections.

C. Product Data: Submit data on pipe drainage products and pipe accessories.

D. Manufacturer’s Certificate: Certify Products meet or exceed specified requirements.

94.5 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.
      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.

94.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record location of pipe runs, connections, cleanouts and principal invert elevations.

C. Operation and Maintenance Data: Procedures for submittals.

94.7 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.

PART 95 PRODUCTS

95.1 PIPE MATERIALS

A. Furnish materials in accordance with Local government Standards.

B. Polyvinyl Chloride Pipe: ASTM D2729; plain end; with required fittings.

C. Corrugated Plastic Tubing: Flexible type; with required fittings.

D. Use perforated pipe at subdrainage system; unperforated through sleeved walls.

95.2 AGGREGATE AND BEDDING

A. Filter Aggregate and Bedding Materials: As specified in Section 31 05 16.

****** [OR] ******

B. Filter Sand and Bedding Materials: As specified in Section 31 05 16.

95.3 ACCESSORIES

A. Pipe Coupling: Solid plastic.

B. Filter Fabric: Water pervious type, black polyolefin or polyester or reasonable substitute.

C. Pipe Sleeve: Steel type for foundation wall.

PART 96 EXECUTION

96.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify trench cut excavated base is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

96.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with coarse aggregate.

B. Remove large stones or other hard matter which could damage drainage piping or impede consistent backfilling or compaction.

96.3 INSTALLATION

A. Place drainage pipe on clean cut subsoil.

B. Lay pipe to slope gradients noted on Drawings with maximum variation from indicated slope of 1/8 inch in 10 feet.

C. Place pipe with perforations facing down. Mechanically join pipe ends.

D. Install pipe couplings.

E. Install aggregate at sides, over joints and top of pipe. Install top cover compacted thickness of 12 inches.

F. Place filter fabric over leveled top surface of aggregate cover prior to subsequent backfilling operations.

G. Place aggregate in maximum 4 inch lifts, consolidating each lift.

H. Refer to Section 31 23 23 for compaction requirements. Do not displace or damage pipe when compacting.

I. Place impervious fill over drainage pipe aggregate cover and compact.

J. Connect to storm sewer system with unperforated pipe through installed sleeves.

K. Coordinate the Work with connection to municipal sewer utility service and trenching.

96.4 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 inspection prior to and immediately after placing aggregate cover over pipe.

96.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation begins.

END OF SECTION