PROJECT MANUAL for:

Life First Ambulance District
Life First Ambulance Station

4585 State Route 98
Sulphur Springs, Ohio 44881

BIDDING

Date: 8/17/26

Prepared by:

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Public Notice

Sealed bids will be received by the Life First Ambulance District as provided in this notice for the New Ambulance Station Project. Questions may be directed to Stacey Sutherland, Fiscal Officer & HR Coordinator, at lifefirstambulancedistrict@gmail.com. Additionally, copies of the Contract Documents, which include additional details, are on file and available by contacting Stacey Sutherland, Fiscal Officer & HR Coordinator, at lifefirstambulancedistrict@gmail.com.

Bids shall be enclosed in a sealed envelope addressed to the Life First Ambulance District, ATTN Stacey Sutherland, Fiscal Officer & HR Coordinator, 4628 Liberty Street, Sulphur Springs, Ohio 44881, bearing the Bidder's name, address, and license number if applicable. Bids may be hand-delivered or mailed. If mailed, the sealed envelope containing the bid must be enclosed in an additional outer envelope addressed to Life First Ambulance District, P.O. Box 31, Sulphur Springs, Ohio 44881. Bids received by mail must be received by September 13, 2026. Bids received by hand delivery will be received until 2:00 p.m. local time September 14, 2026 and immediately after the deadline the bids will be opened and publicly read aloud at 4628 Liberty Street, Sulphur Springs, Ohio 44881. It is requested that Bidders who intend to hand deliver their bids call Stacey Sutherland, Fiscal Officer & HR Coordinator, at (419) 569-3619, in advance of their arrival at the address set forth above to ensure that a representative of the Ambulance District will be available to accept delivery of their sealed bid.

A pre-bid conference will be held on August 20, 2026, at 1:30 p.m. at 4628 Liberty Street, Sulphur Springs, Ohio 44881.

All bids must include a Bid Guaranty, as described in the Instructions to Bidders. Prevailing wage rates apply. No bidder may withdraw its bid within 60 days after the opening; the Board reserves the right to waive irregularities, reject any or all bids, and conduct necessary investigations to determine bidder responsibility.

This project is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act (IIJA), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's regulation (reference 2 CFR 200) on the application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

INFORMATION FOR BIDDERS

BIDS will be received by the Life First Ambulance District
(Name)

at 4628 Liberty Street, Sulphur Springs, Ohio 44881
(Address)

until 2:00 p.m., ET, on September 14, 20 26, and then at said office publicly
(Time & Time Zone)

publicly opened and read aloud.

Each BID must be submitted in a sealed envelope, addressed to

Life First Ambulance District, ATTN: Stacey Sutherland, Fiscal Officer & HR Coordinator
(Name) at

4628 Liberty Street, Sulphur Springs, Ohio 44881,
(Address)

for New Ambulance Station Project,
(Project Name)

bearing the BIDDER'S name, address, and license number if applicable. If the BID is forwarded by mail, the sealed envelope containing the BID must also be enclosed in an envelope addressed to the OWNER at

P.O. Box 31, Sulphur Springs, Ohio 44881.
(Address)

The deadline for all BIDS forwarded by mail will be the same as that illustrated above.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within sixty (60) calendar days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER. **(OH modification)**

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID Schedule by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve the contractor from fulfilling any of the conditions of the contract.

Each BID must be accompanied by a BID bond payable to the OWNER for ten percent (10%) of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will return the BONDS of all except the three lowest responsive and responsible BIDDERS. When the Agreement is executed the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the payment BOND and performance BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

The OWNER shall require BONDS assuring performance and payment, each in the amount of one hundred percent (100%) of the CONTRACT SUM, be furnished by the CONTRACTOR by a Corporate Surety Company approved by the OWNER. Corporate Surety Companies providing performance and payment BONDS must hold a certificate of authority as an acceptable SURETY on Federal BONDS as listed in Treasury Circular 570 as amended and be legally certified to do business in the State where the PROJECT is located. 'THE UNITED STATES, ACTING THROUGH RURAL DEVELOPMENT', will be named as co-obligee on all surety unless prohibited by State law. Both the performance and payment BONDS shall remain in full force and effect during the project's guarantee period (period for correction of the Work). The cost of these BONDS shall be included in the BID. **(OH modification)**

Attorneys-in-fact who sign BID BONDS or payment BONDS and performance BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The Bidder to whom the CONTRACT is awarded will be required to execute the AGREEMENT, obtain performance and payment BONDS, and provide current CERTIFICATES of insurance coverage within ten (10) calendar days after receipt of the NOTICE OF AWARD. The NOTICE OF AWARD shall be accompanied by the necessary AGREEMENT and BOND forms. In case of failure of the BIDDER to execute the AGREEMENT, obtain BONDS, and provide CERTIFICATES of insurance; the OWNER may consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the Property of the OWNER. **(OH modification)**

The OWNER within ten (10) days of receipt of acceptable performance BOND, payment BOND and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the OWNER not execute the Agreement within such period, the BIDDER may by WRITTEN NOTICE withdraw the signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.

The NOTICE TO PROCEED shall be issued within ten (20) days of the execution of the Agreement by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the OWNER AND CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the Agreement without further liability on the part of either party.

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the Agreement and to complete the WORK contemplated therein.

A conditional or qualified BID will not be accepted. Award will be made to the lowest responsive and responsible BIDDER. A BIDDER'S qualifications; ability to perform good quality work; possession of adequate resources; accommodation of the OWNER'S schedule; and provision of a fair and reasonable price will also be taken into consideration.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

The low RESPONSIBLE BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

Inspection trips for prospective BIDDERS will leave from the office of

Stacey Sutherland, Fiscal Officer & HR Coordinator,
(Name)

at 4628 Liberty Street, Sulphur Springs, Ohio 44881,
(Address)

at 1:30 p.m., ET, on August, 20, 20 26.
(Time & Time Zone)

The ENGINEER IS Triad Architects, Ltd.
(Name)

at 172 E. State St., Suite 600, Columbus, Ohio 43215,
(Address)

AIA® Document A701® – 2018

Instructions to Bidders

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

New Ambulance Station Project
Project Location: 4585 State Route 98
Sulphur Springs, Ohio 44881

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

Life First Ambulance District
P.O. Box 31
Sulphur Springs, Ohio 44881

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

Triad Architects, Ltd
172 E. State St., Suite 600
Columbus, Ohio 43215

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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.)

Copies of the Bidding Documents are on file and available by contacting Stacey Sutherland, Fiscal Officer & HR Coordinator, at lifefirstambulancedistrict@gmail.com.

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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.)

Questions may be directed to Stacey Sutherland, Fiscal Officer & HR Coordinator, at lifefirstambulancedistrict@gmail.com.

§ 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.)

Addenda shall be transmitted to Bidders known by the issuing office to have received complete Bidding Documents via electronic mail, or such other means as may be determined by the Owner.

§ 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.)

See Bid Guaranty included with the Contract Documents

§ 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.)

Bids shall be enclosed in a sealed envelope addressed to the Life First Ambulance District, ATTN Stacey Sutherland, Fiscal Officer & HR Coordinator, 4628 Liberty Street, Sulphur Springs, Ohio 44881, bearing the Bidder's name, address, and license number if applicable. Bids may be hand-delivered or mailed. If mailed, the sealed envelope containing the bid must be enclosed in an additional outer envelope addressed to Life First Ambulance District, P.O. Box 31, Sulphur Springs, Ohio 44881. Bids received by mail must be received by September 13, 2026. Bids received by hand delivery will be received until 2:00 p.m. local time September 14, 2026 and immediately after the deadline the bids will be opened and publicly read aloud at 4628 Liberty Street, Sulphur Springs, Ohio 44881.

§ 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.)

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Return of bid security shall be determined at the discretion of the Owner in consultation with the Architect and legal counsel.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

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

§ 5.2 Rejection of Bids

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

§ 5.3 Acceptance of Bid (Award)

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

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

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

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

§ 6.2 Owner's Financial Capability

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

§ 6.3 Submittals

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

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and

.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

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

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

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

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

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

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

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

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.
(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

§ 7.2 Time of Delivery and Form of Bonds

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

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

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

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

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.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.)

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.4 Building Information Modeling Exhibit, if completed:

N/A

.5 Drawings

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.)

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ATTACHMENT TO AIA DOCUMENT A701-2018, *Instructions to Bidders*

The provisions of this Attachment shall delete, modify and supplement the provisions contained in the "*Instructions to Bidders*", AIA Document A701-2018 Edition. The provisions contained in this Attachment will supersede any conflicting provisions of the AIA Document. The term "Agency", as used in this Attachment, shall mean the United States of America, acting through the United States Department of Agriculture.

When the project is not subject to the Build America, Buy America Act the provisions in bold do not apply.

ARTICLE 1, DEFINITIONS

Add the following paragraphs and subparagraphs:

1.10 Build America, Buy America Act (BABAA) – Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials are produced in the United States.

1.10.1 Construction Materials – Those articles, materials, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber or drywall.

1.10.2 Manufactured Product – Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.

1.10.3 Manufacturer's Certification – Documentation provided by a Manufacturer, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA.

ARTICLE 2, BIDDER'S REPRESENTATIONS

Add the following clauses to paragraph 2.1:

.7 This Bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this Bid, with any other Bidder or with any competitor.

.8 Bidder is familiar with all laws and regulations that may affect cost, progress, and performance of the work; **including BABAA requirements.**

ARTICLE 3, BIDDING DOCUMENTS

Add the following sentence to the end of subparagraph 3.3.1: "Any request for substitute or "or equal" shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L.177-58".

ARTICLE 4, BIDDING PROCEDURES

Add the following sentence to the end of subparagraph 4.1.1:

"Only one copy of the Bid is to be submitted".

Delete subparagraph 4.2.1 in its entirety and substitute the following:

4.2.1 Each Bid must be accompanied by a Bid Bond payable to the Owner for 10% of the total amount of the Bid.

Delete the last sentence of subparagraph 4.2.4 and substitute the following:

"However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may withdraw its Bid and request the return of its bid security beginning (60) days after the opening of Bids, unless a different period of time is mandated by State Law." Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended, by mutual agreement between the Owner and the Bidder, and the concurrence of the Agency.

Add the following subparagraphs and clauses to paragraph 4.3:

4.3.6 All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project, shall apply to the Contract throughout.

4.3.7 The Bidder agrees to abide by the requirements of section 319 of Public Law 101-121, which pertains to lobbying activities and applies to recipients of contracts or subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. Each Bid shall be accompanied by a completed lobbying certification form identical to that included in the Bidding Documents.

4.3.8 The Bidder agrees to abide by the requirements under 2 CFR Part 417, which pertains to the debarment or suspension of a person from participating in a Federal program or activity.

4.3.9 This Bid is for services related to a project that is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's regulation (reference 2 CFR 200, 2 CFR 184) on the application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

4.3.10 Under these Bidding Instructions, all Bidders (Contractors / Subcontractors) shall be responsible for:

.1 Providing bids that reflect compliance with BABAA requirements.

.2 Providing only iron, steel, construction materials and manufactured products that meet BABAA requirements. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

.3 Including manufacturer's certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding, a statement that the manufacturer will comply with BABAA requirements must be included with the bid submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

.4 Providing manufacturer's certification for BABAA requirements with any change order for any new construction materials or manufactured products required by the change.

.5 Certifying by submitting an application for payment, based in whole or in part on furnishing construction materials or manufactured products; that such materials and products, to the Contractor's, knowledge, are compliant with BABAA requirements.

.6 Ensuring that the Architect / Engineer has been provided an approved manufacturer's certification or waiver prior to items being delivered to the project site.

.7 Certifying upon completion that all work and materials are in compliance with BABAA requirements.

Add the following terms and conditions to subparagraph 4.4.3:

The Owner keep the bid security provided by the Bidder.

ARTICLE 5, CONSIDERATION OF BIDS

Delete subparagraph 5.3.2 in its entirety and substitute the following:

5.3.2 The Owner shall have the right to accept Alternates in the sequence or combinations listed and to determine the low Bidder on the basis of the sum of the Base Bid and the Alternates accepted.

ARTICLE 7, PERFORMANCE BOND AND PAYMENT BOND

Delete subparagraph 7.1.1 in its entirety and substitute the following:

7.1.1 Prior to execution of the Contract, the Bidder shall furnish Bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder. Both Bonds shall be separately written, each in the amount of the Contract Sum with Power of Attorney attached naming "The United States, acting through Rural Development" as co-obligee. Both Bonds shall remain in full force and effect during the project's guarantee period (period for correction of the Work). The cost of these Bonds shall be included in the Bid.**(OH modification)**

Delete subparagraph 7.1.3 in its entirety and substitute the following:

7.1.3 Surety companies executing Bonds must hold a certificate of authority as a acceptable surety on Federal Bonds as listed in Treasury Circular 570, as amended, and be authorized to transact business in the State where the Project is located.

Delete subparagraph 7.2.1 in its entirety and substitute the following:

7.2.1 The Bidder to whom the Contract is awarded will be required to execute the Agreement and obtain Performance and Payment Bonds, if required, within ten (10) calendar days from the date when the Notice of Award is delivered to the Bidder. The Notice shall be accompanied by the necessary Agreement.

Delete subparagraph 7.2.2 in its entirety and substitute the following:

7.2.2The Bonds shall be written on forms identical to those included in the Bidding Documents.

ARTICLE 8, ENUMERATION OF CONTRACT DOCUMENTS

The following documents should be referenced, if applicable; in paragraph 8.1, clause .9:

Attachment to the Standard Form of Agreement Between Owner and Contractor
(RD Instruction 1942-A, Ohio Guide 27, Attachment 3)
Attachment to the General Conditions of the Contract for Construction
(RD Instruction 1942-A, Ohio Guide 27, Attachment 4)
Invitation for Bids
Information for Bidders

Instructions to Bidders (AIA Document A701-2018)
Attachment to the Instructions to Bidders (this attachment)
(RD Instruction 1942-A, Ohio Guide 27, attachment 2)
Bid Form
Bid Bond
Payment Bond
Performance Bond
Certification for Contracts, Grants and Loans
(RD Instruction 1940-Q, Ohio Exhibit A-1) **(OH Modification)**

(Note: Any additional provisions that are necessary to remain effective after execution of the Contract for Construction will be inserted here and continue in the same format.)

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GENERAL CONDITIONS

When the project is not subject to the Build America, Buy America Act the provisions in bold do not apply.

1. Definitions
2. Conflict of Interest
3. Contract Approval
4. Additional Instructions and Detail Drawings
5. Schedules, Reports, and Records
6. Drawings and Specifications
7. Shop Drawings
8. Materials, Services, and Facilities
9. Inspection and Testing
10. Substitutions
11. Patents
12. Surveys, Permits, Regulations
13. Protection of Work, Property, Persons
14. Supervision by Contractor
15. Changes in the Work
16. Changes in Contract Price
17. Time for Completion and Liquidated Damages
18. Correction of Work
19. Subsurface Conditions
20. Suspension of Work, Termination, and Delay
21. Payment to Contractor
22. Substantial Completion
23. Acceptance of Final Payment as Release
24. Insurance
25. Contract Security
26. Assignments
27. Indemnification
28. Separate Contracts
29. Subcontracting
30. Architect's Authority
31. Lands and Right-of-Way
32. Guarantee
33. Arbitration by Mutual Agreement
34. Taxes
35. Environmental Requirements
36. Miscellaneous Provisions

1. DEFINITIONS

1.1 Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated and shall be applicable to both the singular and plural thereof:

1.2 ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications, or corrections.

1.3 BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4 BIDDER - Any person, firm, or corporation submitting a BID for the WORK.

1.5 BONDS - Bid, Performance, and Payment Bonds and other instruments of surety, furnished by the CONTRACTOR and the CONTRACTOR'S surety in accordance with the CONTRACT DOCUMENTS.

1.6 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion, or revision in the WORK within the general scope of the CONTRACT DOCUMENTS or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.7 CONTRACT DOCUMENTS - The contract, including Advertisement For BIDS, Information For BIDDERS, BID, BID BOND, Agreement, Payment BOND, Performance BOND, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.8 CONTRACT PRICE - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.9 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.10 CONTRACTOR - The person, firm, or corporation with whom the OWNER has executed the Agreement.

1.11 DRAWINGS - The parts of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

1.12 AGENCY – The UNITED STATES of AMERICA, acting through the UNITED STATES DEPARTMENT of AGRICULTURE.

1.13 ARCHITECT – The person, firm, corporation, or authorized representative named as such in the CONTRACT DOCUMENTS.

1.14 ENGINEER - The person, firm, corporation, or authorized representative named as such in the CONTRACT DOCUMENTS.

1.15 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.

1.16 NOTICE OF AWARD - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.17 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing him/her to proceed with the WORK and establishing the date for commencement of the WORK.

1.18 OWNER - A public or quasi-public body or authority, corporation, association, partnership, or an individual for whom the WORK is to be performed.

1.19 PROJECT - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.20 RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the OWNER and / or ARCHITECT who is assigned to the PROJECT site or any part thereof.

1.21 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.22 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.23 SUBCONTRACTOR - An individual, firm, or corporation having a direct contract with CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.24 SUBSTANTIAL COMPLETION - That date certified by the ARCHITECT when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be occupied and utilized by the OWNER for the purposes for which it is intended.

1.25 SUPPLEMENTAL GENERAL CONDITIONS - Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

1.26 SUPPLIER - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.27 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.28 WRITTEN NOTICE - Any notice to any party of the Agreement relative to any one part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address or delivered in person to said party or their authorized representative on the WORK.

1.29 FACILITY - Any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations owned, leased or supervised by a GRANTEE, COOPERATOR, CONTRACTOR or SUBCONTRACTOR, to be utilized in the performance of a grant, agreement, contract, subgrant or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation or structure, the entire location shall be deemed to be a facility except where the DIRECTOR, Office of Federal Activities, Environmental Protection Agency; determines that independent facilities are collocated in one geographical area.

1.30 **BUILD AMERICA, BUY AMERICA ACT (BABAA) – Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials are produced in the United States.**

1.30.1 **CONSTRUCTION MATERIALS – Those articles, materials, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber or drywall.**

1.30.2 **MANUFACTURED PRODUCT – Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.**

1.30.3 **MANUFACTURER'S CERTIFICATION – Documentation provided by a Manufacturer, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA.**

2. CONFLICT OF INTEREST

2.1 UNACCEPTABLE BIDDERS. An ENGINEER or ARCHITECT (individual or firm including persons they employ) who has prepared plans and specifications will not be considered an acceptable bidder. Any firm or corporation in which such ENGINEER or ARCHITECT (including persons they employ) is an

officer, employee, or holds or controls a substantial interest will not be considered an acceptable bidder. Contracts or purchases by the CONTRACTOR shall not be awarded or made to a supplier or manufacturer if the ENGINEER or ARCHITECT (firm or individual) who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Bids will not be awarded to firms or corporations which are owned or controlled wholly or in part by a member of the governing body of the OWNER or to an individual who is such a member.

2.2 The OWNER'S officers, employees, or agents shall not engage in the award or administration of this CONTRACT if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (a) the employee, officer or agent; (b) any member of their immediate family; (c) their partner or (d) an organization which employs, or is about to employ, any of the above baa financial or interest in the CONTRACTOR. The OWNER'S officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from the CONTRACTOR or subcontractor.

3. CONTRACT APPROVAL

3.1 The OWNER and the CONTRACTOR will furnish the OWNER'S Attorney such evidence as required so that the OWNER'S Attorney can complete and execute RD Instruction 1942-A, Guide 18, Page 7, "Certificate of Owner's Attorney" before the OWNER submits the executed CONTRACT DOCUMENTS to RURAL DEVELOPMENT for approval.

3.2 Concurrence by the RURAL DEVELOPMENT STATE DIRECTOR or DESIGNEE in the award of the CONTRACT is required before it is in full effect with all parties. The "Rural Development Concurrence" letter or notification shall be attached and made a part of the approved CONTRACT.

3.3 This CONTRACT is expected to be funded in part with funds from RURAL DEVELOPMENT. Neither the UNITED STATES nor any of its DEPARTMENTS, AGENCIES, or EMPLOYEES is or will be a party to this CONTRACT or any SUBCONTRACT.

4. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

4.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ARCHITECT / ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

4.2 The additional drawings and instructions thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

5. SCHEDULES, REPORTS AND RECORDS

5.1 The CONTRACTOR shall submit to the OWNER and ARCHITECT such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

5.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which the CONTRACTOR proposes to carry on the WORK, including dates at which the various parts of the WORK will be started, estimated date of completion of each part and, as applicable:

5.2.1 The dates at which special detail drawings will be required; and

5.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

5.3 The CONTRACTOR shall also submit a schedule of payments to the OWNER and the ARCHITECT that the CONTRACTOR anticipates will be earned during the WORK.

5.4 If the CONTRACT is based on a negotiated BID (except for those of $10,000.00 or less), the OWNER, the AGENCY, the COMPTROLLER GENERAL OF THE UNITED STATES, or any of their DULY AUTHORIZED REPRESENTATIVES, shall have access to any books, documents, papers, and records of the CONTRACTOR which are pertinent to a specific Federal loan program for the purpose of making audit, examination, excerpts, and transcriptions. The CONTRACTOR shall maintain records for at least three years after the OWNER makes final payment and all other pending matters are closed.

6. DRAWINGS AND SPECIFICATIONS

6.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

6.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over general DRAWINGS.

6.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ARCHITECT, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk. Any additional costs that may result from the CONTRACTOR’S failure to report errors, inconsistencies, or omissions to the OWNER and the ARCHITECT in a timely manner will be the responsibility of the CONTRACTOR.

7. SHOP DRAWINGS

7.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ARCHITECT / ENGINEER shall promptly review all SHOP DRAWINGS. The ARCHITECT / ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by an approved CHANGE ORDER.

7.2 When submitted for the ARCHITECT / ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

7.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the

ARCHITECT / ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ARCHITECT / ENGINEER.

8. MATERIALS, SERVICES AND FACILITIES

8.1 **All construction materials and manufactured products must comply with the BUILD AMERICA, BUY AMERICA ACT's (BABAA) domestic preference requirements. The Contractor / Subcontractor will be required to furnish Manufacturer's documentation, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA. See 1.30 and 36.9.**

8.2 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

8.3 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located to facilitate prompt inspection.

8.4 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer.

8.5 Materials, supplies, and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ARCHITECT / ENGINEER.

8.6 Materials, supplies, or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

9. INSPECTION AND TESTING

9.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

9.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

9.3 The CONTRACTOR shall provide at the CONTRACTOR'S expense the testing and inspection services required by the CONTRACT DOCUMENTS.

9.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the ARCHITECT shall advise the OWNER and the AGENCY of required tests, inspections and test results; shall furnish coordination of such tests and inspections; and shall advise the OWNER and the AGENCY of the results of same. Copies of tests results shall be furnished upon request to the OWNER and the AGENCY.

9.5 Inspections, tests, or approvals by the ARCHITECT / ENGINEER or others shall not relieve the CONTRACTOR from the obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

9.6 The OWNER, the ARCHITECT, and the ENGINEER and their duly authorized representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records or personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection or testing thereof.

9.7 If any WORK is covered contrary to the written instructions of the ARCHITECT / ENGINEER it must, if requested by the ARCHITECT / ENGINEER, be uncovered for the ARCHITECT / ENGINEER'S observation and replaced at the CONTRACTOR'S expense.

9.8 If the ARCHITECT / ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ARCHITECT / ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ARCHITECT / ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, if, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

10. SUBSTITUTIONS

10.1 **All substitutions must comply with the BUILD AMERICA, BUY AMERICA ACT's (BABAA) domestic preference requirements. The Contractor / Subcontractor will be required to furnish Manufacturer's documentation, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA. See 1.30 and 36.9.**

10.2 Whenever a material, article, or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue numbers, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ARCHITECT / ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ARCHITECT / ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by an approved CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

11. PATENTS

11.1 The CONTRACTOR shall pay all applicable royalties and license fees, and shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or product of a particular manufacturer or manufacturers is specified, however, if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, the CONTRACTOR shall be responsible for such loss unless the CONTRACTOR promptly gives such information to the ARCHITECT.

12. SURVEYS, PERMITS, REGULATIONS

12.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pipe locations and other working points, lines, elevations and cut sheets.

12.2 The CONTRACTOR shall carefully preserve benchmarks, reference points and stakes and, in case of willful or careless destruction, shall be charged with the resulting expense and shall be responsible for any mistake that may be caused by their unnecessary loss or disturbance.

12.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, the CONTRACTOR shall promptly notify the ARCHITECT in writing, and any necessary changes shall be adjusted as provided in SECTION 15, CHANGES IN THE WORK.

13. PROTECTION OF WORK, PROPERTY, AND PERSONS

13.1 The CONTRACTOR will be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR will take all necessary precautions for the safety of, will provide the necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities

not designated for removal, relocation or replacement in the course of construction. The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction. The CONTRACTOR will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. The CONTRACTOR will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all

damage, injury or loss to any property caused, directly or indirectly, in whole or part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone directly or indirectly employed by any of them or anyone of whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER, the ARCHITECT, the ENGINEER, or anyone employed by them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

13.2 To protect the lives and health of its employees under the CONTRACT, the CONTRACTOR shall comply with all pertinent provisions of the Occupational Safety and Health Administration (OSHA) and any State Safety and Health agency requirements.

13.3 The CONTRACTOR alone shall be responsible for the safety, efficiency, and adequacy of its plant, appliances, equipment, and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

13.4 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instructions or authorization from the OWNER or ARCHITECT, shall act to prevent threatened damage, injury or loss. The CONTRACTOR will give the OWNER and the ARCHITECT prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and an approved CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

14. SUPERVISION BY CONTRACTOR

14.1 The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK. The CONTRACTOR shall not utilize a proposed supervisor or superintendent without the approval of the OWNER, the ARCHITECT, and concurred with by the AGENCY.

15. CHANGES IN THE WORK

15.1 The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by a CHANGE ORDER utilizing AIA DOCUMENT G701, ‘CHANGE ORDER’, or FORM RD 1924-7, ‘CONTRACT CHANGE ORDER’, approved by the OWNER, ARCHITECT, and CONTRACTOR, and concurred with by an AGENCY REPRESENTATIVE.

15.2 The ARCHITECT / ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ARCHITECT / ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles the CONTRACTOR to a change in CONTRACT PRICE or TIME, or both, in which event the

CONTRACTOR shall give the ARCHITECT WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of a CHANGE ORDER, approved by the OWNER, the CONTRACTOR, the ARCHITECT, and concurred with by an AGENCY REPRESENTATIVE.

16. CHANGES IN CONTRACT PRICE

16.1 The CONTRACT PRICE may be changed only by an approved CHANGE ORDER. The value of any WORK covered by an approved CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

a. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluating.

b. Unit prices stated in the Contract Documents or subsequently agreed upon.

17. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

17.1 The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

17.2 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.
17.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages, as mutually agreed upon in the CONTRACT DOCUMENTS, for each calendar day of delay.

17.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER and ARCHITECT.

17.4.1 To any preference, priority or allocation order duly issued by the OWNER.

17.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, abnormal and unforeseeable weather, supply chain issues, and unexpected actions of the Earth.

17.4.3 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

18. CORRECTION OF WORK

18.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the OWNER and THE ARCHITECT for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

18.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

19. SUBSURFACE CONDITIONS

19.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the OWNER and the ARCHITECT by WRITTEN NOTICE of:

19.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

19.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

19.2 The OWNER and the ARCHITECT shall promptly investigate the conditions, and if it is found that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by an approved CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless the required WRITTEN NOTICE has been given; provided that the OWNER and the ARCHITECT may, if the OWNER and the ARCHITECT determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

20. SUSPENSION OF WORK, TERMINATION, AND DELAY

20.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ARCHITECT which shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

20.2 If the CONTRACTOR is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of its creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of its property, or if CONTRACTOR files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials or equipment or disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK or disregards the

authority of the ARCHITECT / ENGINEER, or otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and its surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method the OWNER may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess shall be paid, as mutually agreed upon, to the CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference, as mutually agreed upon, to the OWNER. Such costs incurred by the OWNER will be determined by the ARCHITECT and incorporated in an approved CHANGE ORDER.

20.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

20.4 After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ARCHITECT, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the CONTRACT. In such case the CONTRACTOR shall be paid, as mutually agreed upon, for all WORK executed and any expense sustained plus reasonable profit.

20.5 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER or under an order of court or other public authority, or the ARCHITECT fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ARCHITECT and the AGENCY or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ARCHITECT terminate the CONTRACT and recover from the OWNER, as mutually agreed upon, payment for all WORK executed and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ARCHITECT has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days written notice to the OWNER and the ARCHITECT stop the WORK until paid, as mutually agreed upon, all amounts then due, in which event and upon resumption of the WORK, an approved CHANGE ORDER shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

20.6 If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ARCHITECT / ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by an approved CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ARCHITECT / ENGINEER.

21. PAYMENT TO CONTRACTOR

21.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ARCHITECT and the AGENCY a partial payment estimate, using AIA Document G702, 'Application and Certificate for Payment' or Form RD 1924-18, 'Partial Payment Estimate', filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ARCHITECT and the AGENCY may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, the ARCHITECT, and the AGENCY; as will establish the OWNER'S title to the material and equipment and protect the OWNER'S interest therein, including applicable insurance. The ARCHITECT will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing approval of payment, and present the partial payment estimate to the OWNER and the AGENCY, or return the partial payment estimate to the CONTRACTOR indicating in writing the reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) days of presentation of an approved and AGENCY concurred partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate less the retainage. Per Ohio requirements, all construction contracts shall contain provisions for retainage. Retainage withholdings shall be an amount equal to (10%) of said payment estimate until (50%) of the work has been completed. When the ARCHITECT has advised the OWNER and the AGENCY in writing that the Work has reached a point of (50%) completion AND is progressing satisfactorily, further retainage withholdings may be eliminated and progress payments to the CONTRACTOR may be made in full. However, previous retainage withholdings shall NOT be paid to the CONTRACTOR. At (50%) completion or any time thereafter, IF the ARCHITECT advises the OWNER and the AGENCY in writing that the Work is NOT progressing satisfactorily, (10%) retainage withholdings may be reinstated and continue until the Work is determined to be SUBSTANTIALLY COMPLETE and accepted for the OWNER’S use by the ARCHITECT and the OWNER. Upon SUBSTANTIAL COMPLETION of the work, previous retainage withholdings may be paid to the CONTRACTOR. In addition, when the WORK has achieved SUBSTANTIAL COMPLETION, except for WORK which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the OWNER are valid reasons for noncompletion, the OWNER may continue to make additional payments to the CONTRACTOR, retaining at all times an amount sufficient to cover the estimated cost of the WORK still to be completed as determined by the ARCHITECT and accepted by the OWNER and the CONTRACTOR. Finally, upon FINAL COMPLETION of the work, when the work is accepted by the ARCHITECT, OWNER, and the AGENCY; any amount under the Contract and associated Change Orders, owed by the OWNER, may be paid to the CONTRACTOR, excepting such sums that may be lawfully retained by the OWNER. **(OH Modification)**

21.1.1 Alternate industry-standard retainage proposals may be considered by the AGENCY when the retainage proposal is mandated by the STATE in which the PROJECT is located and / or the retainage proposal does not add risk to the APPLICANT and the AGENCY.

21.1.2 No PARTIAL PAYMENT ESTIMATE will be made that depletes the retainage, nor places in escrow any funds that are required for retainage, nor invests the retainage for the benefit of the CONTRACTOR.

21.2 The partial payment estimate may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

21.3 The OWNER may after consultation with the ARCHITECT/ENGINEER withhold or, on account of subsequently discovered evidence, nullify the whole or part of any approved partial payment estimate to such extent as may be necessary to protect the OWNER from loss on account of:

21.3.1 Defective work not remedied.

21.3.2 Claims filed.

21.3.3 Failure of CONTRACTOR to make payments properly to subcontractors or suppliers.

21.3.4 A reasonable doubt that the WORK can be completed for the balance then unpaid.

21.3.5 Damage to another CONTRACTOR.

21.3.6 Performance of WORK in violation of the terms of the CONTRACT DOCUMENTS.

21.4 If the OWNER fails to make payment thirty (30) days after approval by the ARCHITECT and the AGENCY, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the rate as indicated in the Contract Documents, commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

22. SUBSTANTIAL COMPLETION

22.1 The CONTRACTOR agrees to the use and occupancy of a portion or unit of the PROJECT before formal acceptance by the OWNER under the following conditions:

22.1.1 A “Certificate of Substantial Completion” shall be prepared by the ARCHITECT and executed by the OWNER and the CONTRACTOR, except that when, in the opinion of the ARCHITECT, the CONTRACTOR is chargeable with unwarranted delay in completing the WORK or other Contract requirements, the signature of the CONTRACTOR will not be required. The Certificate of Substantial Completion shall be accompanied by a written endorsement of the CONTRACTOR'S insurance carrier and surety permitting occupancy by the OWNER during the remaining period of the PROJECT WORK. Occupancy and use by the OWNER shall not commence until authorized by public authorities having jurisdiction over the WORK.

22.1.2 Occupancy by the OWNER shall not be construed by the CONTRACTOR as being an acceptance of that part of the PROJECT to be occupied.

22.1.3 The CONTRACTOR shall not be held responsible for any damage to the occupied part of the PROJECT resulting from the OWNER'S occupancy.

22.1.4 Occupancy by the OWNER shall not be deemed to constitute a waiver of existing claims on behalf of the OWNER or CONTRACTOR against each other.

22.1.5 If the PROJECT consists of more than one building, and one of the buildings is to be occupied, the OWNER, prior to occupancy of that building, shall secure permanent property insurance on the building to be occupied and necessary permits which may be required for use and occupancy.

22.2 Where WORK on unit price items is substantially complete but lacks testing, clean-up and/or corrections, amounts shall be deducted from unit prices in partial payment estimates to amply cover such testing, clean-up and/or corrections.

22.3 When the items in 21.3 and 21.5 are cured, payment shall be made for amounts withheld because of them.

22.4 When the WORK has been substantially completed except for WORK which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the OWNER are valid reasons for noncompletion, the OWNER may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the WORK still to be completed. Agency concurrence is required on all Applications of Payment before payment is made.

23. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

23.1 Upon completion and acceptance of the WORK, the ARCHITECT shall issue a certificate attached to the final payment request that the WORK has been accepted under the conditions of the CONTRACT DOCUMENTS. With AGENCY concurrence, the entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

23.2 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demand of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S and AGENCY'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR and the AGENCY and with the AGENCY's concurrence, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed in accordance with the terms of the CONTRACT DOCUMENTS and with AGENCY concurrence, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, the CONTRACTOR'S Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

23.3 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER and the AGENCY of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in

connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or its sureties from any obligations under the CONTRACT DOCUMENTS or the Performance and Payment BONDS.

23.4 If the OWNER fails to make payment thirty (30) days after approval by the ARCHITECT and the AGENCY, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the rate as indicated in the Contract Documents, commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

24. INSURANCE

24.1 The CONTRACTOR shall purchase and maintain such insurance as will protect it from claims set forth below which may arise out of, or result from, the CONTRACTOR'S execution of the WORK, whether such execution be by the CONTRACTOR, any SUBCONTRACTOR, or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

24.1.1 Claims under workmen's compensation, disability benefit and other similar employee benefit acts;

24.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of employees;

24.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than employees;

24.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and

24.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

24.2 Certificates of Insurance acceptable to the OWNER and the AGENCY shall be filed with the OWNER and the AGENCY prior to commencement of the WORK. These Certificates shall contain a provision that coverages afforded under the policies will not be canceled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the OWNER and the AGENCY.

24.3 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, Liability insurance as hereinafter specified:

24.3.1 CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting the CONTRACTOR from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether such operations be by the CONTRACTOR or by any SUBCONTRACTOR employed by the CONTRACTOR or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR employed by the CONTRACTOR. Insurance shall be written with a limit of liability of not less than $500,000 for all damages arising out of bodily injury,

including death, at any time resulting therefrom, sustained by any one PERSON in any one accident; and a limit of liability of not less than $500,000 aggregate for any such damages sustained by two or more PERSONS in any one accident. Insurance shall be written with a limit of liability of not less than $200,000 for all property damage sustained by any one PERSON in any one accident; and a limit of liability of not less than $200,000 aggregate for any such damage sustained by two or more PERSONS in any one accident. Insurance shall be written with a combined bodily injury and damage liability of not less than $700,000 per occurrence; and with an aggregate of not less than $700,000 per occurrence.

24.3.2 CONTRACTOR'S General public liability and property damage insurance shall also protect the CONTRACTOR from any / all claims for destruction of or damage to all construction materials and / or manufactured products and/or completed operations and shall be written with a per occurrence and aggregate combined property damage liability limit as mandated by STATE statute or the OWNER'S requirements; whichever is greater.

24.4 The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

24.5 The CONTRACTOR shall procure and maintain, at the CONTRACTOR'S own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the STATE in which the PROJECT is located, Workmen's Compensation Insurance, including occupational disease provisions, for all of the CONTRACTOR'S employees at the site of the PROJECT and in case any WORK is sublet, the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statue, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of its employees not otherwise protected.

24.6 The CONTRACTOR shall coordinate with the OWNER and if applicable, secure "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by the OWNER. The policy shall name as the insured the CONTRACTOR and the OWNER.

25. CONTRACT SECURITY

25.1 Within ten (10) days after the receipt of the NOTICE OF AWARD, the CONTRACTOR shall furnish BONDS assuring performance and payment, each in the amount of one hundred percent (100%) of the CONTRACT SUM, from a Corporate Surety Company approved by the OWNER. Corporate Surety Companies providing performance and payment BONDS must hold a certificate of authority as an

acceptable SURETY on Federal BONDS as listed in Treasury Circular 570 as amended and be legally certified to do business in the State where the PROJECT is located. 'THE UNITED STATES, ACTING THROUGH RURAL DEVELOPMENT', will be named as co-obligee on all surety unless prohibited by State law. Both the performance and payment BONDS shall remain in full force and effect during the project's guarantee period as outlined in Section 32. **(OH Modification)**

25.1.1 The CONTRACTOR shall require the ATTORNEY-IN-FACT who executes the required BONDS on behalf of the surety to affix thereto a certified and current POWER OF ATTORNEY.

25.1.2 If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal Bonds, CONTRACTOR shall within ten (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

26. ASSIGNMENTS

26.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign, or otherwise dispose of the Contract or any portion thereof, or of any right, title or interest therein, or any obligations thereunder, without written consent of the other party.

27. INDEMNIFICATION

27.1 The CONTRACTOR will indemnify and hold harmless the OWNER, the ARCHITECT, the AGENCY, and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease

or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

27.2 In any and all claims against the OWNER or the ARCHITECT, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.

27.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ARCHITECT, its agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

28. SEPARATE CONTRACTS

28.1 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

28.2 The OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTORS reasonable opportunity for the introduction and storage of their materials and the execution of their WORK and shall poorly connect and coordinate the WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the OWNER and the ARCHITECT any defects in such WORK that render it unsuitable for such proper execution and results.

28.3 The OWNER may perform additional WORK related to the PROJECT or the OWNER may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or the OWNER, if the OWNER is performing the additional WORK) reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK and shall properly connect and coordinate the WORK with theirs.

28.3.1 OWNERS may accomplish construction by using their own personnel and equipment provided the OWNER possesses the necessary skills, abilities, and resources to perform the WORK. Any request by the OWNER to self-perform a portion of the scope of WORK of their own PROJECT shall not be in full force and effect until concurred with in writing by a duly authorized representative of the AGENCY.

28.4 If the performance of additional WORK by other CONTRACTORS or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves it in additional expense or entitles it to an extension of the CONTRACT TIME, the CONTRACTOR may make a claim thereof as provided in Sections 14 and 15.

29. SUBCONTRACTING

29.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

29.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(s), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER, the ARCHITECT, and the AGENCY.

29.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of its SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as the CONTRACTOR is for the acts and omissions of persons directly employed by the CONTRACTOR. Any additional costs that may result from any such acts and omissions will be the responsibility of the CONTRACTOR.

29.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the contract documents insofar as applicable to the work of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the contract documents.

29.5 Nothing contained in this contract shall create any contractual relationship between any SUBCONTRACTOR and the OWNER. (Revised 2-16-83)

29.6 The CONTRACTOR shall not contract with any PERSON or ENTITY declared ineligible under Federal Laws or Regulations from participating in Federally assisted construction projects and / or to whom the OWNER has made reasonable objection. The CONTRACTOR shall not be required to contract with anyone to whom the CONTRACTOR has reasonable objection.

29.7 The OWNER and the CONTRACTOR shall agree upon a mutually acceptable procedure for review and approval of payments to SUBCONTRACTORS. Except with the OWNER'S prior approval, payments to SUBCONTRACTORS shall be subject to retention of not less than ten percent (10%). The CONTRACTOR shall execute subcontracts in accordance with those agreements.

30. ARCHITECT'S AUTHORITY

30.1 The ARCHITECT shall be a representative of and shall advise and consult with the OWNER during construction until final payment to the Contractor is paid, and at the OWNER'S direction during the period of correction of the work described in the contract for construction. The ARCHITECT shall furnish architectural services and consultations necessary to correct minor construction defects encountered during such correction

period. The ARCHITECT shall assist the OWNER in performing a review of the project during the 11th month after the date of substantial completion. Such services shall be furnished without additional charge except for travel and subsistence costs.

30.2 The ARCHITECT shall decide questions which may arise as to quality and acceptability of materials furnished and work performed and shall interpret the intent of the contract documents in a fair and unbiased manner. The ARCHITECT will make visits to the site and determine if the work is proceeding in accordance with the contract documents.

30.3 The CONTRACTOR will be held strictly to the intent of the contract documents in regard to the quality of materials, workmanship, and execution of the work. The ARCHITECT may perform inspections at the factory or fabrication plant of the source of material supply.

30.4 The ARCHITECT will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

30.5 The ARCHITECT shall promptly make decisions relative to interpretation of the contract documents.

31. LAND AND RIGHTS-OF-WAY

31.1 Prior to the start of construction, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the contract documents.

31.2 The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.

31.3 The CONTRACTOR shall provide at its own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

32. GUARANTEE

32.1 The CONTRACTOR shall guarantee all materials and equipment furnished and work performed for a period of one (1) year from the date of substantial completion. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of substantial completion of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The performance bond shall remain in full force and effect through the guarantee period.

33. ARBITRATION BY MUTUAL AGREEMENT

33.1 Unless otherwise provided in this CONTRACT, all claims, counterclaims, disputes, and other matters in question arising out of, or relating to, the CONTRACT DOCUMENTS or the breach thereof, except for claims which have been waived by making an acceptance of final payment as provided by Section 20, may be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within the State in which the OWNER is located. Any agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof. (Revised 2-16-83, PN 869.)

33.2 Notice of the request for arbitration shall be filed in writing with the other party to the CONTRACT DOCUMENTS and a copy shall be filed with the ARCHITECT. Request for arbitration shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations. (Revised 2-16-83, PN 869.)

33.3 The process for arbitration should proceed as follows:

33.3.1 Each party to the CONTRACT shall appoint one arbitrator; the two arbitrators will select a third arbitrator.

33.3.2 The arbitrators will select a hearing location as close to the OWNER”S current business location as possible.

33.3.3 The procedure for conducting the hearings will follow the Construction Industry Arbitration Rules of American Arbitration Association.

33.4 The CONTRACTOR will carry on the WORK and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

34. TAXES

34.1 The CONTRACTOR will pay all sales, consumer, use, and other similar taxes required by the laws of the place where the WORK is performed.

35. ENVIRONMENTAL REQUIREMENTS (updated 03-23-23)

35.1 MITIGATION MEASURES – The CONTRACTOR shall comply with applicable mitigation measures established in the environmental assessment for the project. These may be obtained from the AGENCY representative.

35.2 TRENCHING, EXCAVATION OR OTHER EARTH MOVING ACTIVITIES - The CONTRACTOR, when constructing a project involving trenching, excavation, and / or other related earth moving activities, shall comply with the following environmental constraints.

35.2.1 WETLANDS - The CONTRACTOR, when disposing of excess, spoil, or other construction materials on public or private property, WILL NOT FILL IN or otherwise CONVERT WETLANDS.

35.2.2 FLOODPLAINS - The CONTRACTOR, when disposing of excess, spoil, or other construction materials on public or private property, WILL NOT

FILL IN or otherwise CONVERT 100 YEAR FLOODPLAIN areas delineated on the latest FEMA Floodplain Maps.

35.2.3 ENDANGERED SPECIES, HISTORIC PRESERVATION, HUMAN REMAINS AND CULTURAL ITEMS, HAZARDOUS MATERIALS, AND PALEONTOLOGY – Any excavation or other earth moving activity by the CONTRACTOR that provides evidence of the presence of endangered or threatened species or their critical habitat, uncovers a historical or archaeological artifact, human remains or cultural items, hazardous materials, a fossil or other paleontological materials will require the CONTRACTOR to:

.1 Temporarily stop work;

.2 Provide immediate notice to the ARCHITECT and the AGENCY, and in the case of potentially hazardous materials, provide immediate notice to local first responders and take such measures as necessary to protect the PUBLIC and WORKERS;

.3 Take reasonable measures as necessary to protect the discovered materials or protected resource;

.4 Abide by such direction as provided by the ARCHITECT, the AGENCY, or AGENCIES responsible for resource protection or hazardous materials management; and

.5 Resume work only upon notice from the ARCHITECT and the AGENCY.

36. MISCELLANEOUS PROVISIONS

36.1 GRATUITIES. If the OWNER finds after a notice and hearing that the CONTRACTOR, or any of the CONTRACTOR'S agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of the OWNER, the State, or AGENCY officials in an attempt to secure this CONTRACT or favorable treatment in awarding, amending, or making any determinations related to the performance of this

CONTRACT, the OWNER may, by written notice to the CONTRACTOR, terminate this CONTRACT as provided in paragraph 20. The OWNER may also pursue other rights and remedies that the law or his CONTRACT provides. However, the existence of the facts on which the OWNER bases such findings shall be an issue and may be reviewed in proceedings as provided in paragraph 32.

36.2 TERMINATION. In the event this CONTRACT is terminated as provided in paragraph 7.1, the OWNER may pursue the same remedies against the CONTRACTOR as it could pursue in the event of a breach of the CONTRACT by the CONTRACTOR. As a penalty, in addition to any other damages to which it may be entitled by law, the OWNER may pursue exemplary damages in an amount has determined by the OWNER, which shall be not less than three (3) times nor more than ten (10) times the costs the CONTRACTOR incurred in providing any such gratuities to any such official, employee, or agent.

36.3 COPELAND ANTI-KICKBACK ACT (18 U.S.C. 874) AS SUPPLEMENTED IN DEPARTMENT OF LABOR REGULATIONS (29 CFR PART 3). This ACT provides that each CONTRACTOR shall be prohibited from inducing, by any means, any PERSON in connection with construction to give up any part of the compensation to which the PERSON is otherwise entitled.

36.4 CLEAN AIR ACT (42 U.S.C. 7414), SECTION 114, AND WATER POLLUTION CONTROL ACT (33 U.S.C. 1813), SECTION 308. Under EXECUTIVE ORDER 11738 AND ENVIRONMENTAL PROTECTION AGENCY (EPA) REGULATIONS 40 C.F.R. PART 15, all Contracts in excess of $100,000 are required to comply with these ACTS. The ACTS require the CONTRACTOR to:

36.4.1 Notify the OWNER of the receipt of any communication from EPA indicating that a facility to be utilized in the performance of the contract is under consideration to be listed on the epa list of violating facilities.

36.4.2 Certify that any facility to be utilized in the performance of any nonexempt CONTRACTOR or SUBCONTRACTOR is not listed on the EPA list of violating facilities as of the date of the Contract Award.

36.4.3 Include or cause to be included the above criteria and requirements of paragraphs .1 and .2 in every nonexempt SUBCONTRACT, and that the CONTRACTOR will take such action as the GOVERNMENT may direct as a means of enforcing such PROVISIONS.

36.5 RESTRICTIONS ON LOBBYING (PUBLIC LAW 101-121, SECTION 319) AS SUPPLEMENTED IN DEPARTMENT OF AGRICULTURE REGULATIONS (2 CFR PART 418). This statute applies to the RECIPIENTS of contracts or subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. If applicable, the CONTRACTOR must complete a CERTIFICATION FORM on lobbying activities related to the specific Federal loan or grant that is a funding source for this contract. The CERTIFICATION AND DISCLOSURE FORMS shall be provided by the OWNER.

36.6 STATE ENERGY POLICY. The CONTRACTOR shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in the State Energy Conservation Plan, shall be utilized.

36.7 DEBARMENT AND SUSPENSION

36.7.1 The CONTRACTOR shall comply with the requirements of 7 CFR PART 3017, which pertains to the debarment or suspension of a PERSON from participating in a Federal program or activity.

36.8 PROJECT SIGN

36.8.1 The CONTRACTOR shall erect a PROJECT SIGN at a prominent location on the project's site. The SIGN shall be constructed and painted in accordance with specifications shown in the SIGN TEMPLATES on the following pages and maintained in good condition until completion of the PROJECT. A mockup up of the SIGN must be furnished to a representative of the AGENCY for approval prior to the completion of the PROJECT'S preconstruction conference. The SIGN shall be erected on the project's site prior to the CONTRACTOR'S first application for payment, NO EXCEPTIONS. The SIGN'S detailed description is as follows:

.1 Outside dimensions shall be 4'-0" by 8'-0".

.2 Supported by and bolted to two 4' X 4' treated posts with the bottom of the sign mounted level at 4'-0", at its center, above the ground.

.3 Painted by a professional sign painter or manufactured by a professional signage fabrication company.

.4 Letters shall be a minimum of 6-3/4" in height and 3/4" in stroke.

Note: 3/4" APA Medium Density (MDO) Plywood may be substituted for the 3/4" Marine Grade Plywood.

36.8.2 All CONTRACTORS shall include in their BID the cost of all materials, labor, and fabrication required to furnish the PROJECT SIGN.

36.9 **BUILD AMERICA, BUY AMERICA ACT - Domestic Preference Requirements for Federal Financial Assistance to Non-Federal Entities. Federal Financial Assistance to Non-Federal Entities, defined pursuant to 2 CFR 200.1 as any State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization, shall be governed by the requirements of Section 70914 of the Build America, Buy America Act (BABAA), under Title IX of the Infrastructure Investment and Jobs Act, Pub. L. 177-58. Any requests for waiver of these requirements must be submitted pursuant to USDA's guidance available online at USDA Buy America Waivers for Federal Financial Assistance | USDA.**

36.9.1 **This AGREEMENT is for services related to a PROJECT that is subject to the BUILD AMERICA, BUY AMERICA ACT (BABAA) requirements under TITLE IX OF THE INFRASTRUCTURE INVESTMENT AND JOBS ACT ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this PROJECT must be produced in the UNITED STATES, as further outlined by the OFFICE OF MANAGEMENT AND BUDGET'S MEMORANDUM M-22-11, INITIAL IMPLEMENTATION GUIDANCE ON APPLICATION OF BUY AMERICA PREFERENCE IN FEDERAL FINANCIAL ASSISTANCE PROGRAMS FOR INFRASTRUCTURE, APRIL 18,2022.**

36.9.2 **The CONTRACTOR shall be responsible for:**

.1 Providing opinions of costs and revisions thereof that reflect compliance with BABAA requirements.

.2 Providing only those CONSTRUCTION MATERIALS or MANUFACTURED PRODUCTS that meet BABAA requirements. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

.3 Including MANUFACTURER'S certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding or subcontractor pricing, a statement that the manufacturer will comply with BABAA requirements must be included with the BID. CONTRACTOR shall comply with BABAA requirements, including coordination with MANUFACTURERS, DISTRIBUTORS, and SUPPLIERS to correct deficiencies in any BABAA documentation.

.4 Providing MANUFACTURER'S certification for BABAA requirements with any change order for any new CONSTRUCTION MATERIALS or MANUFACTURED PRODUCTS required by the change.

.5 Certifying by submitting an APPLICATION FOR PAYMENT, based in whole or in part on furnishing CONSTRUCTION MATERIALS or MANUFACTURED PRODUCTS; that such MATERIALS and PRODUCTS, to the CONTRACTOR'S knowledge, are compliant with BABAA requirements.

.6 Ensuring that the ARCHITECT / ENGINEER has been provided an approved MANUFACTURER'S certification or waiver prior to items being delivered to the project site.

.7 Certifying upon completion that all WORK and MATERIALS are in compliance with BABAA requirements.

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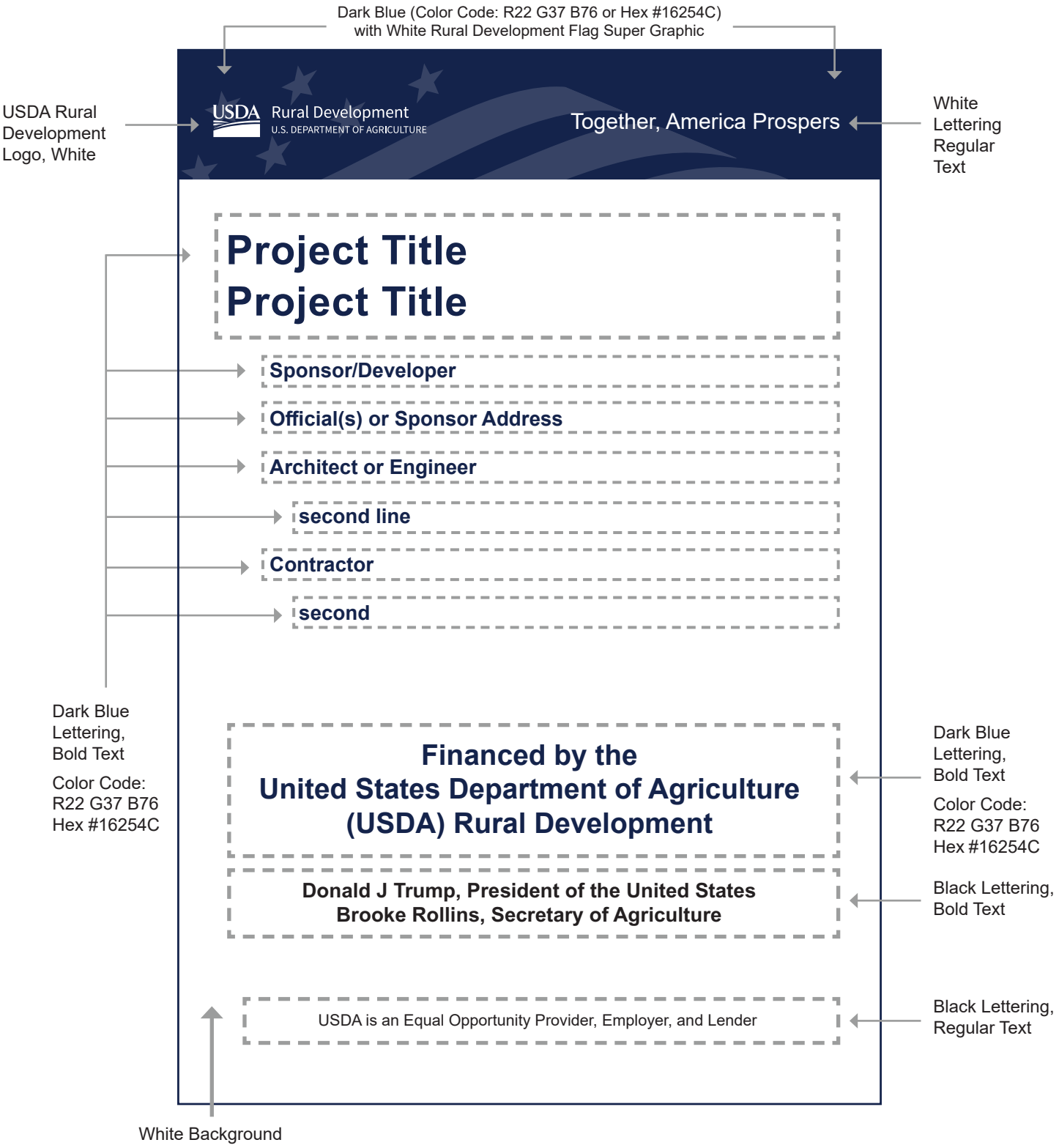
Temporary Construction Sign for Rural Development Projects

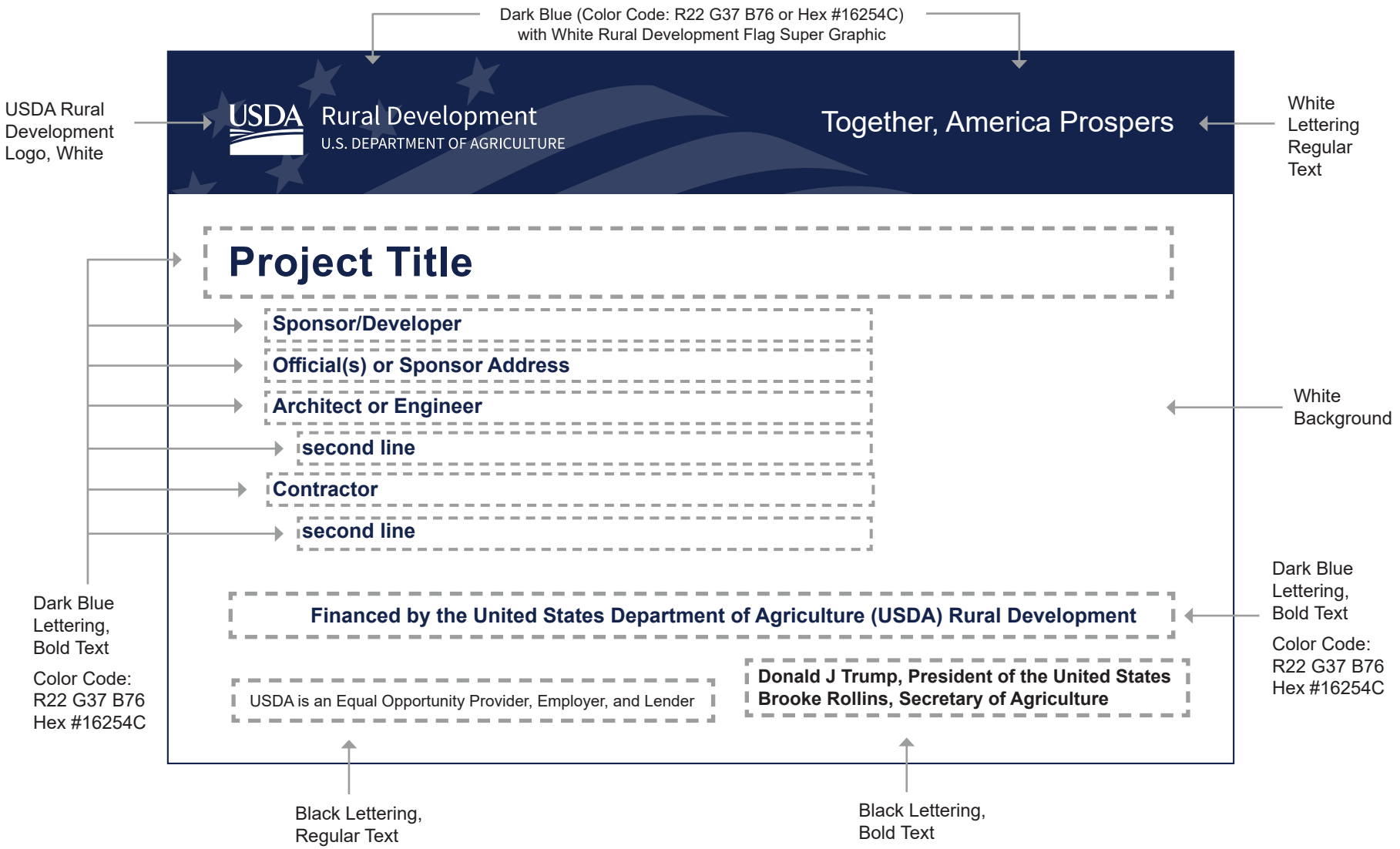
Recommended Font: Arial



SIGN DIMENSIONS: 2400mm x 1200mm x 19mm (approx.8'x 4' x 3/4")
PLYWOOD PANEL (APA RATED A+B GRADE-EXTERIOR)

Temporary Construction Sign for Rural Development Projects

Recommended Font: Arial



SIGN DIMENSIONS: 1200mm x 2400mm x 19mm (approx.4’ x 8’ x 3/4)
PLYWOOD PANEL (APA RATED A+B GRADE-EXTERIOR)

BID

Proposal of _____,
(BIDDER)

organized and existing under the laws of the State of _____

and doing business as _____.
(insert "a corporation", "a partnership", or "an individual" as appropriate)

To Life First Ambulance District.
(OWNER)

In compliance with the Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of New Ambulance Station Project

in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, the BIDDER certifies, and in the case of a joint BID each party thereto certifies as to its own organization to the following:

1. That this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

2. The BIDDER is familiar with all laws and regulations that may affect cost, progress, and performance of the work.

If the project is not subject to the Build America, Buy America Act, delete the provisions in bold:

3. That this BID is for services related to a project that is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's regulation (reference 2 CFR 200) on the application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

4. The BIDDER shall be responsible for:

a. Providing bids that reflect compliance with BABAA requirements.

b. Providing only iron, steel, construction materials and manufactured products that meet BABAA requirements. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

c. Including manufacturer's certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding, a statement that the manufacturer will comply with BABAA requirements must be included with the bid

submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

d. Providing manufacturer's certification for BABAA requirements with any change order for any new construction materials or manufactured products required by the change.

e. Certifying by submitting an application for payment, based in whole or in part on furnishing construction materials or manufactured products; that such materials and products, to the Contractor's, knowledge, are compliant with BABAA requirements.

f. Ensuring that the Architect / Engineer has been provided an approved manufacturer's certification or waiver prior to items being delivered to the project site.

g. Certifying upon completion that all work and materials are in compliance with BABAA requirements.

h. **Ensuring that any request for substitution or "or equal" shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L.177-58.**

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 365 consecutive calendar days thereafter.

BIDDER further agrees to pay to the Owner as liquidated damages the sum of $2,000 for each calendar day of delay thereafter as outlined in the Agreement.

BIDDER acknowledges receipt of the following ADDENDA, dated:

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sum:

BID SCHEDULE

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

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE

Bidders shall provide add or deduct alternate pricing for each of the following Alternates:

Alternate Number	Description	Add or Deduct	Price
One	Formed metal siding in lieu of Fiber cement siding and trim		

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
Two	Standing Seam metal Roofing in lieu of asphalt shingles				
Three	Additional Garage Bay				
Four	Emergency Generator				
Five	Solid Surfacing countertop in lieu of plastic laminate countertop				
Six	Aluminum Windows in lieu of fiberglass clad wood windows				
Seven	Front porch including exterior concrete, wood posts, fiber cement trim, ceiling and lighting, wood framing and sheathing, asphalt shingles and gutters and downspout				

Bidders shall provide unit pricing for the following: removal of unsatisfactory soil and replacement with satisfactory soil or engineered fill.

Dollars Per Cubic Yard: $

TOTAL OF BID..... $ _____

LUMP SUM PRICE (if applicable) ..... $ _____
(excluding Alternates)

Respectfully submitted:

_____ _____
(Signature) (Date)

_____ _____
(Title) (License number)

_____
(Address)

SEAL - (if BID is by a corporation)

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Bid Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)
Life First Ambulance District
P.O. Box 31
Sulphur Springs, Ohio 44881

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
New Ambulance Station Project
Project Location: 4585 State Route 98
Sulphur Springs, Ohio 44881

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

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

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

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

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

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

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Surety companies executing bonds must appear on the Treasury Department's current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located

Signed and sealed this day of ,

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

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User Notes: (1899198838)

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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)
Life First Ambulance District
P.O. Box 31
Sulphur Springs, Ohio 44881

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
New Ambulance Station Project
Project Location: 4585 State Route 98
Sulphur Springs, Ohio 44881

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.

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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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User Notes: (1685665841)

§ 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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User Notes: (1685665841)

§ 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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Performance Bond

CONTRACTOR:
(Name, legal status and address)

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

OWNER:
(Name, legal status and address)
Life First Ambulance District
P.O. Box 31
Sulphur Springs, Ohio 44881

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
New Ambulance Station Project
Project Location: 4585 State Route 98
Sulphur Springs, Ohio 44881

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:
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.

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User Notes: (1449739121)

§ 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.

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User Notes: (1449739121)

§ 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 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.

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User Notes: (1449739121)

§ 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.

§ 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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User Notes: (1449739121)

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS
(2 CFR Part 418)

Note: The Architect, the Contractor, the Construction Manager, or the Design-Builder shall complete this form and furnish the completed document to Rural Development (RD) when their Contract exceeds $100,000.00.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

_____ _____
(name) (date)

_____
(title)

oOo

This content is from the eCFR and is authoritative but unofficial.

This and the following pages are provided for reference only.

Title 2 - Grants and Agreements

Subtitle B - Federal Agency Regulations for Grants and Agreements Chapter IV - Department of Agriculture

PART 418 New Restrictions on Lobbying

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Certification Regarding Lobbying

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Disclosure Form To Report Lobbying

PART 418 - NEW RESTRICTIONS ON LOBBYING

Authority: 31 U.S.C. 1352; 5 U.S.C. 301.

Source: 79 FR 75985, Dec. 19, 2014, unless otherwise noted.

Subpart A - General

§ 418.100 Conditions on use of funds.

(a) No appropriated funds may be expended by the recipient of a Federal contract, grant, loan, or cooperative agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(b) Each person who requests or receives from an agency a Federal contract, grant, loan, or cooperative agreement shall file with that agency a certification, set forth in Appendix A, that the person has not made, and will not make, any payment prohibited by paragraph (a) of this section.

(c) Each person who requests or receives from an agency a Federal contract, grant, loan, or a cooperative agreement shall file with that agency a disclosure form, set forth in Appendix B, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under paragraph (a) of this section if paid for with appropriated funds.

(d) Each person who requests or receives from an agency a commitment providing for the United States to insure or guarantee a loan shall file with that agency a statement, set forth in Appendix A, whether that person has made or has agreed to make any payment to influence or attempt to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with that loan insurance or guarantee.

(e) Each person who requests or receives from an agency a commitment providing for the United States to insure or guarantee a loan shall file with that agency a disclosure form, set forth in Appendix B, if that person has made or has agreed to make any payment to influence or attempt to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with that loan insurance or guarantee.

§ 418.105 Definitions.

For purposes of this part:

(a) ***Agency,*** as defined in 5 U.S.C. 552(f), includes Federal executive departments and agencies as well as independent regulatory commissions and Government corporations, as defined in 31 U.S.C. 9101(1).

(b) ***Covered Federal action.***

(1) Covered Federal action means any of the following Federal actions:

(i) The awarding of any Federal contract;

(ii) The making of any Federal grant;

(iii) The making of any Federal loan;

(iv) The entering into of any cooperative agreement; and,

(v) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) Covered Federal action does not include receiving from an agency a commitment providing for the United States to insure or guarantee a loan. Loan guarantees and loan insurance are addressed independently within this part.

(c) ***Federal contract*** means an acquisition contract awarded by an agency, including those subject to the Federal Acquisition Regulation (FAR), and any other acquisition contract for real or personal property or services not subject to the FAR.

(d) ***Federal cooperative*** *agreement* means a cooperative agreement entered into by an agency.

(e) ***Federal grant*** means an award of financial assistance in the form of money, or property in lieu of money, by the Federal Government or a direct appropriation made by law to any person. The term does not include technical assistance which provides services instead of money, or other assistance in the form of revenue sharing, loans, loan guarantees, loan insurance, interest subsidies, insurance, or direct United States cash assistance to an individual.

(f) ***Federal loan*** means a loan made by an agency. The term does not include loan guarantee or loan insurance.

(g) ***Indian tribe*** and *tribal organization* have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B). Alaskan Natives are included under the definitions of Indian tribes in that Act.

(h) ***Influencing or attempting to influence*** means making, with the intent to influence, any communication to or appearance before an officer or employee or any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

(i) ***Loan guarantee*** **and** ***loan insurance*** means an agency's guarantee or insurance of a loan made by a person.

(j) ***Local government*** means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

(k) ***Officer or employee of an agency*** includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, U.S. Code, including a position under a temporary appointment;

(2) A member of the uniformed services as defined in section 101(3), title 37, U.S. Code;

(3) A special Government employee as defined in section 202, title 18, U.S. Code; and,

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, U.S. Code appendix 2.

(l) ***Person*** means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

(m) ***Reasonable compensation*** means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

(n) ***Reasonable payment*** means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

(o) ***Recipient*** includes all contractors, subcontractors at any tier, and subgrantees at any tier of the recipient of funds received in connection with a Federal contract, grant, loan, or cooperative agreement. The term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

(p) ***Regularly employed*** means, with respect to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement or a commitment providing for the United States to insure or guarantee a loan, an officer or employee who is employed by such person for at least 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract, grant, loan, cooperative agreement, loan insurance commitment, or loan guarantee commitment. An officer or employee who is employed by such person for less than 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

(q) ***State*** means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and a multi-State, regional, or interstate entity having governmental duties and powers.

§ 418.110 Certification and disclosure.

(a) Each person shall file a certification, and a disclosure form, if required, with each submission that initiates agency consideration of such person for:

(1) Award of a Federal contract, grant, or cooperative agreement exceeding $100,000; or

(2) An award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding $150,000.

(b)

(1) Each person shall file a certification, and a disclosure form, if required, upon receipt by such person of:

(i) A Federal contract, grant, or cooperative agreement exceeding $100,000; or

(ii) A Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding $150,000,

(2) Unless such person previously filed a certification, and a disclosure form, if required, under paragraph (a) of this section.

(c) Each person shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under paragraphs (a) or (b) of this section. An event that materially affects the accuracy of the information reported includes:

(1) A cumulative increase of $25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(2) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or,

(3) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(d) Any person shall file a certification, and a disclosure form, if required, to the next tier above who requests or receives from a person referred to in paragraphs (a) or (b) of this section:

(1) A subcontract exceeding $100,000 at any tier under a Federal contract;

(2) A subgrant, contract, or subcontract exceeding $100,000 at any tier under a Federal grant;

(3) A contract or subcontract exceeding $100,000 at any tier under a Federal loan exceeding $150,000; or,

(4) A contract or subcontract exceeding $100,000 at any tier under a Federal cooperative agreement.

(e) All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the person referred to in paragraphs (a) or (b) of this section. That person shall forward all disclosure forms to the agency.

(f) Any certification or disclosure form filed under paragraph (e) of this section shall be treated as a material representation of fact upon which all receiving tiers shall rely. All liability arising from an erroneous representation shall be borne solely by the tier filing that representation and shall not be shared by any tier to which the erroneous representation is forwarded. Submitting an erroneous certification or disclosure constitutes a failure to file the required certification or disclosure, respectively. If a person fails to file a required certification or disclosure, the United States may pursue all available remedies, including those authorized by section 1352, title 31, U.S. Code.

(g) For awards and commitments in process prior to December 23, 1989, but not made before that date, certifications shall be required at award or commitment, covering activities occurring between December 23, 1989, and the date of award or commitment. However, for awards and commitments in process prior to the December 23, 1989 effective date of these provisions, but not made before December 23, 1989, disclosure forms shall not be required at time of award or commitment but shall be filed within 30 days.

(h) No reporting is required for an activity paid for with appropriated funds if that activity is allowable under either Subpart B or C of this part.

Subpart B - Activities by Own Employees

§ 418.200 Agency and legislative liaison.

(a) The prohibition on the use of appropriated funds, in § 418.100 (a), does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(b) For purposes of paragraph (a) of this section, providing any information specifically requested by an agency or Congress is allowable at any time.

(c) For purposes of paragraph (a) of this section, the following agency and legislative liaison activities are allowable at any time only where they are not related to a specific solicitation for any covered Federal action:

(1) Discussing with an agency (including individual demonstrations) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities; and,

(1) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(d) For purposes of paragraph (a) of this section, the following agencies and legislative liaison activities are allowable only where they are prior to formal solicitation of any covered Federal action:

(1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

(2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and,

(3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Public Law 95–507 and other subsequent amendments.

(e) Only those activities expressly authorized by this section are allowable under this section.

§ 418.205 Professional and technical services.

(a) The prohibition on the use of appropriated funds, in § 418.100 (a), does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement or an extension, continuation, renewal, amendment, or modification of a Federal contract, grant, loan, or cooperative agreement if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal contract, grant, loan, or cooperative agreement or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal contract, grant, loan, or cooperative agreement.

(b) For purposes of paragraph (a) of this section, “professional and technical services” shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(c) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.

(d) Only those services expressly authorized by this section are allowable under this section.

§ 418.210 Reporting.

No reporting is required with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

Subpart C - Activities by Other Than Own Employees

§ 418.300 Professional and technical services.

(a) The prohibition on the use of appropriated funds, in § 418.100 (a), does not apply in the case of any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action, if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal contract, grant, loan, or cooperative agreement or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal contract, grant, loan, or cooperative agreement.

(b) The reporting requirements in § 418.110 (a) and (b) regarding filing a disclosure form by each person, if required, shall not apply with respect to professional or technical services rendered directly in the preparation, submission, or negotiation of any commitment providing for the United States to insure or guarantee a loan.

(c) For purposes of paragraph (a) of this section, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(d) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.

(e) Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(f) Only those services expressly authorized by this section are allowable under this section.

Subpart D - Penalties and Enforcement

§ 418.400 Penalties.

(a) Any person who makes an expenditure prohibited herein shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such expenditure.

(b) Any person who fails to file or amend the disclosure form (see Appendix B) to be filed or amended if required herein, shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

(c) A filing or amended filing on or after the date on which an administrative action for the imposition of a civil penalty is commenced does not prevent the imposition of such civil penalty for a failure occurring before that date. An administrative action is commenced with respect to a failure when an investigating official determines in writing to commence an investigation of an allegation of such failure.

(d) In determining whether to impose a civil penalty, and the amount of any such penalty, by reason of a violation by any person, the agency shall consider the nature, circumstances, extent, and gravity of the violation, the effect on the ability of such person to continue in business, any prior violations by such person, the degree of culpability of such person, the ability of the person to pay the penalty, and such other matters as may be appropriate.

(e) First offenders under paragraphs (a) or (b) of this section shall be subject to a civil penalty of $10,000, absent aggravating circumstances. Second and subsequent offenses by persons shall be subject to an appropriate civil penalty between $10,000 and $100,000, as determined by the agency head or his or her designee.

(f) An imposition of a civil penalty under this section does not prevent the United States from seeking any other remedy that may apply to the same conduct that is the basis for the imposition of such civil penalty.

§ 418.405 Penalty procedures.

Agencies shall impose and collect civil penalties pursuant to the provisions of the Program Fraud and Civil Remedies Act, 31 U.S.C.s 3803 (except subsection (c)), 3804, 3805, 3806, 3807, 3808, and 3812, insofar as these provisions are not inconsistent with the requirements herein.

§ 418.410 Enforcement.

The head of each agency shall take such actions as are necessary to ensure that the provisions herein are vigorously implemented and enforced in that agency.

Subpart E - Exemptions

§ 418.500 Secretary of Defense.

(a) The Secretary of Defense may exempt, on a case-by-case basis, a covered Federal action from the prohibition whenever the Secretary determines, in writing, that such an exemption is in the national interest. The Secretary shall transmit a copy of each such written exemption to Congress immediately after making such a determination.

(b) The Department of Defense may issue supplemental regulations to implement paragraph (a) of this section.

Subpart F - Agency Reports

§ 418.600 Semi-annual compilation.

(a) The head of each agency shall collect and compile the disclosure reports (see appendix B) and, on May 31 and November 30 of each year, submit to the Secretary of the Senate and the Clerk of the House of Representatives a report containing a compilation of the information contained in the disclosure reports received during the six-month period ending on March 31 or September 30, respectively, of that year.

(b) The report, including the compilation, shall be available for public inspection 30 days after receipt of the report by the Secretary and the Clerk.

(c) Information that involves intelligence matters shall be reported only to the Select Committee on Intelligence of the Senate, the Permanent Select Committee on Intelligence of the House of Representatives, and the Committees on Appropriations of the Senate and the House of Representatives in accordance with procedures agreed to by such committees. Such information shall not be available for public inspection.

(d) Information that is classified under Executive Order 12356 or any successor order shall be reported only to the Committee on Foreign Relations of the Senate and the Committee on Foreign Affairs of the House of Representatives or the Committees on Armed Services of the Senate and the House of Representatives (whichever such committees have jurisdiction of matters involving such information) and to the Committees on Appropriations of the Senate and the House of Representatives in accordance with procedures agreed to by such committees. Such information shall not be available for public inspection.

(e) The first semi-annual compilation shall be submitted on May 31, 1990, and shall contain a compilation of the disclosure reports received from December 23, 1989 to March 31, 1990.

(f) Major agencies, designated by the Office of Management and Budget (OMB), are required to provide machine-readable compilations to the Secretary of the Senate and the Clerk of the House of Representatives no later than with the compilations due on May 31, 1991. OMB shall provide detailed specifications in a memorandum to these agencies.

(g) Non-major agencies are requested to provide machine-readable compilations to the Secretary of the Senate and the Clerk of the House of Representatives.

(h) Agencies shall keep the originals of all disclosure reports in the official files of the agency.

§ 418.605 Inspector General report.

(a) The Inspector General, or other official as specified in paragraph (b) of this section, of each agency shall prepare and submit to Congress each year, commencing with submission of the President's Budget in 1991, an evaluation of the compliance of that agency with, and the effectiveness of, the requirements herein. The evaluation may include any recommended changes that may be necessary to strengthen or improve the requirements.

(b) In the case of an agency that does not have an Inspector General, the agency official comparable to an Inspector General shall prepare and submit the annual report, or, if there is no such comparable official, the head of the agency shall prepare and submit the annual report.

(c) The annual report shall be submitted at the same time the agency submits its annual budget justifications to Congress.

(d) The annual report shall include the following: All alleged violations relating to the agency's covered Federal actions during the year covered by the report, the actions taken by the head of the agency in the year covered by the report with respect to those alleged violations and alleged violations in previous years, and the amounts of civil penalties imposed by the agency in the year covered by the report.

Appendix A to Part 418 - Certification Regarding Lobbying

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Appendix B to Part 418 - Disclosure Form To Report Lobbying

DISCLOSURE OF LOBBYING ACTIVITIES

Approved by OMB
0348-0046

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(see reverse for public burden disclosure)

1. Type of Federal Action: ☐ a. contract b. grant c. cooperative agreement d. loan e. loan guarantee f. loan insurance	2. Status of Federal Action: ☐ a. bid/offer/application b. initial award c. post-award	3. Report Type: ☐ a. initial filing b. material change For Material Change Only: year _____ quarter _____ date of last report _____

4. Name and Address of Reporting Entity: ☐ Prime ☐ Subawardee Tier _____, if known Congressional District, if known:	5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime: Congressional District, if known:
6. Federal Department/Agency:	7. Federal Program Name/Description: CFDA Number, if applicable: _____
8. Federal Action Number, if known:	9. Award Amount, if known: $
10. a. Name and Address of Lobbying Entity (if individual, last name, first name, MI) (attach continuation sheet(s) SF-LLL-A, if necessary)	b. Individuals Performing Services (including address if different from No. 10a) (last name, first name, MI): (attach continuation sheet(s) SF-LLL-A, if necessary)
11. Amount of Payment (check all that apply): $ _____ ☐ actual ☐ planned	13. Type of Payment (check all that apply): ☐ a. retainer ☐ b. one-time fee ☐ c. commission ☐ d. contingent fee ☐ e. deferred ☐ f. other, specify: _____
12. Form of Payment (check all that apply): ☐ a. cash ☐ b. in-kind; specify: nature _____ value _____	

14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted for Payment indicated in Item 11:

(attach continuation sheet(s) SF-LLL-A, if necessary)

15. Continuation Sheet(s) SF-LLL-A attached: ☐ Yes ☐ No

16. Information requested through this form is authorized by title 31 U.S.C. section 1353. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the requested disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.	Signature _____ Print Name: _____ Title: _____ Telephone No: _____ Date: _____

Federal Use Only:	Authorized for Local Reproduction Standard Form - LLL

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying is and/or has been secured to influence the outcome of a covered Federal action.

2. Identify the status of the covered Federal action.

3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.

4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.

5. If the organization filing the report in item 4 checks "subawardee", then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.

6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.

7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans and loan commitments.

8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g. Request for Proposal (RFP) number, Invitation for Bid (IFB) number, grant announcement number, the contract, grant or loan award number, the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."

9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.

10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.
(b) Enter the full names of the individual(s) performing services and include full address if different from 10(a). Enter Last Name, First Name and Middle Initial (MI).

11. Enter the amount of compensation paid or reasonably expected to be paid by the reported entity (item4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.

12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.

13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.

14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s) or Member(s) of Congress that were contacted.

15. Check whether or not a SF-LLL-A continuation Sheet(s) is attached.

16. The certifying official shall sign and date the form, print his/her name, title and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information is OMB No. 0348-0046. Public reporting burden for this collection is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, paperwork Reduction Project (0348-0046), Washington D.C. 200503.

Approved by OMB
0348-0046

DISCLOSURE OF LOBBYING ACTIVITIES
CONTINUATION SHEET

R<:pofling Enii!y: Page ____ _ of ____ _

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NOTICE OF AWARD

TO: _____

_____

_____

_____

PROJECT Description: _____

_____

_____

The OWNER has considered the BID, dated _____, day of _____, 20_____, submitted by you for the above-described WORK in the amount of $_____.

You are hereby notified that your CONSTRUCTION SERVICES outlined in the AGREEMENT and GENERAL CONDITIONS and your PRICE for the above-described WORK, as indicated in the AGREEMENT, have been accepted by the OWNER.

Therefore, you are required to execute the AGREEMENT and to furnish the required Performance BOND, Payment BOND, and CERTIFICATES OF INSURANCE within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said AGREEMENT and / or to furnish said BONDS and CERTIFICATES within ten calendar (10) days from the date of this Notice, the OWNER will be entitled to consider all your rights arising out of the OWNER's acceptance of the AGREEMENT as abandoned. The OWNER will be entitled to such other rights as may be granted by law.

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

Dated this _____ day of _____, 20____.

By _____
(Owner)

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

Dated this _____ day of _____, 20____.

By _____
(Contractor)

Title _____

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.

Init.
/
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TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[ ] The date of this Agreement.

[ ] A date set forth in a notice to proceed issued by the Owner.

[ ] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

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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 a building information modeling exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with a building information modeling exhibit, 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:

Prevailing Wage - The Contractor and its subcontractors, regardless of tier, shall strictly comply with their obligation to pay their employees working on the Project site at the applicable prevailing wage rates for the type of work, including any changes thereto, pursuant to Ohio Revised Code Chapter 4115. Contractor shall submit a Certified Payroll Report for payment of prevailing wages with each Application for Payment as well as a final certified payroll report and the required Affidavit of Compliance with its final Application for Payment.

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

.4 Building information modeling exhibit, dated as indicated below:
(Insert the date of the building information modeling exhibit incorporated into this Agreement.)

.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:

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(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 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.)

Exhibit B – Prevailing Wage Rates

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 A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month and year.)

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

THE OWNER:
(Name, legal status and address)

THE CONTRACTOR:
(Name, legal status and address)

TABLE OF ARTICLES

A.1 GENERAL

A.2 OWNER'S INSURANCE

A.3 CONTRACTOR'S INSURANCE AND BONDS

A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

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

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.

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.

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User Notes: (2019711344)

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

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(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[ ] **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

[ ] **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

[ ] **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

[ ] **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

[ ] **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

[ ] **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

[ ] **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[ ] **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach,

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including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

[ ] **§ A.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than ($) each occurrence, ($) general aggregate, and ($) aggregate for products-completed operations hazard, providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
.2 personal injury and advertising injury;
.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
.4 bodily injury or property damage arising out of completed operations; and
.5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

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§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.

.3 Claims for bodily injury other than to employees of the insured.

.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.

.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.

.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.

.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.

.8 Claims related to roofing, if the Work involves roofing.

.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.

.10 Claims related to earth subsidence or movement, where the Work involves such hazards.

.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than ($) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than ($) each accident, ($) each employee, and ($) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than ($) per claim and ($) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than ($) per claim and ($) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than ($) per claim and ($) in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than ($) per claim and ($) in the aggregate.

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§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than ($) per claim and ($) in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.
(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[ ] **§ A.3.3.2.1** Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

[ ] **§ A.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than ($) per claim and ($) in the aggregate, for Work within fifty (50) feet of railroad property.

[ ] **§ A.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than ($) per claim and ($) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

[ ] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

[ ] **§ A.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[ ] **§ A.3.3.2.6 Other Insurance**
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

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§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	
Performance Bond	

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

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ATTACHMENT TO AIA DOCUMENT A101-2017, *Standard Form of Agreement Between Owner and Contractor*

The provisions of this Attachment shall delete, modify and supplement the provisions contained in the "*Standard Form of Agreement Between Owner and Contractor*," AIA Document A101-2017 Edition. The provisions contained in this attachment shall supersede any conflicting provisions of the AIA Document. The term "Agency", as used in this Attachment, shall mean the United States of America, acting through the United States Department of Agriculture.

When the project is not subject to the Build America, Buy America Act the provisions in bold do not apply.

ARTICLE 3, DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

Delete paragraph 3.1 and associated option boxes in their entirety and replace with the following:

3.1 The date of commencement shall be contained in the Notice to Proceed.

Replace subparagraph 3.3.3 with the following:

3.3.3 If the work is not substantially complete on or before this date, or within this period of time, or extension thereof granted by the Owner, damage will be sustained by the Owner and that it is and will be impracticable and extremely difficult to fix the actual damage which the Owner will sustain in the event of and by reason of such delays. The Contractor shall pay to the Owner liquidated damages in the sum of $2,000 for each calendar day of delay. Any sums that may be due the Owner as liquidated damages may be deducted from any monies due or to become due the Contractor under the Contract or may be collected from the Contractor's surety.

ARTICLE 5, PAYMENTS

Add the following after the words "Payment issued by the Architect" in subparagraph 5.1.1: "using AIA Document G702, 'Application and Certificate for Payment,' or Form RD 1924-18, 'Partial Payment Estimate'".

Add the following to the end of subparagraph 5.1.1: "Agency concurrence is required on all Applications of Payment before payment is made".

Insert the following retainage descriptions and clauses in subparagraph 5.1.7.1: **(OH Modification)**

No payments will be made that would deplete the retainage nor place in escrow any funds that are required for retainage nor invest the retainage for the benefit of the Contractor. Retainage shall not be less than an amount equal to 10% of the value of the Work completed.

Insert the following retainage reduction description and clause in subparagraph 5.1.7.2: **(OH Modification)**

When the Architect has advised the Owner and RD in writing that the Work has reached a point of 50% completion and is progressing satisfactorily, further retainage withholdings may be eliminated and progress payments to the Contractor may be made in full. However, previous retainage withholdings shall not be paid to the Contractor.

.1 At 50% completion or any time thereafter, if the Architect advises the Owner and RD in writing that the progress of the Work is not satisfactory, 10% retainage withholdings may be reinstated and continue until the Work is determined to be substantially complete and accepted for the Owner's use by the Architect and the Owner.

Insert the following retainage release conditions in subparagraph 5.1.7.3: **(OH Modification)**

Except as set forth in this Section, upon Substantial Completion of the Work, except for Work which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the Owner are valid reasons for noncompletion; the Owner may make additional progress payments to the Contractor in full, retaining at all times an amount sufficient enough to cover the estimated cost of the work still to be completed as determined by the Architect and accepted by the Owner and the Contractor.

Insert the following clause into subparagraph 5.2.1: **(OH Modification)**

.3 the work is accepted by the Architect, Owner, and the Agency; excepting such sums that may be lawfully retained by the Owner.

ARTICLE 8, MISCELLANEOUS PROVISIONS

Add the following subparagraphs and clauses to paragraph 8.7:

8.7.1 This Agreement and any Amendments to this Agreement shall not be in full force and effect until concurred with in writing by a duly authorized representative of the Agency. The concurrence so evidenced by the Agency shall in no way commit the Agency to render financial assistance to the Owner and is without liability to the Agency for any payment thereunder, but in the event such assistance is provided, the concurrence shall signify that the provisions of this Agreement and any amendments to this Agreement are consistent with Agency requirements.

8.7.2 Build America, Buy America Act

***Domestic Preference Requirements for Federal Financial Assistance to Non-Federal Entities*. Federal Financial Assistance to Non-Federal Entities, defined pursuant to 2 CFR 200.1 and 2 CFR 184, as any State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization, shall be governed by the requirements of Section 70914 of the Build America, Buy America Act (BABAA), under Title IX of the Infrastructure Investment and Jobs Act, Pub. L. 177-58. Any requests for waiver of these requirements must be submitted pursuant to USDA's guidance available online at USDA Buy America Waivers for Federal Financial Assistance | USDA.**

8.7.2.1 This agreement is for services related to a project that is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's regulation (reference 2 CFR 200, 2 CFR 184) on the application of Buy America

Preference in Federal Financial Assistance Programs for Infrastructure.

8.7.2.2 The Contractor shall be responsible for:

.1 Providing costs and revisions thereof that reflect compliance with BABAA requirements.

.2 Providing only iron, steel, construction materials and manufactured products that meet BABAA requirements. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

.3 Including manufacturer's certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding, a statement that the manufacturer will comply with BABAA requirements must be included with the bid submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

.4 Providing manufacturer's certification for BABAA requirements with any change order for any new construction materials or manufactured products required by the change.

.5 Certifying by submitting an application for payment, based in whole or in part on furnishing construction materials or manufactured products; that such materials and products, to the Contractor's knowledge, are compliant with BABAA requirements.

.6 Ensuring that the Architect / Engineer has been provided an approved manufacturer's certification or waiver prior to items being delivered to the project site.

.7 Certifying upon completion that all work and materials are in compliance with BABAA requirements.

ARTICLE 9, ENUMERATION OF CONTRACT DOCUMENTS

The following documents should be referenced, if applicable; in paragraph 9.1, clause .9:

Attachment to the Standard Form of Agreement Between Owner and Contractor (this Attachment)
(RD Instruction 1942-A, Ohio Guide 27, Attachment 3)
Attachment to the General Conditions of the Contract for Construction
(RD Instruction 1942-A, Ohio Guide 27, Attachment 4)
Advertisement For Bids
Instructions to Bidders, AIA A701-2018
Attachment to the Instructions to Bidders
(RD Instruction 1924-A, Ohio Guide 27, Attachment 2)
Bid Form
Bid Bond
Payment Bond
Performance Bond
Certification for Contracts, Grants and Loans
(RD Instruction 1940-Q, Ohio Exhibit A-1) **(OH Modification)**

PAGE 8, OWNER AND CONTRACTOR SIGNATURE PAGE

Delete the signature block and replace with the following:

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in duplicate on the respective dates indicated below:

OWNER:

ATTEST: _____ By _____

Type Name _____ Type Name _____

Title _____ Title _____

Date _____ Date _____

CONTRACTOR:

ATTEST: _____ By _____

Type Name _____ Type Name _____

Title _____ Title _____

Date _____ Date _____

AGENCY CONCURRENCE:

By _____

Type Name _____

Title _____

Date _____

The concurrence so evidenced by the Agency shall in no way commit the Agency to render financial assistance to the Owner and is without liability to the Agency for any payment hereunder, but in the event such assistance is provided, the concurrence shall signify the provisions of this Agreement are consistent with Agency requirements.

CERTIFICATE OF FUNDS
(ORC Section 5705.41)

The undersigned, Fiscal Officer of the Owner, hereby certifies in connection with the Agreement to which this Certificate is attached that the amount required to meet the obligations under the contract, obligation, or expenditure for the services described in the attached agreement, has been lawfully appropriated for the purpose, and is in the treasury or in process of collection to the credit of an appropriate fund, free from any outstanding obligation or encumbrance.

Dated: _____

_____
Fiscal Officer

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

New Ambulance Station Project
Project Location: 4585 State Route 98
Sulphur Springs, Ohio 44881

THE OWNER:
(Name, legal status and address)

Life First Ambulance District
P.O. Box 31
Sulphur Springs, Ohio 44881

THE ARCHITECT:
(Name, legal status and address)

Triad Architects, Ltd.
172 E. State St., Suite 600
Columbus, Ohio 43215

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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14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

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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 written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 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 written protocols governing the use of, and reliance on, the information contained in the model 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.

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ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

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

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

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

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

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

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

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

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

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These

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obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

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

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.4 Labor and Materials

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

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

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

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§ 3.5 Warranty

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

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

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices and Compliance with Laws

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

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

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

§ 3.7.4 Concealed or Unknown Conditions

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

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

§ 3.8 Allowances

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

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

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§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 3.13 Use of Site

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

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

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

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work,

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provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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

ARTICLE 4 ARCHITECT

§ 4.1 General

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

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

§ 4.2 Administration of the Contract

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

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

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

§ 4.2.4 Communications

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

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

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Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

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

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

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

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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§ 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.

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.

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§ 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.

§ 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.

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§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

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

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

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

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

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

- **.1** Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- **.2** Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

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.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.

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

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

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.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.

§ 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.

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§ 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

- **.1** employees on the Work and other persons who may be affected thereby;

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.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

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

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

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

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

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

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

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

§ 10.2.8 Injury or Damage to Person or Property

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

§ 10.3 Hazardous Materials and Substances

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

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities

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proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

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

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

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

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

§ 10.4 Emergencies

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

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

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

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

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the

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procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

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

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

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

§ 11.3 Waivers of Subrogation

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

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

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

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

§11.5 Adjustment and Settlement of Insured Loss

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

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

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

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

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

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

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

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

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

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

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

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

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and

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approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

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

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

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

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

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

§ 13.5 Interest

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

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

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

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

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

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

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

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

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

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

§ 14.3 Suspension by the Owner for Convenience

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

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

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

§ 14.4 Termination by the Owner for Convenience

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

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

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

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

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

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

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

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

§ 15.1.4 Continuing Contract Performance

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

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

§ 15.1.5 Claims for Additional Cost

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

§ 15.1.6 Claims for Additional Time

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

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

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§ 15.1.7 Waiver of Claims for Consequential Damages

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

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

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

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

§ 15.2 Initial Decision

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

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

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

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

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

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

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

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

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

§ 15.3 Mediation

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

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

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

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

§ 15.4 Arbitration

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

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

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

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

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§ 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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ATTACHMENT TO AIA DOCUMENT A201-2017, *General Conditions of the Contract for Construction*

The provisions of this attachment shall delete, modify and supplement the provisions contained in the "*General Conditions of the Contract for Construction*," AIA Document A201-2017 Edition. The provisions contained in this attachment will supersede any conflicting provisions of the AIA Document. The term "Agency," as used in this Attachment, shall mean the United States of America, acting through the United States Department of Agriculture.

When the project is not subject to the Build America, Buy America Act the provisions in bold do not apply.

ARTICLE 1, GENERAL PROVISIONS

Add the following subparagraph to paragraph 1.1:

1.1.1.1 The General Conditions are modified and supplemented by Attachment to the General Conditions of the Contract for Construction (this attachment) (RD Instruction 1942-A, Ohio Guide 27, Attachment 4) **(OH Modification)**

Add the following subparagraphs to paragraph 1.1:

1.1.9 <u>Build America, Buy America Act (BABAA)</u> – Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials are produced in the United States.

1.1.9.1 Construction Materials – Those articles, materials, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber or drywall.

1.1.9.2 Manufactured Product – Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.

1.1.9.3 Manufacturer's Certification – Documentation provided by a Manufacturer, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA.

ARTICLE 2, OWNER

Delete subparagraph 2.3.6 and substitute the following:

2.3.6 The Owner shall furnish to the Contractor, free of charge, two copies of the Contract Documents necessary for execution of the Work. Additional copies will be available from the Architect at the cost of reproduction and handling.

ARTICLE 3: CONTRACTOR

Add the following subparagraph to paragraph 3.7:

3.7.3.1 The Contractor shall comply with the Federal Requirement for Domestic Preference: Iron and steel products, Manufactured Products, and Construction Materials used in this project shall comply with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

ARTICLE 4, ARCHITECT

Add the following to subparagraph 4.1.1: The term "Architect" means the Architect, or the Engineer when the nature of the work is within the authority granted engineers by the State licensure law, or an authorized representative of the Architect or Engineer.

ARTICLE 5, SUBCONTRACTORS

Add the following to the end of subparagraph 5.2.2: "The Contractor shall not contract with any person or entity declared ineligible under Federal laws or regulations from participating in federally assisted construction projects or to whom the Owner has made reasonable objection. The Contractor shall not be required to contract with anyone to whom the Contractor has reasonable objection".

ARTICLE 7, CHANGES IN THE WORK

Delete the words ", Construction Change Directive" from subparagraph 7.1.1.

Insert the words ", Agency " after the word "Owner," and delete the words "A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor" in subparagraph 7.1.2.

Delete the words "Construction Change Directive" from subparagraph 7.1.3.

Delete subparagraph 7.2.1, associated clauses, and substitute the following:

7.2.1 A Change Order is a written order to the Contractor utilizing AIA Document G701, 'Change Order', or Form RD 1924-7, 'Contract Change Order', signed by the Owner, Architect, Contractor, and the Agency representative. It is issued after the execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. The Contractor's signing of a Change Order indicates complete agreement therein.

Add subparagraph 7.2.2, and associated clauses as follows:

7.2.2 Methods used in determining adjustments to the Contract Sum may include any of the following:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluating.

.2 Unit prices stated in the Contract Documents or subsequently agreed upon.

Add the following sentence to the beginning of subparagraph 7.3.1: "A Construction Change Directive may be used only for a change in response to an emergency as described in paragraph 10.4".

Delete subparagraph 7.3.2 in its entirety.

Add the sentence "When the use of a Construction Change Directive is justified" where appropriate to subparagraphs 7.3.3, 7.3.6, 7.3.7, 7.3.9, and 7.3.10.

ARTICLE 8, TIME

Delete subparagraph 8.1.2 in its entirety and replace with the following:

8.1.2 The date of commencement of the Work shall be illustrated as follows: **(OH Modification)**

.1 When utilizing the Design-Bid-Build Contracting Method, the date of commencement shall be illustrated in the executed and acknowledged Notice to Proceed (RD Instruction 1942-A, Guide 19, attachment #8).

.2 When utilizing the Construction Manager as Constructor Contracting Method, the date of commencement shall be illustrated in the executed Guaranteed Maximum Price Amendment (AIA Document A133-2019, Exhibit A, Guaranteed Maximum Price Amendment).

Add the following subparagraphs:

8.2.4 The Notice to Proceed shall be issued as follows: **(OH Modification)**

.1 When utilizing the Design-Bid-Build Contracting Method, the executed and acknowledged Notice to Proceed (RD Instruction 1942-A, Guide 19, attachment #8), shall serve as the project's Notice to Proceed. Said Notice shall be issued to the Contractor within twenty (20) calendar days of the execution by the Owner. Should there be reasons why the executed Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement of the Owner and Contractor, with the concurrence of the Agency. If the Notice to Proceed has not been issued within the twenty (20) calendar day period or within the period mutually agreed upon, the Contractor may terminate the Agreement with the Owner per subparagraph 14.1.5.

.2 When utilizing the Construction Manager as Constructor Contracting Method, the executed Guaranteed Maximum Price Amendment (AIA Document A133-2019 Exhibit A, Guaranteed Maximum Price Amendment) shall serve as the project's Notice to Proceed. Said Amendment shall be issued to the Construction Manager within twenty (20) calendar days of the execution by the Owner. Should there be reasons why the executed Amendment cannot be issued within such period, the time may be extended by mutual agreement of the Owner and Construction Manager, with the concurrence of the Agency. If the Guaranteed Maximum Price Amendment has not been issued within the twenty (20) calendar day period or within the period mutually agreed upon, the Construction Manager may terminate the Agreement with the Owner per subparagraph 14.1.5.

8.3.4 As outlined in the Agreement, the Contractor agrees to pay liquidated damages to the Owner for each calendar day of delay.

ARTICLE 9, PAYMENTS AND COMPLETION

Delete subparagraph 9.3.1.1 and substitute the following:

9.3.1.1 Work performed and materials supplied under a Change Order may be included for payment only after the Change Order has been approved by all appropriate parties and concurred with by the Agency.

Add the following sentence to the end of subparagraph 9.4.1: "All Certificates for Payment shall be prepared using AIA Document G702, 'Application and Certificate for Payment' or Form RD 1924-18, 'Partial Payment Estimate'.

Replace the word "seven" with the words "fifteen (15)" in the first sentence of subparagraph 9.7.

Delete subparagraph 9.8.5, after the first sentence, and substitute the following: "When the Work has been substantially completed, except for Work which cannot be completed because of weather conditions, lack of materials or other reasons, which, in the judgment of the Owner, are valid reasons for non-completion, the Owner may make additional payments in full, retaining at all times an amount sufficient to cover the estimated cost of the Work still to be completed. The Owner shall provide a copy of the Certificate of Substantial Completion to the Agency". **(OH Modification)**

Delete subparagraphs 9.9.1 in its entirety and replace with the following subparagraph and clauses:

9.9.1 The Contractor agrees to the use and occupancy of a portion or unit of the Project before formal acceptance by the Owner under the following conditions:

.1 A "Certificate of Substantial Completion" shall be prepared and executed as provided in subparagraph 9.8.4, except that when, in the opinion of the Architect, the Contractor is chargeable with unwarranted delay in completing the Work or other Contract requirements, the signature of the Contractor will not be required. The Certificate of Substantial Completion shall be accompanied by a written endorsement of the Contractor's insurance carrier and surety permitting occupancy by the Owner during the remaining period of the Project Work. Occupancy and use by the Owner shall not commence until authorized by public authorities having jurisdiction over the Work.

.2 Occupancy by the Owner shall not be construed by the Contractor as being an acceptance of that part of the Project to be occupied.

.3 The Contractor shall not be held responsible for any damage to the occupied part of the Project resulting from the Owner's occupancy.

.4 Occupancy by the Owner shall not be deemed to constitute a waiver of existing claims in behalf of the Owner or Contractor against each other.

.5 If the Project consists of more than one building, and one of the buildings is to be occupied, the Owner, prior to occupancy of that building, shall secure permanent property insurance on the building to be occupied and necessary permits which may be required for use and occupancy.

Add the following sentence to the end of subparagraph 9.9.3: "Use and occupancy by the Owner prior to Project acceptance does not relieve the Contractor of responsibility to maintain all insurance and bonds required of the Contractor under the Contract Documents until the Project is completed and accepted by the Owner".

ARTICLE 11, INSURANCE AND BONDS

Add the following subparagraphs and clauses:

11.1.1.1 Insurance shall be:

.1 Written with a limit of liability of not less than $500,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than $500,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than $200,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than $200,000 aggregate for any such damage sustained by two or more persons in any one accident, or

.2 Written with a combined bodily injury and damage liability of not less than $700,000 per occurrence; and with an aggregate of not less than $700,000 per occurrence.

.3 Insurance policies shall be written with limits of liability consistent with those insurance liability limits contained in the Contract Documents but not less than limits prescribed in 11.1.1.1.1 and 11.1.1.1.2.

Delete subparagraph 11.1.2 in its entirety and substitute the following subparagraphs:

11.1.2 The Contractor shall furnish the Owner bonds covering faithful performance of the Contract and payment of obligations arising thereunder within ten (10) calendar days after receipt of the Notice of Award. The surety company executing the bonds must hold a certificate of authority as an acceptable surety on Federal bonds as listed in Treasury Circular 570 and be authorized to transact business in the State where the Project is located. The bonds (using the forms included in the Bidding Documents) shall each be equal to the amount of the Contract. The "United States, acting through Rural Development", will be named as co-obligee on all surety unless prohibited by State law. The bonds shall remain in full force and effect throughout the project's guarantee period (period for correction of the Work). The cost of these bonds shall be included in the Contract Sum. **(OH Modification)**

11.1.2.1 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current power of attorney.

11.1.2.2 If at any time a surety on any such bond is declared bankrupt or loses its right to do business in the State in which the work is to be performed or is removed from the list of surety companies accepted on Federal Bonds, the Contractor shall within ten (10) calendar days after notice from the Owner to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums of such bond shall be paid by any Contractor. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

Add the following sentence to the end of subparagraph 11.2.1:

Property insurance written on a builder's risk "all-risks" completed value shall be provided as described in AIA Document A101-2017, Exhibit A, paragraph A.2.3, or AIA Document A133-2019, Exhibit B, as applicable. The policy shall name as the insured the Contractor and the Owner. The provisions of this paragraph shall apply to the Contractor if the Contractor purchases and maintains said insurance coverage. **(OH Modification)**

ARTICLE 13, MISCELLANEOUS PROVISIONS

Add the following paragraphs, subparagraphs, and clauses:

13.6 As applicable, the Agreement and Amendment and any amendments to the Agreement and Amendment shall not be in full force and effect until concurred with in writing by a duly authorized representative of the Agency. The concurrence so evidenced by the Agency shall in no way commit the Agency to render financial assistance to the Owner and is without liability to the Agency for any payment thereunder, but in the event such assistance is provided, the concurrence shall signify that the provisions of the Agreement and Amendment and any amendments to the Agreement and Amendment are consistent with Agency requirements. **(OH Modification)**

13.7 Lands and Rights-of Way

13.7.1 Prior to the start of construction, the Owner shall obtain all lands and rights-of-way necessary for the execution and completion of work to be performed under this contract.

13.9 Statutes

13.9.1 The Contractor and each Subcontractor shall comply with the following statutes (and with regulations issued pursuant thereto, which are incorporated herein by reference):

13.9.1.1 Copeland Anti-Kickback Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR part 3). This Act provides that each Contractor shall be prohibited from inducing, by any means, any person in connection with construction to give up any part of the compensation to which the person is otherwise entitled.

13.9.1.2 Clean Air Act (42 U.S.C. 7414), section 114, and Water Pollution Control Act (33 U.S.C. 1813), section 308. Under Executive

Order 11738 and Environmental Protection Agency (EPA) regulations 40 C.F.R. part 15, all Contracts in excess of $100,000 are required to comply with these Acts. The Acts require the Contractor to:

.1 Notify the Owner of the receipt of any communication from EPA indicating that a facility to be utilized in the performance of the Contract is under consideration to be listed on the EPA list of Violating Facilities.

.2 Certify that any facility to be utilized in the performance of any nonexempt Contractor or Subcontractor is not listed on the EPA list of Violating Facilities as of the date of the Contract Award.

.3 Include or cause to be included the above criteria and requirements of paragraphs .1 and .2 in every nonexempt subcontract, and that the Contractor will take such action as the Government may direct as a means of enforcing such provisions.

13.9.1.3 Restrictions on Lobbying (Public Law 101-121, section 319) as supplemented in Department of Agriculture regulations (2 CFR part 418). This statute applies to the recipients of contracts or subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. If applicable, the Contractor must complete a certification form on lobbying activities related to the specific Federal loan or grant that is a funding source for this contract. The certification and disclosure forms shall be provided by the Owner.

13.10 Records

13.10.1 If the Contract is based on a negotiated Bid, the Owner, the Agency, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books,

documents, papers, and records of the Contractor which are pertinent to a specific Federal loan program for the purpose of making audit, examination, excerpts, and transcriptions. The Contractor shall maintain records for at least three years after the Owner makes final payment and all other pending matters are closed.

13.11 Environmental Requirements

13.11.1 Mitigation Measures – The contractor shall comply with applicable mitigation measures established in the environmental assessment for the project. These may be obtained from the Agency representative.

13.11.2 The Contractor, when constructing a Project involving trenching, excavating, or other earth moving activity, shall comply with the following environmental constraints:

13.11.2.1 Endangered Species, Historic Preservation, Human Remains and Cultural Items, Hazardous Materials, and Paleontology – Any excavation or other earth moving activity by the Contractor that provides evidence of the presence of endangered or threatened species or their critical habitat, uncovers a historical or archaeological artifact, human remains or cultural items, hazardous materials, a fossil or other paleontological materials will require the Contractor to:

.1 Temporarily stop work;

.2 Provide immediate notice to the Architect and the Agency, and in the case of potentially hazardous materials, provide immediate notice to local first responders and take such measures as necessary to protect the public and workers;

.3 Take reasonable measures as necessary to protect the discovered materials or protected resource;

.4 Abide by such direction as provided by the Agency, or Agencies responsible for resource protection or hazardous materials management; and

.5 Resume work only upon notice from the Architect and the Agency.

13.11.2.2 Historic Preservation - Applicants shall ensure that Contractors maintain a copy of the following inadvertent discovery plan onsite for review:
13.11.2.3

.1 If during the course of any ground disturbance related to any Project, any post review discovery, including but not limited to, any artifacts, foundations, or other indications of past human occupation of the area are uncovered, shall be protected by complying with 36 CFR § 800.13(b)(3) and (c) and shall include the following:

.2 All Work, including vehicular traffic, shall immediately stop within a 50 ft. radius around the area of discovery. The Contractor shall ensure barriers are established to protect the area of discovery and notify the Architect or Engineer to contact the appropriate RD personnel. The Architect or Engineer shall engage a Secretary of the Interior (SOI) qualified professional archeologist to quickly assess the nature and scope of the discovery; implement interim measures to protect the discovery from looting and vandalism; and establish broader barriers if further historic and/or precontact properties, can reasonably be expected to occur.

.3 The RD personnel shall notify the appropriate RD environmental staff member, the Federal Preservation Officer (FPO), and State Historic Preservation Office (SHPO) immediately. Indian tribe(s) or

.4 Native Hawaiian Organization (NHOs) that have an interest in the area of discovery shall be contacted immediately. The SHPO may require additional tribes or NHOs who may have an interest in the area of discovery also be contacted. The notification shall include an assessment of the discovery provided by the

SOI qualified professional archeologist.

.5 When the discovery contains burial sites or human remains, the Contractor shall immediately notify the appropriate RD personnel who will contact the RD environmental staff member, FPO, and the SHPO. The relevant law enforcement authorities shall be immediately contacted by onsite personnel to reduce delay times, in accordance with tribal, state, or local laws including 36 CFR Part 800.13; 43 CFR Part 10, Subpart B; and the Advisory Council on Historic Preservation's Policy Statement Regarding treatment of Burial Sites, Human Remains, or Funerary Objects (February 23, 2007).

.6 When the discovery contains burial sites or human remains, all construction activities, including vehicular traffic shall stop within a 100 ft. radius of the discovery and barriers shall be established. The evaluation of human remains shall be conducted at the site of discovery by a SOI qualified professional. Remains that have been removed from their primary context and where that context may be in question may be retained in a secure location, pending further decisions on treatment and disposition. RD may expand this radius based on the SOI professional's assessment of the discovery and establish broader barriers if

further subsurface burial sites, or human remains can reasonably be expected to occur. RD, in consultation with the SHPO and interested tribes or NHOs, shall develop a plan for the treatment of native human remains.

.7 Work may continue in other areas of the undertaking where no historic properties, burial sites, or human remains are present. If the inadvertent discovery appears to be a consequence of illegal activity such as looting, the onsite personnel shall contact the appropriate legal authorities immediately if the landowner has not already done so.

.8 Work may not resume in the area of the discovery until a notice to proceed has been issued by RD. RD shall not issue the notice to proceed until it has determined that the appropriate local protocols and consulting parties have been consulted.

.9 Inadvertent discoveries on federal and tribal land shall follow the processes required by the federal or tribal entity.

13.11.3 Lead-Based Paint - The Contractor and Owner shall comply with applicable Agency requirements of the Lead-Based Paint Poisoning Prevention Act, as amended (42 U.S.C. 4821), and the Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 U.S.C. 4851) for rehabilitation work on residential property built prior to 1978.

13.12 Debarment and Suspension

13.12.1 The Contractor shall comply with the requirements of 2 CFR part 417, which pertains to the debarment or suspension of a person from participating in a Federal program or activity.

13.13 Build America, Buy America Act

Domestic Preference Requirements for Federal Financial Assistance to Non-Federal Entities. Federal Financial Assistance to Non-Federal Entities, defined pursuant to 2 CFR 200.1 as any State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization, shall be governed by the requirements of Section 70914 of the Build America, Buy America Act (BABAA), under Title IX of the Infrastructure Investment and Jobs Act, Pub. L. 177-58. Any requests for waiver of these requirements must be submitted pursuant to USDA's guidance available online at USDA Buy America Waivers for Federal Financial Assistance | USDA.

13.13.1 This agreement is for services related to a project that is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's regulation (reference 2 CFR 200, 2 CFR 184) on the application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

13.13.2 The Contractor or Construction Manager shall be responsible for:

.1 Providing costs and revisions thereof that reflect compliance with BABAA requirements.

.2 Providing only iron, steel, construction materials and manufactured products that meet BABAA requirements. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

.3 Including manufacturer's certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding or subcontractor pricing, a statement that the manufacturer will comply with BABAA requirements must be included with the bid or GMP submission. Contractor or Construction Manager shall comply with BABAA requirements, including coordination with manufacturers distributors, and suppliers to correct deficiencies in any BABAA documentation.

.4 Providing manufacturer's certification for BABAA requirements with any change order for any new construction materials or manufactured products required by the change.

.5 Certifying by submitting an application for payment, based in whole or in part on furnishing construction materials or manufactured products; that such materials and products, to the Contractor's or Construction Manager's knowledge, are compliant with BABAA requirements.

.6 Ensuring that the Architect / Engineer has been provided an approved manufacturer's certification or waiver prior to items being delivered to the project site.

.7 Certifying upon completion that all work and materials are in compliance with BABAA requirements.

ARTICLE 14 TERMINATION OR SUSPENSION OF CONTRACT

Add the following subparagraph: **(OH Modification)**

14.1.5 If the Owner fails to issue the Notice to Procced as outlined in subparagraph 8.2.4, the Contractor or Construction Manager may, upon issuing a (7) day written notice to the Owner and the Architect, terminate the Agreement and recover from the Owner payment for the Work, costs, and fees as outlined in subparagraph 14.4.3.

ARTICLE 15 CLAIMS AND DISPUTES

Add the words "may be" after "on the parties but" in the last sentence of subparagraph 15.2.5.

Replace the word "shall" with the word "may" in the first sentence, first occurrence of subparagraph 15.3.2.

Add the subparagraph: 15.4.1.2 The arbitrators will select a hearing location as close to the Owner's current place of business as possible.

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DUAL OBLIGEE RIDER

TO BE ATTACHED to and form part of Performance and Payment Bond No. _____, dated _____, issued by _____, a _____ Corporation, as Surety, on behalf of _____, as Principal, and in favor of _____, as Obligee.

Whereas, upon the written request of the Principal and Obligee, the attached bond(s) is (are) hereby amended to add UNITED STATES, ACTING THROUGH RURAL DEVELOPMENT as additional Obligees.

IT IS HEREBY understood and agreed that the above described bond(s) is (are) hereby amended to include the following paragraph:

> Notwithstanding anything contained herein to the contrary, there shall be no liability on the part of the Principal or Surety under this bond to the Obligees, or either of them, unless the Obligees, or either of them, shall make payments to the Principal or to the Surety in case it arranges for completion of the contract upon default of the Principal, strictly in accordance with the terms of said contract as to payments, and shall perform all the other obligations required to be performed under said contract at the time and in the manner therein set forth.
>
> The aggregate liability of the Surety hereunder to the Obligees or their assigns is limited to the penal sum stated in the bond, and Surety, upon making payment hereunder, shall be subrogated to, and shall be entitled to an assignment of, all rights of the Payee, either against the Principal or against any other part liable to the Payee in connection with the loss which is the subject of the payment.

IT IS FURTHER understood and agreed that nothing herein contained shall be held to change, alter or vary the terms of the above described bond(s) except as hereinbefore set forth.

Signed, sealed, and dated this_____day_____of, 20____.

ACCEPTED BY: (Obligees)

BY: _____

PRINCIPAL:

BY:_____

SURETY:

BY: _____

BY:_____
Attorney in fact

NOTICE TO PROCEED

TO:_____

_____

_____

_____

PROJECT Description:_____

_____

_____

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

You are required to return an acknowledged copy of this NOTICE TO PROCEED to the OWNER.

Dated this_____ day of_____, 20____.

By_____
(Owner)

Title_____

ACCEPTANCE OF NOTICE
Receipt of the above NOTICE TO PROCEED is hereby acknowledged

By _____
(Contractor)

Title_____

this the_____, 20_____

_____
(Employer Identification Number)

oOo

ATTACHMENT C – Instructions for Submitting Build America Buy America Act Certifications

The Made in America Office of the OMB has established evidentiary recommendations to substantiate compliance with BABAA. The following instructions present those requirements allowing the designated parties to provide tailored certifications of their compliance to the specifics of the iron, steel, manufactured products, or construction materials under consideration.

INSTRUCTIONS FOR SUBMITTING A BABAA COMPLIANCE CERTIFICATION

Notes to User: Following are instructions to enable the "Contractor," "Subcontractor," "Seller," Or "Material Supplier," to produce a valid certification of compliance with Build America, Buy America Act domestic preference requirements. A certification should be provided to the Owner and Agency.

The following are to be carried out by an individual(s) with the necessary knowledge of the composition, fabrication and pricing of all Iron, Steel, Manufactured Products, and Construction Materials installed on the project.

BABAA Compliance Certification Checklist:

Step 1: Preparation
The "Contractor," "Subcontractor," "Seller," Or "Material Supplier," should collect country-of-origin information on all the materials and components of products. For those elements and items not satisfying the BABAA requirement, separate requests for BABAA waivers must be submitted.

Step 2: Assemble the Data
Create a table containing the country-of-origin for all materials and components of products employed in the project. Immediately below the material and product country-of-origin table, place the authorized and knowledgeable individual(s) signatory space and date over their printed name(s). Below each signature should appear the title of the certifying individual(s), the company's name, and the contact information including a telephone number and email address at which the individual(s) may be reached.

Step 3: Documentation
Prepare a document, either paper or electronic, on the letterhead of the company titled "BABAA Compliance Certification". Include the project designation in the second line. Then insert the following statement:

I hereby certify that to the best of my knowledge and belief all Iron, Steel, Manufactured Products, and Construction Materials installed on this project by my company and by any and all subcontractors and suppliers for this project comply with the Build America, Buy America Act (BABAA) requirements of the Infrastructure Investment and Jobs Act of 2021 (Pub. L. 117- 58, §§ 70901-70953), or are the subject of a waiver approved by the Secretary of Agriculture or designee.

Step 4: Compilation
The information tabulated in step 2, Assemble the Data, for all materials and components of products employed in the project should then be inserted.

Step 5: Certifying
After compiling all information and documentation, each certifying individual(s) provides wet signature and date.

AIA® Document G702® – 1992

Application and Certificate for Payment

TO OWNER:

PROJECT:

APPLICATION NO: 001
PERIOD TO:
CONTRACT FOR:
CONTRACT DATE:
PROJECT NOS: / /

Distribution to:
OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER : ☐

FROM CONTRACTOR:

VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703®, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM	0.00
2. NET CHANGE BY CHANGE ORDERS	0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)	0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)	0.00
5. RETAINAGE:	
a. 0 % of Completed Work (Column D + E on G703)	0.00
b. 0 % of Stored Material (Column F on G703)	0.00
Total Retainage (Lines 5a + 5b or Total in Column I of G703)	0.00
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)	0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)	0.00
8. CURRENT PAYMENT DUE	0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	0.00

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	0.00	0.00
Total approved this Month	0.00	0.00
TOTALS	0.00	0.00
NET CHANGES by Change Order		0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED 0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

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User Notes: (3B9ADA57)

AIA® Document G701® – 2017

Change Order

PROJECT: *(Name and address)*

CONTRACT INFORMATION:
Contract For:
Date:

CHANGE ORDER INFORMATION:
Change Order Number:
Date:

OWNER: *(Name and address)*

ARCHITECT: *(Name and address)*

CONTRACTOR: *(Name and address)*

THE CONTRACT IS CHANGED AS FOLLOWS:
(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)

The original Contract Sum was	$	0.00
The net change by previously authorized Change Orders	$	0.00
The Contract Sum prior to this Change Order was	$	0.00
The Contract Sum will be increased by this Change Order in the amount of	$	0.00
The new Contract Sum including this Change Order will be	$	0.00

The Contract Time will be increased by Zero (0) days.
The new date of Substantial Completion will be

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	**CONTRACTOR** *(Firm name)*	**OWNER** *(Firm name)*
SIGNATURE	**SIGNATURE**	**SIGNATURE**
PRINTED NAME AND TITLE	**PRINTED NAME AND TITLE**	**PRINTED NAME AND TITLE**
DATE	**DATE**	**DATE**

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User Notes: (3B9ADA44)

AIA® Document G706® – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR:

CONTRACT DATED:

TO OWNER: *(Name and address)*

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
SURETY: ☐
OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment ☐ Yes ☒ No

The following supporting documents should be attached hereto if required by the Owner:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.

2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

BY: _____
(Signature of authorized representative)

_____
(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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User Notes: (3B9ADA56)

AIA® Document G706®A – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*	**ARCHITECT'S PROJECT NUMBER:**	OWNER: ☐
	CONTRACT FOR:	ARCHITECT: ☐
TO OWNER: *(Name and address)*	**CONTRACT DATED:**	CONTRACTOR: ☐
		SURETY: ☐
		OTHER: ☐

STATE OF:
COUNTY OF:

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

BY: _____

(Signature of authorized representative)

_____

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

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User Notes: (3B9ADA56)

GEOTECHNICAL CONSULTANTS INC.

GCI PROJECT No. 25-G-31251

Subsurface Exploration and Geotechnical Engineering Report

Life First Ambulance District New Building
4585 SR 98
Sulphur Springs, Ohio

Prepared for:
Life First Ambulance District

May 13, 2026

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May 13, 2026

Stacey Sutherland
Fiscal Officer & HR Coordinator
Life First Ambulance District
P.O. Box 31
Sulphur Springs, Ohio 44881

Reference: Subsurface Exploration and Geotechnical Engineering Report
Life First Ambulance District New Building
4585 SR 98 – Sulphur Springs, Ohio
GCI Project No. 25-G-31251

Geotechnical Consultants, Inc. has performed a subsurface exploration and prepared a geotechnical engineering report for the above referenced project. Our borings encountered a surface cover of topsoil (4" to 6"), with possible fill in 2 of the borings, overlying natural soils consisting of lean clay (including glacial till). Bedrock was not encountered in our borings. We encountered groundwater seepage in 1 boring at 6 feet below grade.

It is our opinion that the site soils are generally suitable for the proposed construction, with proper site preparation. The primary geotechnical issues include proper removal of existing/prior construction elements, proper stripping (including existing possible fill and/or mounds), subgrade stabilization (as needed), new fill placement (as needed), and installation of foundations, slabs, and pavements. We discuss these and other geotechnical considerations in the report.

After you have reviewed the report, feel free to contact us with any questions you may have. We appreciate the opportunity to provide our services for this project and hope to continue our services through construction.

Respectfully submitted,
Geotechnical Consultants, Inc.

Curtis L. Miller, P.E.
Principal

Jeffrey M. Holko, P.E.
In-House Reviewer

Distribution: Stacey Sutherland @ Life First Ambulance District – pdf via email
Bob Gibson @ Triad Architects – pdf via email
GCI File: 25-G-31251

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General Notes for Soil Sampling and Classifications
Site Location Map and Boring Location Plan
Summary of Encountered Subsurface Conditions
Boring Logs (B-1 to B-7)

INTRODUCTION

As authorized by Stacey Sutherland, representing Life First Ambulance District, Geotechnical Consultants, Inc. (GCI) performed a subsurface exploration and prepared this geotechnical engineering report for the proposed Life First Ambulance District new building project in Sulphur Springs, Ohio. Prior to drilling, we were provided with a site plan (prepared by REEL Engineering LLC; plan dated 5/30/2025) showing the proposed project layout, prior structure location, and requested boring locations.

Our subsurface study consisted of seven standard penetration test borings performed at the requested locations. We located the borings in the field using GIS coordinates and handheld GPS equipment; locations shown on our plan should be considered approximate. We did not determine ground elevations at the boring locations. A boring location plan and test boring logs are attached in the Appendix.

The intent of this study was to evaluate subsurface conditions and offer geotechnical recommendations relative to site preparation, foundations, floor slabs, and pavements for the proposed construction. This report is issued prior to the receipt of final site layout and grading plans. GCI should review these plans when available, and provide additional recommendations, if necessary.

This report was prepared for the exclusive use of the Life First Ambulance District and their consultants for specific application to the proposed project in Sulphur Springs, Ohio, in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

SITE AND PROJECT DESCRIPTIONS

The project is located at 4585 State Route 98, on the southwest side of Sulphur Springs, Ohio. The general site location is shown on a map in the appendix. The site previously contained a structure, areas of trees, and open grass-covered areas. The aerial photo below shows what the site looked like prior to structures being removed.

Aerial Photo, Dated 9.25.2013 (Courtesy of Google.com)

At the time of drilling, the site was mostly grass-covered, with some trees, and some soil mounds in the south portion of the property. The aerial photo on the following page shows what the site looked like at the time of drilling.

Aerial Map Current (courtesy Google.com maps)

The following photo was taken by GCI drillers on the day of drilling. The photo shows the soil mounding on the south part of the site.

Photo by GCI Drillers (taken 5/5/2026, looking south to north)

We understand the project will include a new ambulance facility building and associated paved parking and drive areas.

SUBSURFACE CONDITIONS

We mobilized a truck-mounted, rotary drill rig to the site on May 5, 2026, and drilled seven standard penetration borings (B-1 to B-7) at the requested locations. We extended the borings to depths of 10 to 15 feet below grade. Boring logs, a boring location plan, and a summary table of the encountered subsurface conditions are attached in the appendix. We summarize the subsurface findings below. Refer to the individual boring logs and summary table for more detailed subsurface information at specific boring locations.

Surface Cover

The borings encountered a topsoil cover, measuring about 4 to 6 inches thick. Below the topsoil in borings B-6 and B-7 (drilled just off the existing soil mound areas), we encountered possible fill to 4 feet below grade. The material was similar to the upper level natural soils, but contains minor amounts of topsoil. This possible fill material was medium stiff to stiff in cohesive consistency.

Natural Soils

Below the surface cover, the borings encountered natural soils visually described as moderate plasticity brown mottled gray lean clay (classified as CL in the Unified Soil Classification System). N-values indicated material of a medium stiff cohesive consistency; we noted a soft sample at the surface of boring B-5. This upper portion of this layer was stained, which is typically attributed to water filtering down through the

overlying topsoil over the years. The mottled lean clay extended to depths of 2 to 8 feet below grade.

Below the mottled lean clay, the borings (except boring B-4) encountered brown glacial till visually described as moderate plasticity lean clay with sand (CL). We encountered low plasticity gray glacial till (CL) described as sandy lean clay with gravel, in borings B-1 to B-4, at depths of 8 to 13 feet below grade. N-values indicated the till soils were generally stiff to very stiff, with some hard zones noted. The borings terminated within the brown and gray glacial till at depths of 10 to 15 feet below grade.

Bedrock

We did not encounter bedrock within the maximum drilled depths of our borings (15 feet).

Groundwater

We encountered groundwater seepage in boring B-1 at 6 feet below grade. By completion of drilling, the water level had dropped to 12 feet. We did not encounter groundwater in the remaining six borings. Split-spoon samples were noted generally as moist, with an occasional very moist to wet sample noted. Soil moisture conditions and groundwater levels fluctuate in response to precipitation events, seasonal changes in climate, stabilization time, and other factors that may differ from the time the measurements were made.

ANALYSES AND CONCLUSIONS

GEOTECHNICAL EVALUATION

It is GCI's opinion that the site is generally suitable for the proposed construction with proper site preparation. We discuss geotechnical considerations in the following paragraphs.

Site Preparation

We did not encounter elements of the prior construction, but we also do not know how the prior construction was removed and if any excavation voids (that may have been created) were backfilled. Existing and prior construction elements should be removed from below proposed construction areas, and to at least 10 feet outside the building and pavement limits. Removal should include foundations, walls, slabs, and pavement, and any utilities (including trench backfill). Utilities abandoned outside these limits should be capped to prevent loss of soil.

Our borings encountered 4 to 6 inches of surface topsoil. Topsoil, rootmat, stumps from removed trees, and other unsuitable materials should be removed in their entirety from the proposed development area, plus 5 feet laterally. After initial site stripping activities, we anticipate the exposed surface will consist of stained clay-based soils. Stained soils can remain in place provided the soils are stable below a thorough proof roll.

Existing Fill

There are several mounds and other debris on the south part of the site, and we encountered possible fill in borings B-6 and B-7, extending to about 4 feet. We recommend that any mounds and debris be completely removed to expose stable

subgrade soils. Provided the fill soil found in borings B-6 and B-7 is firm and stable below a thorough proof roll, it is our opinion that the material would be suitable for support of proposed pavements with a small risk of movement.

Subgrade Stabilization

Stabilization of soft soil subgrades by disking, aerating/drying, and re-compaction may be feasible during traditionally drier times of the year. During wet seasons, partial undercutting and replacing of wet soils with structural fill, drying with soil additives such as lime, or use of geosynthetics may be needed to create a stable subgrade before placing controlled fills. The use of soil additives, such as lime and fly-ash, or installation of geosynthetics should be reviewed by our office prior to use in the field. We expect fewer problems with soft subgrades if work is performed during traditionally drier times of the year (late spring, summer, and early fall). Traditionally wetter seasons (i.e., late fall, winter, and early spring) will contribute to more problems associated with soft, very moist subgrades. Non-organic portions of existing fill can be reused for structural fill with proper moisture control.

New Fill Placement

Structural fill can be placed to design grade once the subgrades are brought to firm and stable conditions. Non-organic site soils and non-organic removed fills can be used as structural fill provided proper moisture control is maintained. Imported fill materials should be reviewed by our office prior to placement. Depending on the time of year of earthwork, the fill may require drying to achieve proper compaction. The contractor should place and compact controlled fills in accordance with the information presented in the *Site Preparation and Earthwork* section of this report.

FOUNDATIONS

Once the site has been properly prepared, it is our opinion the new building can be supported on conventional shallow foundations that bear on firm and stable, natural non-organic soils or new, controlled fill placed directly over firm and stable, natural non-organic soils. An allowable bearing pressure of **3,000 pounds per square foot** would be appropriate for foundation design.

Regardless of calculated sizes, we recommend minimum sizes of 16 inches wide for wall footings and 30 inches square for column pads to prevent a “punch” effect. Exterior footings should extend to local frost bearing depth (36 inches anticipated) or to stable bearing (as stated above), whichever is deeper. Interior footings in heated areas may be placed as shallow as feasible, if bearing on acceptable soils.

Typical to local practice, if soft or unstable soils are encountered at footing design subgrade, undercut to firm and stable soils. Soft, unstable footing subgrades should be reviewed by the soils engineer prior to undercut. Undercut areas can be backfilled to footing design subgrade using a controlled density fill (CDF) or footings can be constructed at the bottom of the undercut.

FLOOR SLABS

Conventional concrete slab-on-grade is feasible for the proposed structure. GCI recommends placing a minimum of 4 inches of granular fill (such as ODOT Item 304 or crushed No. #57 limestone) under an at-grade slab to serve as a capillary cut-off and to provide a uniform, firm sub-base. The aggregate thickness should be increased to at least

6 inches under heavily loaded slabs. We suggest placing a vapor retarder below the slab in areas where moisture could cause problems with floor finishes.

SEISMIC FACTOR

Our borings encountered topsoil and possible fill over natural medium stiff to hard lean clays (including glacial till). In accordance with the Ohio Building Code – Site class definitions, we estimate the site as a Site Class D – stiff soil profile.

EXCAVATIONS

The site soils can be excavated with conventional track hoe equipment. Excavation into granular layers within the glacial till soils may require layback or trench box construction techniques to prevent sidewall collapse. **Excavations should comply with current OSHA regulations**.

GROUNDWATER

Groundwater seepage was encountered in one boring at 6 feet below grade, with the final water level measured at 12 feet below grade after drilling completion. Based upon our boring observations, we do not anticipate groundwater will have a significant impact on foundation and shallow utility excavations. We expect that groundwater flows, if encountered, can be handled with portable sump pumps**.** Contact GCI for additional recommendations if persistent water flows are encountered.

PAVEMENTS

Provided the site is properly prepared, conventional aggregate base and flexible asphalt wearing course pavements can be used. Prior to pavement construction, the subgrade

should be carefully proof-rolled, and stabilized as necessary. We provide recommendations for minimum sections, but a specific pavement design is beyond the scope of work of this report; GCI can provide one if requested. A site-specific pavement design would require additional laboratory testing and pavement use criteria.

We assume that traffic will consist primarily of automobiles. Properly compacted, we feel that the site soils would have a CBR value of at least 3. Based on our experience with similar projects and soils, and assuming properly prepared subgrades, we recommend a minimum light-duty pavement section consisting of 3 inches of asphalt over 8 inches of aggregate base for the parking spaces. We suggest a pavement section consisting of a minimum of 4 inches of asphalt over 10 inches of aggregate base for heavily-trafficked areas. We recommend a minimum of 8 inches of air-entrained, Portland cement concrete for dumpster pad and approach areas.

Providing adequate subbase drainage is important to future pavement performance. Finger drains connecting to weep-holes in catch basin inlets, proper grading of pavement subgrades and surfaces to shed run-off, and underdrains in pavement swales are suggested subbase drainage methods and should be designed by the site civil engineer. Pavement areas should be thoroughly proof-rolled and steel-wheel rolled to a smooth surface prior to placement of base aggregate. Subgrade preparation during wet seasons may require the use of engineering fabrics or geogrids.

SITE PREPARATION AND EARTHWORK

We provide below general guidelines for site preparation and earthwork operations.

1. Remove existing/prior construction, soil mounds and debris, topsoil, rootmat, stumps from removed trees, and other unsuitable objects from proposed development areas, plus a minimum of 5 to 10 feet beyond (as noted in the report).

2. Thoroughly and carefully proof-roll the exposed soil subgrades with a fully-loaded, tandem-axle dump truck (or equivalent) to identify potential soft subgrade areas. Undercut soft areas or otherwise stabilize soft spots identified during the proof-roll prior to placing controlled fill to design grade.

3. Place controlled fills to design grade within proposed building and pavement areas, as required. Non-organic natural soils are suitable for reuse in new controlled fills. **Off-site borrow materials should be reviewed by our office prior to use.**

4. Place controlled fills in maximum 8-inch thick loose lifts and compact each lift to a minimum of 98% of the maximum Standard Proctor dry density (ASTM D-698). The moisture in the fill soils should be controlled to within ±3% of the optimum Standard Proctor moisture content. **Depending on the time of year of earthwork, moisture adjustment of the existing fill and site soils may be required to achieve proper compaction.** Cohesive soils will compact best with a sheepsfoot roller and granular soils with a vibratory roller.

5. Construct foundations and start building construction after the building pad is completed. Refer to the *Foundations* section of this report for specific foundation design parameters.

6. Slab-on-grade and pavement areas should be steel-wheel rolled to a smooth surface prior to placement of base aggregate. Subgrade preparation during wet seasons may require the use of engineering fabric or geo-grid.

7. It is recommended that GCI be retained to observe proof-rolling operations, cut and fill operations, and footing excavations.

8. If work is performed during the winter (e.g., when freezing temperatures occur), special protective measures will be required during filling and footing construction procedures. Contact GCI for additional cold weather recommendations, as needed.

CONSTRUCTION MATERIALS ENGINEERING AND TESTING

GCI provides construction materials engineering and testing services. For project continuity throughout construction, we recommend that GCI be retained to observe, test, and document:

- earthwork procedures (stripping, fill placement, compaction, utility trench backfill, etc.),
- foundation subgrade observation,
- concrete placement and compressive strength testing (footings, slabs, etc.),
- structural steel (welds, bolts, etc.), and
- masonry wall construction observation and grout testing (if applicable).

The purpose of this work is to assess that the intent of our recommendations is being followed and to make timely changes to our recommendations (as needed) in the event site conditions vary from those encountered in our borings. Please contact our field department to initiate these services.

FINAL

We recommend that GCI review final site layout and grading plans. Recommendations contained in this report may be changed based on review of final site plans. If any changes in the nature, design or locations of the construction are planned, conclusions and recommendations should not be considered valid unless verified in writing by GCI.

The recommendations contained in this report are the opinion of GCI based on the subsurface conditions found in the borings and available development information. It should be noted that the nature and extent of variations between borings might not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report. This report has been prepared for design purposes only and should not be considered sufficient to prepare an accurate bid document.

If you have any questions or need for any additional information, please contact our office. It has been a pleasure to be of service to you on this project, and we hope to continue our services through construction.

GEOTECHNICAL CONSULTANTS INC.

APPENDIX – Life First Ambulance District New Building

General Notes for Soil Sampling and Classifications
Site Location Map and Boring Location Plan
Summary of Encountered Subsurface Conditions
Test Boring Logs (B-1 to B-7)

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937.736.2053 **phone**

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GENERAL NOTES FOR SOIL SAMPLING AND CLASSIFICATIONS

BORINGS, SAMPLING AND GROUNDWATER OBSERVATIONS:

Drilling and sampling were conducted in accordance with procedures generally recognized and accepted as standard methods of exploration of subsurface conditions. The borings were drilled using a truck-mounted drill rig using auger boring methods with standard penetration testing performed in each boring at intervals ranging from 1.5 to 5.0 feet. The stratification lines on the logs represent the approximate boundary between soil types at that specific location and the transition may be gradual.

Water levels were measured at drill locations under conditions stated on the logs. This data has been reviewed and interpretations made in the text of the report. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time the measurements were made.

The Standard Penetration Test (ASTM-D-1586) is performed by driving a 2.0 inch O.D. split barrel sampler a distance of 18 inches utilizing a 140 pound hammer free falling 30 inches. The number of blows required to drive the sampler each 6 inches of penetration are recorded. The summation of the blows required to drive the sampler for the final 12 inches of penetration is termed the Standard Penetration Resistance (N). Soil density/consistency in terms of the N-value is as follows:

COHESIONLESS DENSITY		COHESIVE CONSISTENCY	
0-10	Loose	0-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	Very Stiff
		30 +	Hard

SOIL MOISTURE TERMS

Soil Samples obtained during the drilling process are visually characterized for moisture content as follows:

MOISTURE CONTENT	DESCRIPTION
Damp	Soil moisture is much drier than the Atterberg plastic limit (where soils are cohesive) and generally more than 3% below Standard Proctor “optimum” moisture conditions. Soils of this moisture generally require added moisture to achieve proper compaction.
Moist	Soil moisture is near the Atterberg plastic limit (cohesive soils) and generally within ±3% of the Standard Proctor “optimum” moisture content. Little to no moisture conditioning is anticipated to be required to achieve proper compaction and stable subgrades.
Very Moist	Soil moisture conditions are above the Atterberg plastic limit (cohesive soils) and generally greater than 3% above Standard Proctor “optimum” moisture conditions. Drying of the soils to near “optimum” conditions is anticipated to achieve proper compaction and stable subgrades.
Wet	Soils are saturated. Significant drying of soils is anticipated to achieve proper compaction and stable subgrades.

SOIL CLASSIFICATION PROCEDURE:

Soil samples obtained during the drilling process are preserved in plastic bags and visually classified in the laboratory. Select soil samples may be subjected to laboratory testing to determine natural moisture content, gradation, Atterberg limits and unit weight. Soil classifications on logs may be adjusted based on results of laboratory testing.

Soils are classified in accordance with the ASTM version of the Unified Soil Classification System. ASTM D-2487 “Classification of Soils for Engineering Purposes (Unified Soil Classification System) describes a system for classifying soils based on laboratory testing. ASTM D-2488 “Description and Identification of Soil (Visual-Manual Procedure) describes a system for classifying soils based on visual examination and manual tests.

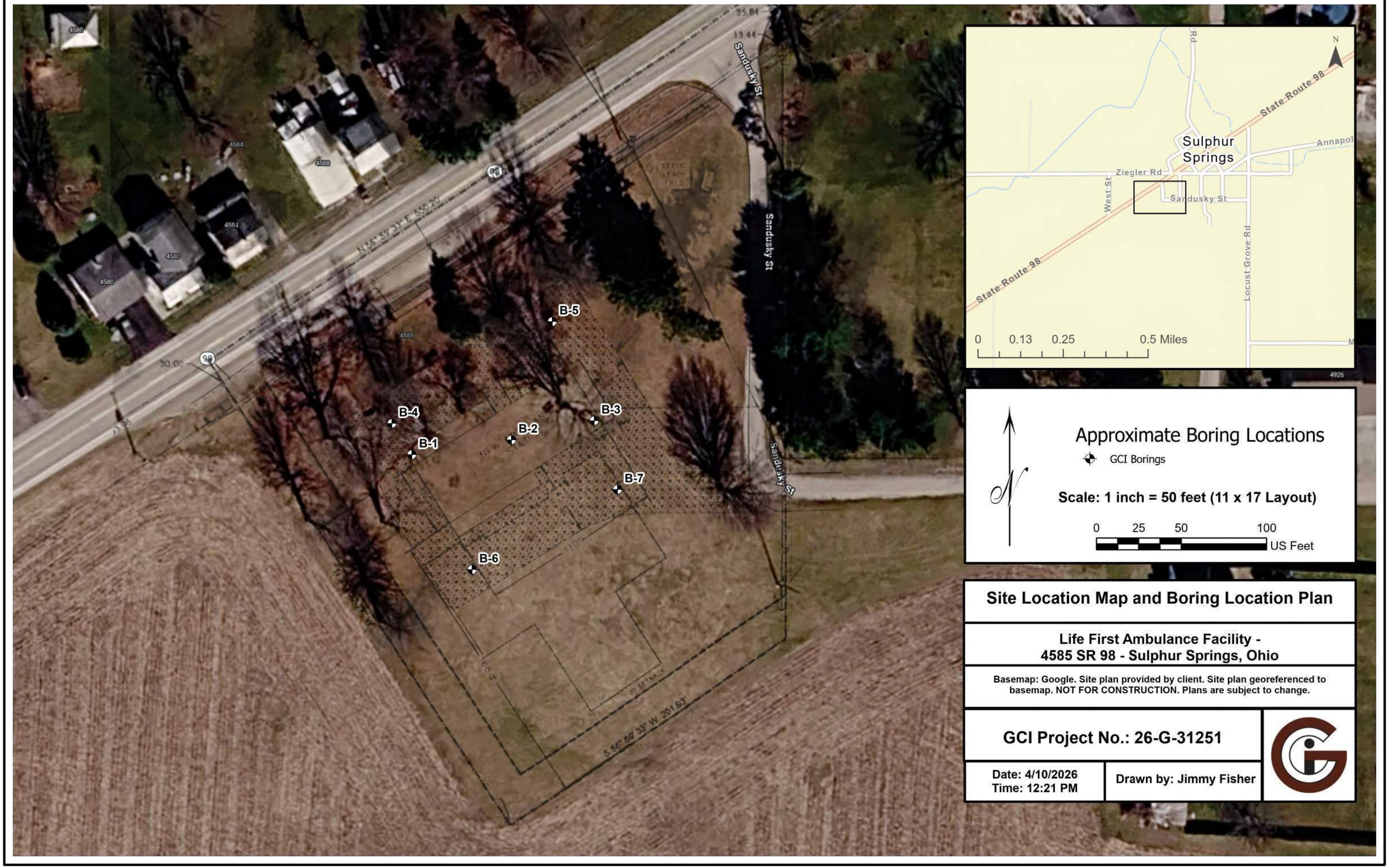
Soil classifications are based on the following tables (see reverse side):

GENERAL NOTES FOR SOIL SAMPLING AND CLASSIFICATIONS

PARTICLE SIZE DEFINITION		
Boulders:		>12"
Cobbles:		3" to 12"
Gravel:	Coarse:	3/4" to 3"
	Fine:	No. 4 (3/16") to 3/4"
Sand:	Coarse	No. 10 (2.0mm) to No. 4 (4.75mm)
	Medium	No. 40 (0.425mm) to No. 10 (2.0mm)
	Fine	No. 200 (0.074mm) to No. 40 (0.425mm)
Silt & Clay		<0.074mm; classification based on overall plasticity; in general clay particles <0.005mm.

CONSTITUENT MODIFIERS	
Trace	Less than 5%
Few	5-10%
Little	15-25%
Some	30-45%
Mostly	50-100%

ASTM/UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART		
COARSE-GRAINED SOILS (more than 50% of materials is larger than No. 200 sieve size)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	*Clean Gravel (less than 5% fines)*	
	GW	Well-graded gravel, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel sand mixtures, little or no fines
	Gravels with fines (more than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
SANDS More than 50% of coarse fraction smaller than No. 4 sieve size	*Clean Sands (Less than 5% fines)*	
	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly-graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent ……GW, GP, SW, SP Greater than 12 percent ……GM, GC, SM, SC 5 to 12 percent ……Borderline cases requiring dual symbols: SP-SM, GP-GM, etc.		
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size)		
SILTS AND CLAYS Liquid Limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	CL-ML	Inorganic silty clay of slight plasticity, P.I. between 4 and 7
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid Limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays or medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils



Site Location Map and Boring Location Plan

Life First Ambulance Facility -
4585 SR 98 - Sulphur Springs, Ohio

Basemap: Google. Site plan provided by client. Site plan georeferenced to basemap. NOT FOR CONSTRUCTION. Plans are subject to change.

GCI Project No.: 26-G-31251

Date: 4/10/2026 Time: 12:21 PM	Drawn by: Jimmy Fisher

Summary of Encountered Subsurface Conditions

Life First Ambulance Building
4585 SR 98 – Sulphur Springs, Ohio
GCI Job Number 25-G-31251

Boring	Topsoil Thickness (in)	Possible Fill (ft)	Depth to Groundwater		Depth to Mottled Lean Clay (ft)	Depth to Brown Till (ft)	Depth to Gray Till (ft)	Bottom of Boring (ft)
			During Drilling (ft)	At Drilling Completion (ft)				
B-1	6”	---	6’	12’	0.5’	3.5’	12’	15’
B-2	5”	---	---	---	0.4’	5’	13’	15’
B-3	5”	---	---	---	0.4’	3’	12’	15’
B-4	5”	---	---	---	0.4’	---	8’	10’
B-5	5”	---	---	---	0.4’	2’	---	10’
B-6	4”	0.3’ to 4’	---	---	---	4’	---	10’
B-7	4”	0.3’ to 4’	---	---	---	4’	---	10’

NOTES: --- indicates not encountered

SOIL BORING LOG

PROJECT NAME Life First Ambulance District New Building
BORING NO. B-1
CLIENT Life First Ambulance District
PROJ. NO. 26-G-31251
SURF. ELEV. N/A
PROJECT ADDRESS 4585 SR 98 - Sulphur Springs, Ohio
DATE DRILLED 05/05/2026
BORING LOCATION See Boring Location Plan
WEATHER -

Observations	
Water at Time of Drill	6'
Water After Drilling	12'
Water After 24-Hours	N/A
Cave In	N/A

Proportions Used	
Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sample

Cohesionless Density		Cohesive Consistency	
Very Loose	0-5	Soft	0-4
Loose	5-10	Medium Stiff	4-8
Medium Dense	10-30	Stiff	8-15
Dense	30-50	Very Stiff	15-30
Very Dense	+50	Hard	+30

Depth (ft)	Pocket Penetrometer (tsf)	Sample Interval (ft)	Sample Type	Blow Counts	Moisture	Depth (ft)	Graphic Log	Soil Description and Remarks
	0.5	0-1.5	SS	3-2-3	Moist			Topsoil 0.5
								Stained Brown Mottled Gray Lean Clay (CL) - moderate plasticity; trace sand
	4.5	2-3.5	SS	6-7-7	Moist			3.5
5	0.5	4-5.5	SS	5-4-4	Very Moist	5		Brown Lean Clay with Sand (CL); glacial till - moderate plasticity; little fine to coarse sand, trace gravel; random silty sand and gravel layers noted
								Water Seepage at 6 ft
10	--	8.5-10	SS	7-5-6	Very Moist	10		
								12.0
								Gray Sandy Lean Clay with Gravel (CL); glacial till - low plasticity; little to some fine to coarse sand, little gravel; random silty sand and gravel layers noted
15	2.5	13.5-15	SS	6-6-9	Moist	15		15.0
								Bottom of Boring @ 15'

GEOTECHNICAL CONSULTANTS INC.

*The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

SOIL BORING LOG

PROJECT NAME Life First Ambulance District New Building
BORING NO. B-2
CLIENT Life First Ambulance District
PROJ. NO. 26-G-31251
SURF. ELEV. N/A
PROJECT ADDRESS 4585 SR 98 - Sulphur Springs, Ohio
DATE DRILLED 05/05/2026
BORING LOCATION See Boring Location Plan
WEATHER -

Observations		Proportions Used		140 lb Wt. x 30" fall on 2" O.D. Sample			
				Cohesionless Density		Cohesive Consistency	
Water at Time of Drilling	N/A	Trace	Less than 5%	Very Loose	0-5	Soft	0-4
Water After Drilling	N/A	Few	5 to 10%	Loose	5-10	Medium Stiff	4-8
Water After 24-Hours	N/A	Little	15 to 25%	Medium Dense	10-30	Stiff	8-15
Cave In	N/A	Some	30 to 45%	Dense	30-50	Very Stiff	15-30
		Mostly	50 to 100%	Very Dense	+50	Hard	+30

Depth (ft)	Pocket Penetrometer (tsf)	Sample Interval (ft)	Sample Type	Blow Counts	Moisture	Depth (ft)	Graphic Log	Soil Description and Remarks
	2.5	0-1.5	SS	3-2-3	Moist			Topsoil 0.4 Stained Brown Mottled Gray Lean Clay (CL) - moderate plasticity; trace sand
	3.5	2-3.5	SS	3-3-3	Moist			
5	2.5	4-5.5	SS	4-3-3	Moist	5		5.0 Brown Lean Clay with Sand (CL); glacial till - moderate plasticity; little fine to coarse sand, trace gravel; random silty sand and gravel layers noted
10	4.5	8.5-10	SS	7-7-8	Moist	10		
								13.0 Gray Sandy Lean Clay with Gravel (CL); glacial till - low plasticity; little to some fine to coarse sand, little gravel; random silty sand and gravel layers noted
15	4	13.5-15	SS	7-9-9	Moist	15		15.0 Bottom of Boring @ 15'

GEOTECHNICAL CONSULTANTS INC.

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SOIL BORING LOG

PROJECT NAME Life First Ambulance District New Building
BORING NO. B-3
CLIENT Life First Ambulance District
PROJ. NO. 26-G-31251
SURF. ELEV. N/A
PROJECT ADDRESS 4585 SR 98 - Sulphur Springs, Ohio
DATE DRILLED 05/05/2026
BORING LOCATION See Boring Location Plan
WEATHER -

Observations	
Water at Time of Drilling	N/A
Water After Drilling	N/A
Water After 24-Hours	N/A
Cave In	N/A

Proportions Used	
Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sample

Cohesionless Density	
Very Loose	0-5
Loose	5-10
Medium Dense	10-30
Dense	30-50
Very Dense	+50

Cohesive Consistency	
Soft	0-4
Medium Stiff	4-8
Stiff	8-15
Very Stiff	15-30
Hard	+30

Depth (ft)	Pocket Penetrometer (tsf)	Sample Interval (ft)	Sample Type	Blow Counts	Moisture	Depth (ft)	Graphic Log	Soil Description and Remarks
	0.5	0-1.5	SS	4-3-4	Moist to Very Moist			Topsoil 0.4
								Stained Brown Mottled Gray Lean Clay (CL) - moderate plasticity; trace sand
	4	2-3.5	SS	5-5-5	Moist			3.0
								Brown Lean Clay with Sand (CL); glacial till - moderate plasticity; little fine to coarse sand, trace gravel; random silty sand and gravel layers noted
5	--	4-5.5	SS	5-4-6	Moist	5		
10	4.5	8.5-10	SS	6-7-11	Moist	10		
								12.0
								Gray Sandy Lean Clay with Gravel (CL); glacial till - low plasticity; little to some fine to coarse sand, little gravel; random silty sand and gravel layers noted
15	4.5	13.5-15	SS	9-11-15	Moist	15		15.0
								Bottom of Boring @ 15'

GEOTECHNICAL CONSULTANTS INC.

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SOIL BORING LOG

PROJECT NAME Life First Ambulance District New Building
BORING NO. B-4
CLIENT Life First Ambulance District
PROJ. NO. 26-G-31251
SURF. ELEV. N/A
PROJECT ADDRESS 4585 SR 98 - Sulphur Springs, Ohio
DATE DRILLED 05/05/2026
BORING LOCATION See Boring Location Plan
WEATHER -

Observations	
Water at Time of Drilling	N/A
Water After Drilling	N/A
Water After 24-Hours	N/A
Cave In	N/A

Proportions Used	
Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sample

Cohesionless Density	
Very Loose	0-5
Loose	5-10
Medium Dense	10-30
Dense	30-50
Very Dense	+50

Cohesive Consistency	
Soft	0-4
Medium Stiff	4-8
Stiff	8-15
Very Stiff	15-30
Hard	+30

Depth (ft)	Pocket Penetrometer (tsf)	Sample Interval (ft)	Sample Type	Blow Counts	Moisture	Graphic Log	Soil Description and Remarks
	3	0-1.5	SS	2-2-2	Moist		Topsoil 0.4
							Stained Brown Mottled Gray Lean Clay (CL) - moderate plasticity; trace sand
	4	2-3.5	SS	4-5-5	Moist		
5	4.5	4-5.5	SS	7-6-7	Moist		8.0
							Gray Sandy Lean Clay (CL) - low plasticity; silty layers noted
10	4.5	8.5-10	SS	7-9-10	Very Moist		10.0
							Bottom of Boring @ 10'
15							

GEOTECHNICAL CONSULTANTS INC.

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SOIL BORING LOG

PROJECT NAME Life First Ambulance District New Building
BORING NO. B-5
CLIENT Life First Ambulance District
PROJ. NO. 26-G-31251
SURF. ELEV. N/A
PROJECT ADDRESS 4585 SR 98 - Sulphur Springs, Ohio
DATE DRILLED 05/05/2026
BORING LOCATION See Boring Location Plan
WEATHER -

Observations		Proportions Used		140 lb Wt. x 30" fall on 2" O.D. Sample			
				Cohesionless Density		Cohesive Consistency	
Water at Time of Drilling	N/A	Trace	Less than 5%	Very Loose	0-5	Soft	0-4
Water After Drilling	N/A	Few	5 to 10%	Loose	5-10	Medium Stiff	4-8
Water After 24-Hours	N/A	Little	15 to 25%	Medium Dense	10-30	Stiff	8-15
Cave In	N/A	Some	30 to 45%	Dense	30-50	Very Stiff	15-30
		Mostly	50 to 100%	Very Dense	+50	Hard	+30

Depth (ft)	Pocket Penetrometer (tsf)	Sample Interval (ft)	Sample Type	Blow Counts	Moisture	Depth (ft)	Graphic Log	Soil Description and Remarks
	2	0-1.5	SS	2-1-2	Very Moist			Topsoil 0.4 Stained Brown Mottled Gray Lean Clay (CL) - moderate plasticity; trace sand 2.0
	4	2-3.5	SS	4-5-5	Moist			Brown Lean Clay with Sand (CL); glacial till - moderate plasticity; little fine to coarse sand, trace gravel
5	4.5	4-5.5	SS	7-7-7	Moist	5		
10	4.5	8.5-10	SS	9-12-14	Moist	10		10.0
15						15		Bottom of Boring @ 10'

GEOTECHNICAL CONSULTANTS INC.

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SOIL BORING LOG

PROJECT NAME Life First Ambulance District New Building
BORING NO. B-6
CLIENT Life First Ambulance District
PROJ. NO. 26-G-31251
SURF. ELEV. N/A
PROJECT ADDRESS 4585 SR 98 - Sulphur Springs, Ohio
DATE DRILLED 05/05/2026
BORING LOCATION See Boring Location Plan
WEATHER -

Observations	
Water at Time of Drilling	N/A
Water After Drilling	N/A
Water After 24-Hours	N/A
Cave In	N/A

Proportions Used	
Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sample

Cohesionless Density	
Very Loose	0-5
Loose	5-10
Medium Dense	10-30
Dense	30-50
Very Dense	+50

Cohesive Consistency	
Soft	0-4
Medium Stiff	4-8
Stiff	8-15
Very Stiff	15-30
Hard	+30

Depth (ft)	Pocket Penetrometer (tsf)	Sample Interval (ft)	Sample Type	Blow Counts	Moisture	Graphic Log	Soil Description and Remarks
	2	0-1.5	SS	3-4-3	Moist		Topsoil 0.3 Stained Brown Mottled Gray Lean Clay (CL) - moderate plasticity; trace sand (driller noted this material as possible fill)
	3	2-3.5	SS	4-3-4	Moist		4.0
5	4.5	4-5.5	SS	6-8-9	Moist		Brown Lean Clay with Sand (CL); glacial till - moderate plasticity; little fine to coarse sand, trace gravel
10	4.5	8.5-10	SS	12-15-15	Moist		10.0
15							Bottom of Boring @ 10'

GEOTECHNICAL CONSULTANTS INC.

*The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

SOIL BORING LOG

PROJECT NAME Life First Ambulance District New Building
BORING NO. B-7
CLIENT Life First Ambulance District
PROJ. NO. 26-G-31251
SURF. ELEV. N/A
PROJECT ADDRESS 4585 SR 98 - Sulphur Springs, Ohio
DATE DRILLED 05/05/2026
BORING LOCATION See Boring Location Plan
WEATHER -

Observations		Proportions Used		140 lb Wt. x 30" fall on 2" O.D. Sample			
				Cohesionless Density		Cohesive Consistency	
Water at Time of Drilling	N/A	Trace	Less than 5%	Very Loose	0-5	Soft	0-4
Water After Drilling	N/A	Few	5 to 10%	Loose	5-10	Medium Stiff	4-8
Water After 24-Hours	N/A	Little	15 to 25%	Medium Dense	10-30	Stiff	8-15
Cave In	N/A	Some	30 to 45%	Dense	30-50	Very Stiff	15-30
		Mostly	50 to 100%	Very Dense	+50	Hard	+30

Depth (ft)	Pocket Penetrometer (tsf)	Sample Interval (ft)	Sample Type	Blow Counts	Moisture	Depth (ft)	Graphic Log	Soil Description and Remarks
	4	0-1.5	SS	4-3-4	Moist			Topsoil 0.3 Stained Brown Mottled Gray Lean Clay (CL) - moderate plasticity; trace sand (driller noted this material as possible fill)
	4	2-3.5	SS	4-4-5	Moist			4.0
5	3.54.5	4-5.5	SS	4-4-4	Moist	5		Brown Lean Clay with Sand (CL); glacial till - moderate plasticity; little fine to coarse sand, trace gravel
10	4	8.5-10	SS	5-5-7	Moist	10		10.0
15						15		Bottom of Boring @ 10'

GEOTECHNICAL CONSULTANTS INC.

*The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Asbestos Local 207

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Asbestos Worker	7/8/2026	7/8/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Asbestos Abatement	$35.25		$11.20	$7.50	$1.00	$4.00	$0.00	$0.05	$0.00	$0.00	$59.00	$76.63
Apprentice	BHR	Percent										
Trainee 1 Year - 600 Hrs	$25.00	$70.92	$11.20	$1.90	$1.00	$1.00	$0.00	$0.05	$0.00	$0.00	$40.15	$52.65

(*)Special Calculation Note :

Other: Drug Testing

Ratio :

3 Journeymen to 1 Trainee

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula*, Athens, Auglaize, Brown, Butler*, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Erie*, Fairfield, Fayette, Franklin, Geauga, Greene, Guernsey, Hamilton, Hardin, Harrison, Highland, Hocking, Holmes, Huron, Knox, Lake, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Miami, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Portage, Preble, Richland, Ross, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren*, Wayne

Special Jurisdictional Note :

Ashtabula County: (post offices & townships of Ashtabula, Austinburg, Geneva, Harperfield, Jefferson, Plymouth & Saybrook) (townships of Andover, Cherry Valley, Colbrook, Canneaut, Denmark, Dorset, East Orwell, Hartsgrove, Kingville, Lenox, Monroe,Morgan,New Lyme,North Kingsville, Orwell, Pierpoint, Richmond Rock Creek, Rome, Shefield, Trumbull, Wayne, Williamsfield & Windsor)

Butler County: (townships of Fairfield, Hanover, Liberty, Milford, Morgan, Oxford, Ripley, Ross, St. Clair, Union & Wayne) (Lemon & Madison)

Erie County: (post offices & townships of Berlin, Berlin Heights,Birmingham,Florence, Huron, Milan, Shinrock & Vermilion)

Warren County: (townships of: Deerfield, Hamilton, Harlan, Salem, Union & Washington) (Clear Creek, Franklin, Mossie, Turtle Creek & Wayne)

Details :

An Abatement Journeyman is anyone who has more than 600 hours in the Asbestos Abatement field.

Asbestos & lead paint abatement including, but not limited to the removal or encapsulation of asbestos & lead paint, all work in conjunction with the preparation of the removal of same & all work in conjunction with the clean up after said removal. The removal of all insulation materials, whether they contain asbestos or not, from mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) is recognized as being the exclusive work of the Asbestos Abatement Workers.

On all mechanical systems (pipes, boilers, ducts, flues, breaching, etc.) that are going to be demolished, the removal of all insulating materials whether they contain asbestos or not shall be the exclusive work of the Laborers.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Asbestos Local 50 Heat & Frost Insulators

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Asbestos Worker	7/15/2026	7/15/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Asbestos Insulation Mechanic	$42.85		$10.20	$10.10	$0.55	$0.00	$5.25	$0.00	$0.00	$0.00	$68.95	$90.38
Firestop Technician	$42.85		$10.20	$10.10	$0.55	$0.00	$5.25	$0.00	$0.00	$0.00	$68.95	$90.38
Apprentice	BHR	Percent										
1st year	$27.91	$65.13	$9.80	$4.52	$0.50	$0.00	$0.50	$0.00	$0.00	$0.00	$43.23	$57.19
2nd year	$32.57	$76.00	$9.80	$4.52	$0.50	$0.00	$0.85	$0.00	$0.00	$0.00	$48.24	$64.53
3rd year	$37.23	$86.88	$9.80	$6.76	$0.50	$0.00	$1.25	$0.00	$0.00	$0.00	$55.54	$74.16
4th year	$39.56	$92.32	$9.80	$6.76	$0.50	$0.00	$1.50	$0.00	$0.00	$0.00	$58.12	$77.90

(*)Special Calculation Note :

Ratio :

1 Journeymen to 1 Apprentice
4 Journeymen to 1 Apprentice thereafter

Jurisdiction (* denotes special jurisdictional note) :

Athens, Auglaize, Butler*, Champaign, Clark, Clinton, Crawford, Darke, Delaware, Fairfield, Fayette, Franklin, Greene, Guernsey, Hardin, Hocking, Knox, Licking, Logan, Madison, Marion, Miami, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Preble, Ross, Shelby, Union, Vinton, Warren*

Special Jurisdictional Note :

Butler County: Townships of Lemon and Madison.
Warren County: Township of Clear Creek, Franklin, Massie, Turtle Creek and Wayne

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Boilermaker Local 85

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2012kp	Boilermaker	3/28/2012	3/28/2012

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Boilermaker	$31.01		$6.97	$10.77	$0.35	$0.00	$3.00	$2.09	$0.00	$0.00	$54.19	$69.70
Apprentice	BHR	Percent										
1st 6 months	$21.71	$70.00	$6.97	$0.25	$0.35	$0.00	$0.25	$2.09	$0.00	$0.00	$31.62	$42.47
2nd 6 months	$22.48	$72.50	$6.97	$0.25	$0.35	$0.00	$0.25	$2.09	$0.00	$0.00	$32.39	$43.63
3rd 6 months	$23.26	$75.00	$6.97	$0.25	$0.35	$0.00	$0.25	$2.09	$0.00	$0.00	$33.17	$44.80
4th 6 months	$24.03	$77.50	$6.97	$10.77	$0.35	$0.00	$3.00	$2.09	$0.00	$0.00	$47.21	$59.23
5th 6 months	$24.81	$80.00	$6.97	$10.77	$0.35	$0.00	$3.00	$2.09	$0.00	$0.00	$47.99	$60.39
6th 6 months	$26.36	$85.00	$6.97	$10.77	$0.35	$0.00	$3.00	$2.09	$0.00	$0.00	$49.54	$62.72
7th 6 months	$27.91	$90.00	$6.97	$10.77	$0.35	$0.00	$3.00	$2.09	$0.00	$0.00	$51.09	$65.04
8th 6 months	$29.46	$95.00	$6.97	$10.77	$0.35	$0.00	$3.00	$2.09	$0.00	$0.00	$52.64	$67.37

(*)Special Calculation Note :

No special calculations for this skilled craft wage rate are required at this time.

Ratio :

5 Journeymen to 1 Apprentice 10 Journeymen to 2 Apprentice 15 Journeymen to 3 Apprentice Helpers will be referred in the event that apprentices are NOT available.

Jurisdiction (* denotes special jurisdictional note) :

Allen, Ashland, Auglaize, Crawford, Darke, Defiance, Delaware, Erie, Fulton, Hancock, Hardin, Henry, Huron, Knox, Logan, Lucas, Marion, Mercer, Morrow, Ottawa, Paulding, Putnam, Richland, Sandusky, Seneca, Shelby, Union, Van Wert, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Bricklayer Local 23 (Mansfield)

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Bricklayer

Effective Date: 6/3/2026

Effective Date: 6/3/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Bricklayer	$37.57		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$65.41	$84.20
Pointer Caulker Cleaner	$37.57		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$65.41	$84.20
Tile Setter, Stone, Marble & Cement Masons, Plasterer and Terrazzo & Mosaic Workers	$37.57		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$65.41	$84.20
Tile Marble Terrazzo Finishers	$32.42		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$60.26	$76.47
Lay Out Man	$37.57		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$65.41	$84.20
Saw Man	$37.57		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$65.41	$84.20
Stack Worker	$39.07		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$66.91	$86.45
Refractory Hot Work	$40.07		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$67.91	$87.95
Carbon Masonry and Swing Sand Blasting	$39.07		$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$66.91	$86.45
Masonry Maintenance Specialist	$22.54		$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$22.54	$33.81
Apprentice	BHR	Percent										
1st 6 Months	$22.54	$60.00	$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$50.38	$61.65
2nd 6 Months	$24.42	$65.00	$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$52.26	$64.47
3rd 6 Months	$26.30	$70.00	$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$54.14	$67.29
4th 6 Months	$28.18	$75.00	$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$56.02	$70.11
5th 6 Months	$30.06	$80.00	$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$57.90	$72.93
6th 6 Months	$31.93	$85.00	$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$59.77	$75.73

7th 6 Months	$33.81	$90.00	$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$61.65	$78.56
8th 6 Months	$35.69	$95.00	$11.13	$12.30	$0.91	$0.00	$3.50	$0.00	$0.00	$0.00	$63.53	$81.38
Mason Trainee 1-90 Days	$22.54	$60.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$22.54	$33.81
91-365 Days	$22.54	$60.00	$11.13	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$33.67	$44.94
2nd Year	$26.30	$70.00	$11.13	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$37.43	$50.58

(*)Special Calculation Note :

APPRENTICES BASED ON % OF EACH CLASS ABOVE PLUS FULL FRINGES

Ratio :

1-2 Journeymen to 1 Apprentice
3-4 Journeymen to 2 Apprentices
5-6 Journeymen to 2 Apprentices
6-10 Journeymen to 3 Apprentices

** Apprentices must be hired prior to hiring Mason Trainees***
Mason Finisher Ratio
1 Apprentice permits 1 Mason Trainee
2 Apprentices permits 1 Mason Trainee
3 Apprentices permits 2 Mason Trainees
4 Apprentices permits 2 Mason Trainees

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Hardin, Holmes, Marion, Morrow, Richland, Wayne, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Bricklayer Local 23 Heavy Hwy (A)

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN02-2026ib	Bricklayer	6/10/2026	6/10/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason Bricklayer Sewer Water Works A	$35.31		$10.71	$10.14	$0.59	$0.00	$1.80	$0.00	$0.00	$0.00	$58.55	$76.21
Apprentice	BHR	Percent										
1st year	$24.72	$70.00	$10.71	$10.14	$0.59	$0.00	$1.80	$0.00	$0.00	$0.00	$47.96	$60.32
2nd year	$28.25	$80.00	$10.71	$10.14	$0.59	$0.00	$1.80	$0.00	$0.00	$0.00	$51.49	$65.62
3rd year	$31.78	$90.00	$10.71	$10.14	$0.59	$0.00	$1.80	$0.00	$0.00	$0.00	$55.02	$70.91

(*)Special Calculation Note :

This rate is not for building construction.

This rate applies only to the Cement Masons. All other Bricklaying, PCC, Stone, Tile, Marble, Refractory, Industrial and all other applicable work performed will be performed under the applicable rates for those contracts.

Ratio :

3 Journeymen to 1 Apprentice
6 Journeymen to 2 Apprentice
9 Journeymen to 3 Apprentice
12 Journeymen to 4 Apprentice
15 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

Bricklayer Local 23 Heavy Hwy (A): Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

Bricklayer Local 23 Heavy Hwy (B): Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control, Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Bricklayer Local 23 Heavy Hwy (B)

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN02-2026ib	Bricklayer	6/10/2026	6/10/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason Bricklayer Power Plants Tunnels Amusement Parks B	$36.31		$10.71	$10.14	$0.60	$0.00	$1.80	$0.00	$0.00	$0.00	$59.56	$77.72
Apprentice	BHR	Percent										
1st year	$25.42	$70.00	$10.71	$10.14	$0.60	$0.00	$1.80	$0.00	$0.00	$0.00	$48.67	$61.38
2nd year	$29.05	$80.00	$10.71	$10.14	$0.60	$0.00	$1.80	$0.00	$0.00	$0.00	$52.30	$66.83
3rd year	$32.68	$90.00	$10.71	$10.14	$0.60	$0.00	$1.80	$0.00	$0.00	$0.00	$55.93	$72.27

(*)Special Calculation Note :

This rate is not for building construction.

This rate applies only to the Cement Masons. All other Bricklaying, PCC, Stone, Tile, Marble, Refractory, Industrial and all other applicable work performed will be performed under the applicable rates for those contracts.

Ratio :

3 Journeymen to 1 Apprentice
6 Journeymen to 2 Apprentice
9 Journeymen to 3 Apprentice
12 Journeymen to 4 Apprentice
15 Journeymen to 5 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

Bricklayer Local 23 Heavy Hwy (A): Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site Heavy Construction, Airport Construction Or Railroad Construction Work.

Bricklayer Local 23 Heavy Hwy (B): Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work ,Pollution Control, Sewer Plant, Waste Plant, & Water Treatment Facilities, Construction.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Carpenter Floorlayer Zone II L

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Carpenter	5/6/2026	5/6/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Floorlayer	$32.10		$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$60.17	$76.22
Apprentice	BHR	Percent										
1st 6 Month Period	$22.47	$70.00	$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$50.54	$61.77
2nd 6 Month Period	$22.47	$70.00	$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$50.54	$61.77
3rd 6 Month Period	$25.68	$80.00	$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$53.75	$66.59
4th 6 Month Period	$25.68	$80.00	$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$53.75	$66.59
5th 6 Month Period	$28.89	$90.00	$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$56.96	$71.41
6th 6 Month Period	$28.89	$90.00	$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$56.96	$71.41
7th 6 Month Period	$30.50	$95.00	$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$58.57	$73.82
8th 6 Month Period	$30.50	$95.00	$9.73	$11.48	$1.00	$0.00	$5.86	$0.00	$0.00	$0.00	$58.57	$73.82

(*)Special Calculation Note :

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Allen, Auglaize, Crawford, Hardin, Mercer, Paulding, Putnam, Sandusky, Seneca, Van Wert, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Carpenter Hev Hwy Zone 2-WBHH

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Carpenter	5/6/2026	5/6/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter	$32.86		$9.63	$11.48	$0.97	$0.00	$5.66	$0.00	$0.00	$0.00	$60.60	$77.03
Apprentice	BHR	Percent										
1st 6 Months	$19.72	$60.00	$9.63	$0.00	$0.97	$0.00	$0.00	$0.00	$0.00	$0.00	$30.32	$40.18
2nd 6 Months	$19.72	$60.00	$9.63	$11.48	$0.97	$0.00	$5.66	$0.00	$0.00	$0.00	$47.46	$57.32
3rd 6 Months	$21.36	$65.00	$9.63	$11.48	$0.97	$0.00	$5.66	$0.00	$0.00	$0.00	$49.10	$59.78
4th 6 Months	$24.64	$75.00	$9.63	$11.48	$0.97	$0.00	$5.66	$0.00	$0.00	$0.00	$52.38	$64.70
5th 6 Months	$26.29	$80.00	$9.63	$11.48	$0.97	$0.00	$5.66	$0.00	$0.00	$0.00	$54.03	$67.17
6th 6 Months	$27.93	$85.00	$9.63	$11.48	$0.97	$0.00	$5.66	$0.00	$0.00	$0.00	$55.67	$69.63
7th 6 Months	$29.57	$90.00	$9.63	$11.48	$0.97	$0.00	$5.66	$0.00	$0.00	$0.00	$57.31	$72.09
8th 6 Months	$31.22	$95.00	$9.63	$11.48	$0.97	$0.00	$5.66	$0.00	$0.00	$0.00	$58.96	$74.57

(*)Special Calculation Note :

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Allen, Auglaize, Crawford, Hardin, Mercer, Paulding, Seneca, Van Wert, Wyandot

Special Jurisdictional Note :

Details :

Any construction work as performed within the definitions listed here below, all of which, taken together are "Heavy-Highway Construction" work:

"HIGHWAY CONSTRUCTION" work is defined as work performed to provide a facility to accommodate vehicular or pedestrian traffic and includes, but is not limited to, the construction of all streets, roads, expressways, turnpikes, bridges, drainage structures, grade separations, parking lots, rest areas, alleys, sidewalks, guardrails, fences, and sound barriers, but shall not include construction of buildings.

"AIRPORT CONSTRUCTION" work is defined as including site preparation, grading, paving, drainage, fences, sidewalks, driveways, parking areas and similar work incidental to the construction of airfields but shall not include the construction of buildings.

"HEAVY CONSTRUCTION" work is defined as including, but not limited to grade separations, foundations (does not include building foundations), abutments, retaining walls, shafts, tunnels, subways, elevators, drainage projects, flood control projects, reclamation projects, reservoirs, water supply projects, water development projects, hydro-electric development, utility transmission lines, including right-of-way clearing, locks, dams, dikes, levees, revetments, channels, channel cutoffs, intakes, dredging projects, jetties, breakwater, docks, harbors; and all municipal and utility construction except construction classified as building construction.

"RAILROAD CONSTRUCTION" work is defined as including, grading, drainage, placing of rails, crossties, ballast and the construction of bridges, and other incidentals for railroads, street railways construction projects and rapid transit system projects, but shall not include the construction of buildings.

"SEWER WATERWORKS AND UTILITY CONSTRUCTION" work is defined as including construction of all storm sewers, sanitary sewers, supplying and distributing waterlines, gas lines, telephone and television conduit, underground electrical lines, and similar utility construction. Main waterline and trunk sewers connecting water works and/or sewage disposal plants are included within this definition.

"SUPPORIVE EXCAVATION AND DEEP FOUNDATIONS" work is all driven and drilled foundations within the building site.

"POWER PLANT SITE" work is defined as all work which is inside the property line, but outside the actual building construction. Such work shall include, but is not limited to, the grading and installation of sewer lines, drainage lines, gas lines, telephone and television conduit, underground electrical lines and similar utility construction, parking lots, bridges, roads, streets, sidewalks, reservoirs, ash pits, storage tanks, ramps and other such construction work performed on the work site, but shall not include the actual excavation for the buildings, foundations or footers or construction of the buildings.

"POLLUTION CONTROL, SEWAGE PLANT, WASTE PLANT AND WATER TREATMENT FACILITIES CONSTRUCTION" WORK shall be all work in construction of pumping stations, waste and sewage disposal plants, incinerator plants, water treatment plants, filtration plants, solid waste disposal and similar pollution control facilities.

"SOLAR & WIND FARM" WORK is considered "HEAVY CONSTRUCTION" and includes all work in the construction of solar fields/farms and wind fields/farms (not installations on buildings).

Prevailing Wage Rate
Skilled Crafts

Name of Union: Carpenter Millwright & Pile Driver Zone I South

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Carpenter

Effective Date: 5/6/2026

Effective Date: 5/6/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Millwright Pile Driver	$40.06		$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$69.82	$89.85
Apprentice	BHR	Percent										
1st 6 months	$28.04	$70.00	$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$57.80	$71.82
2nd 6 months	$28.04	$70.00	$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$57.80	$71.82
3rd 6 months	$32.05	$80.00	$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$61.81	$77.83
4th 6 months	$32.05	$80.00	$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$61.81	$77.83
5th 6 months	$36.05	$90.00	$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$65.81	$83.83
6th 6 months	$36.05	$90.00	$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$65.81	$83.83
7th 6 months	$38.06	$95.00	$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$67.82	$86.85
8th 6 months	$38.06	$95.00	$9.55	$12.75	$1.02	$0.00	$6.44	$0.00	$0.00	$0.00	$67.82	$86.85

(*)Special Calculation Note :

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Crawford, Paulding, Sandusky, Seneca

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Carpenter Pile Driver Hev Hwy Zone 1-BWMWHH

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Carpenter	5/6/2026	5/6/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter Pile Driver	$39.19		$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$68.87	$88.47
Diver	$58.79		$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$88.47	$117.87
Certified Welder	$40.24		$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$69.92	$90.04
Apprentice	BHR	Percent										
1st 6 months	$23.51	$60.00	$9.57	$0.00	$1.02	$0.00	$0.00	$0.00	$0.00	$0.00	$34.10	$45.86
2nd 6 months	$23.51	$60.00	$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$53.19	$64.94
3rd 6 months	$27.43	$70.00	$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$57.11	$70.82
4th 6 months	$29.39	$75.00	$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$59.07	$73.77
5th 6 months	$31.35	$80.00	$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$61.03	$76.71
6th 6 months	$33.31	$85.00	$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$62.99	$79.65
7th 6 months	$35.27	$90.00	$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$64.95	$82.59
8th 6 months	$37.23	$95.00	$9.57	$12.75	$1.02	$0.00	$6.34	$0.00	$0.00	$0.00	$66.91	$85.53

(*)Special Calculation Note :

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Crawford, Paulding, Sandusky, Seneca

Special Jurisdictional Note :

Details :

Pile Drivers duties shall include but not limited to: Pile driving, milling, fashioning, joining assembling, erecting, fastening, or dismantling of all material of wood, plastic, metal, fiber, cork and composition and all other substitute materials: pile driving, cutting, fitting and placing of lagging, and the handling, cleaning, erecting, installing and dismantling of machinery, equipment and erecting pre-engineered metal buildings.

Pile Drivers work but not limited to: unloading, assembling, erection, repairs, operation, signaling, dismantling and reloading all equipment that is used for pile driving including pule butts is defined as sheeting or scrap piling. Underwater work that may be required in connection with the installation of piling. The driver and his tender work as a team and shall arrive at their own financial arrangements with the contractor. Any configuration of wood, steel, concrete or composite that is jetted, driven or vibrated onto the ground by conventional pile driving equipment for the purpose of supporting a future load that may be permanent or temporary. The construction of all wharves and docks, including the fabrication and installation of floating docks. Driving bracing, plumbing, cutting off and capping of all piling whether wood, metal, pipe piling or composite, loading, unloading, erecting, framing, dismantling, moving and handling of pile driving equipment piling used in the construction and repair of all wharves, docks, piers, trestles, caissons, cofferdams and erection of all sea walls and breakwaters. All underwater and marine work on bulkheads, wharves, docks, shipyards, caissons, piers, bridges, pipeline, work, viaducts, marine cable and trestles, as well as salvage and reclamation work where divers are employed.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Carpenter Zone II B

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Carpenter	5/6/2026	5/6/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Carpenter	$33.22		$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$60.62	$77.23
Apprentice	BHR	Percent										
1st 6 Months	$23.25	$70.00	$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$50.65	$62.27
2nd 6 Months	$23.25	$70.00	$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$50.65	$62.27
3rd 6 Months	$26.58	$80.00	$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$53.98	$67.27
4th 6 Months	$26.58	$80.00	$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$53.98	$67.27
5th 6 Months	$29.90	$90.00	$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$57.30	$72.25
6th 6 Months	$29.90	$90.00	$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$57.30	$72.25
7th 6 Months	$31.56	$95.00	$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$58.96	$74.74
8th 6 Months	$31.56	$95.00	$9.67	$11.48	$0.97	$0.00	$5.28	$0.00	$0.00	$0.00	$58.96	$74.74

(*)Special Calculation Note :

Special Work Rates: 40-100 foot free fall - $ .50 per hour above scale
Over 100 foot free fall - $1.00 per hour above scale

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Crawford, Paulding, Sandusky, Seneca, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Cement Mason Local 132 (Columbus)

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Cement Mason	6/1/2026	6/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason	$36.92		$9.30	$4.85	$0.85	$0.00	$3.18	$0.06	$0.00	$0.00	$55.16	$73.62
Apprentice	BHR	Percent										
1st Year	$25.84	$70.00	$9.30	$4.85	$0.85	$0.00	$3.18	$0.06	$0.00	$0.00	$44.08	$57.00
2nd Year	$29.54	$80.00	$9.30	$4.85	$0.85	$0.00	$3.18	$0.06	$0.00	$0.00	$47.78	$62.55
3rd Year	$33.23	$90.00	$9.30	$4.85	$0.85	$0.00	$3.18	$0.06	$0.00	$0.00	$51.47	$68.08

(*)Special Calculation Note :

Other: International Training Fund

Working on swing stage, slip scaffold, window jack scaffold, scissor lifts, and aerial lifts shall receive the following rates:
$.50 above the regular rate for heights up to fifty (50) feet above grade level
$1.00 above the regular rate for heights over fifty (50) feet above grade level

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Coshocton, Crawford, Delaware, Fairfield, Fayette, Franklin, Guernsey, Hocking, Knox, Licking, Madison, Marion, Morrow, Muskingum, Perry, Pickaway, Richland, Ross, Union, Vinton, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Cement Mason Local 132 Hev Hwy (Columbus)

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Cement Mason	5/1/2026	5/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Cement Mason	$39.04		$9.38	$7.05	$0.85	$0.00	$3.00	$0.09	$0.00	$0.00	$59.41	$78.93
Apprentice	BHR	Percent										
1st Year	$27.33	$70.00	$9.38	$7.05	$0.85	$0.00	$3.00	$0.09	$0.00	$0.00	$47.70	$61.36
2nd Year	$31.23	$80.00	$9.38	$7.05	$0.85	$0.00	$3.00	$0.09	$0.00	$0.00	$51.60	$67.22
3rd Year	$35.14	$90.00	$9.38	$7.05	$0.85	$0.00	$3.00	$0.09	$0.00	$0.00	$55.51	$73.08

(*)Special Calculation Note :

Other: International Training Fund

Ratio :

1 Journeyman to 1 Apprentice
2 Journeymen to 1 Apprentice thereafter

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Athens, Coshocton, Crawford, Delaware, Fairfield, Fayette, Franklin, Guernsey, Hocking, Knox, Licking, Madison, Marion, Meigs, Monroe, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Richland, Ross, Union, Vinton, Washington, Wyandot

Special Jurisdictional Note :

Details :

Highway Construction, Sewer, Waterworks And Utility Construction, Industrial & Building Site, Heavy Construction, Airport Construction Or Railroad Construction Work, Power Plant, Tunnels, Amusement Park, Athletic Stadium Site Work, Pollution Control, Sewer Plant, Waste & Water Plant, Water Treatment Facilities Construction.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 688 Inside

Type of Rate: Commercial

Change #: LCN02-2025ib

Craft: Electrical

Effective Date: 9/10/2025

Effective Date: 9/10/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrician	$38.00		$10.10	$7.75	$0.60	$0.00	$3.26	$1.14	$0.00	$0.00	$60.85	$79.85
Over 50 feet	$76.00		$10.10	$7.75	$0.60	$0.00	$3.26	$2.28	$0.00	$0.00	$99.99	$137.99
1st Level Construction Wireman 0-2000 hours	$15.29		$6.83	$0.46	$0.92	$0.00	$0.46	$0.00	$0.00	$0.00	$23.96	$31.61
2nd Level CW 2001-4000 hours	$16.25		$6.83	$0.49	$0.92	$0.00	$0.49	$0.00	$0.00	$0.00	$24.98	$33.11
3rd Level CW 4001-6000 hours	$17.20		$6.83	$0.52	$0.92	$0.00	$0.52	$0.00	$0.00	$0.00	$25.99	$34.59
4th Level CW 6001-8000 hours	$19.12		$6.83	$0.57	$0.92	$0.00	$0.57	$0.00	$0.00	$0.00	$28.01	$37.57
1st Level Construction Electrician 8001-10000 hours	$21.03		$6.83	$0.63	$0.92	$0.00	$0.63	$0.00	$0.00	$0.00	$30.04	$40.56
2nd Level CE 10001-12000 hours	$22.94		$6.83	$0.69	$0.92	$0.00	$0.69	$0.00	$0.00	$0.00	$32.07	$43.54
3rd Level CE 12001-14000 hours	$28.67		$6.83	$0.86	$0.92	$0.00	$0.86	$0.00	$0.00	$0.00	$38.14	$52.48
Apprentice	BHR	Percent										
1st Period	$19.00	$50.00	$10.10	$0.00	$0.60	$0.00	$0.00	$0.57	$0.00	$0.00	$30.27	$39.77
2nd Period	$20.90	$55.00	$10.10	$0.00	$0.60	$0.00	$0.00	$0.63	$0.00	$0.00	$32.23	$42.68
3rd Period	$22.80	$60.00	$10.10	$7.75	$0.60	$0.00	$3.26	$0.68	$0.00	$0.00	$45.19	$56.59
4th Period	$24.70	$65.00	$10.10	$7.75	$0.60	$0.00	$3.26	$0.74	$0.00	$0.00	$47.15	$59.50
5th Period	$28.50	$75.00	$10.10	$7.75	$0.60	$0.00	$3.26	$0.86	$0.00	$0.00	$51.07	$65.32
6th Perod	$32.30	$85.00	$10.10	$7.75	$0.60	$0.00	$3.26	$0.93	$0.00	$0.00	$54.94	$71.09

(*)Special Calculation Note :

Other: NEBF (National Electrical Benefit Fund).

Ratio :

1-3 Journeymen to 2 Apprentices
4-6 Journeymen to 4 Apprentices
7-9 Journeymen to 6 Apprentices Etc.

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Huron*, Knox*, Marion, Morrow, Richland, Wyandot*

Special Jurisdictional Note :

In Huron County the following townships: Richmond, New Haven, Ripley, and Greenwich
In Knox County the following townships: Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown, Jefferson
In Wyandot County the following townships: Sycamore, Crane, Eden, Pitt, Antrim and Tymochee

Details :

Scope of work for CW/CEs will be limited only by what the employer deems appropriate and within the individual's qualifications to properly perform safely and in a workmanlike manner. Projects where CW/CEs could be utilized are office buildings, shopping centers, gas stations, auto sales agencies and garages, educational facilities, food service centers, restaurants, entertainment facilities, funeral homes, hospitals, clinics, motels, retail and wholesale facilities not to exceed 200,000 square feet and small manufacturing facilities not to exceed 50,000 square feet.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 688 Inside Lt Commercial South West

Type of Rate: Commercial

Change #: LCN02-2025ib

Craft: Electrical

Effective Date: 9/10/2025

Effective Date: 9/10/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrician	$38.00		$10.10	$7.75	$0.60	$0.00	$3.26	$1.14	$0.00	$0.00	$60.85	$79.85
Over 50 feet	$76.00		$10.10	$7.75	$0.60	$0.00	$3.26	$2.28	$0.00	$0.00	$99.99	$137.99
CE-3 12,001-14,000 Hrs	$28.67		$6.83	$0.86	$0.92	$0.00	$0.86	$0.00	$0.00	$0.00	$38.14	$52.48
CE-2 10,001-12,000 Hrs	$22.94		$6.83	$0.69	$0.92	$0.00	$0.69	$0.00	$0.00	$0.00	$32.07	$43.54
CE-1 8,001-10,000 Hrs	$21.03		$6.83	$0.63	$0.92	$0.00	$0.63	$0.00	$0.00	$0.00	$30.04	$40.56
CW-4 6,001-8,000 Hrs	$19.12		$6.83	$0.57	$0.92	$0.00	$0.57	$0.00	$0.00	$0.00	$28.01	$37.57
CW-3 4,001-6,000 Hrs	$17.20		$6.83	$0.52	$0.92	$0.00	$0.52	$0.00	$0.00	$0.00	$25.99	$34.59
CW-2 2,001-4,000 Hrs	$16.25		$6.83	$0.49	$0.92	$0.00	$0.49	$0.00	$0.00	$0.00	$24.98	$33.11
CW-1 0-2,000 Hrs	$15.29		$6.83	$0.46	$0.92	$0.00	$0.46	$0.00	$0.00	$0.00	$23.96	$31.61
Apprentice	BHR	Percent										
1st Period	$19.00	$50.00	$10.10	$0.00	$0.60	$0.00	$0.00	$0.57	$0.00	$0.00	$30.27	$39.77
2nd Period	$20.90	$55.00	$10.10	$0.00	$0.60	$0.00	$0.00	$0.63	$0.00	$0.00	$32.23	$42.68
3rd Period	$22.80	$60.00	$10.10	$7.75	$0.60	$0.00	$3.26	$0.68	$0.00	$0.00	$45.19	$56.59
4th Period	$24.70	$65.00	$10.10	$7.75	$0.60	$0.00	$3.26	$0.74	$0.00	$0.00	$47.15	$59.50
5th Period	$28.50	$75.00	$10.10	$7.75	$0.60	$0.00	$3.26	$0.86	$0.00	$0.00	$51.07	$65.32
6th Period	$32.30	$85.00	$10.10	$7.75	$0.60	$0.00	$3.26	$0.93	$0.00	$0.00	$54.94	$71.09
	$	$	$	$	$	$	$	$	$	$	$	$

(*)Special Calculation Note :

Other: NEBF (National Electrical Benefit Fund) and Administration Fund

Ratio :

Journeymen 1-3 to 2 Apprentices
Journeymen 4-6 to 4 Apprentices
Journeymen 7-9 to 6 Apprentices Etc.

Construction Electrician and Construction Wireman Ratio There shall be a minimum ratio of one inside Journeyman to every (4) employees of different classification per jobsite. An inside Journeyman Wireman is required on the project as the fifth (5th) worker or when apprentices are used.

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Huron*, Knox*, Marion, Morrow, Richland, Wyandot*

Special Jurisdictional Note :

In Huron County the following townships: Richland, New Haven, Ripley, and Greenwich
In Knox County the following townships: Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown, Jefferson
In Wyandot County the following townships: Sycamore, Crane, Eden, Pitt, Antrim and Tymochee

Details :

The scope of work for the light commercial agreement shall apply to the following facilities not to exceed 200,000 square feet; office buildings, shopping centers, auto sales agencies and garages, churches, funeral homes, nursing homes, hotels, retail and wholesale facilities, small stand-alone manufacturing facilities when free standing and not part of a larger facility (not to exceed 50,000 square fee), solar projects (500 panels or less) unless otherwise covered under the agreement, lighting retrofits (when not associated with remodels involving branch re-circuiting) lighting retrofits shall be defined as the changing of lamps and ballasts in existing light fixtures and shall also include the one for one replacement of existing fixtures, warehouses, gas stations, food service centers, restaurants, entertainment facilities, hospitals, clinics, motels, residential buildings.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 688 Voice Data Video

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2022sks	Electrical	6/29/2022	6/29/2022

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Installer Technician B	$29.50		$9.65	$2.14	$0.70	$0.00	$1.21	$0.68	$0.00	$0.00	$43.88	$58.63
Installer Technician A	$30.75		$9.65	$2.18	$0.70	$0.00	$1.21	$0.71	$0.00	$0.00	$45.20	$60.58
Cable Puller	$14.75		$9.65	$1.70	$0.70	$0.00	$1.21	$0.34	$0.00	$0.00	$28.35	$35.73
Apprentice	BHR	Percent										
1st Period 0-1000hrs	$16.23	$55.00	$9.65	$1.74	$0.70	$0.00	$1.21	$0.38	$0.00	$0.00	$29.91	$38.02
2nd 1001-2000 hours	$17.70	$60.00	$9.65	$1.79	$0.70	$0.00	$1.21	$0.41	$0.00	$0.00	$31.46	$40.31
3rd 2001-3000 hours	$19.18	$65.00	$9.65	$1.83	$0.70	$0.00	$1.21	$0.45	$0.00	$0.00	$33.02	$42.60
4th 3001-4000 hours	$20.65	$70.00	$9.65	$1.87	$0.70	$0.00	$1.21	$0.48	$0.00	$0.00	$34.56	$44.89
5th 4001-5000 hours	$22.13	$75.00	$9.65	$1.92	$0.70	$0.00	$1.21	$0.51	$0.00	$0.00	$36.12	$47.18
6th 5001-6000 hours	$23.60	$80.00	$9.65	$1.96	$0.70	$0.00	$1.21	$0.55	$0.00	$0.00	$37.67	$49.47

(*)Special Calculation Note :

Other is for Holiday Pay. Vacation: Only applies to employees with one (1) continuous year of service with a firm.

Ratio :

1 Journeyman Installer to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Huron*, Knox*, Marion, Morrow, Richland, Wyandot*

Special Jurisdictional Note :

In Knox County the following townships: Liberty, Clinton, Union, Howard, Monroe, Middleberry, Morris, Wayne, Berlin, Pike, Brown, Jefferson. In Wyandot County: Sycamore, Crane, Eden, Pitt, Antrim & Tymochee. In Huron County: Richmond, New Haven, Ripley, & Greenwich.

Details :

An employee who is required to wear an electronic device after hours will receive an additional 1.00 per hour for all hours worked. HOLIDAYS: Memorial Day, 4th of July, Labor Day, Thanksgiving Day, Christmas Day, New Years Day. The following work is EXCLUDED from the Teledata Technician work scope: - Installation of computer systems in industrial applications such as assembly lines, robotics, computer controller manufacturing systems. - Installation of conduit &/or raceways shall be installed by Inside Wireman . On sites where there is no Inside Wireman employed, the Teledata Technician may install raceway, or conduit not greater than 10 foot. - Fire Alarm work is excluded on all new construction sites or wherever the fire alarm system is installed in conduit - All HVAC control work. TECHNICIAN (A) is a Technician B who holds a current Technician Certification from BICSI (Building Industry Consulting Service International, Inc.) CABLE PULLERS are for the installation of cable from one termination point to another.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 High Tension Pipe Type Cable

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Electrical	1/7/2026	1/7/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Lineman	$54.94		$7.50	$1.65	$0.55	$0.00	$13.19	$1.00	$0.00	$0.00	$78.83	$106.30
Certified Lineman Welder	$54.94		$7.50	$1.65	$0.55	$0.00	$13.19	$1.00	$0.00	$0.00	$78.83	$106.30
Certified Cable Splicer	$54.94		$7.50	$1.65	$0.55	$0.00	$13.19	$1.00	$0.00	$0.00	$78.83	$106.30
Operator A	$49.20		$7.50	$1.48	$0.49	$0.00	$11.81	$1.00	$0.00	$0.00	$71.48	$96.08
Operator B	$43.52		$7.50	$1.31	$0.44	$0.00	$10.44	$1.00	$0.00	$0.00	$64.21	$85.97
Operator C	$34.93		$7.50	$1.05	$0.35	$0.00	$8.38	$1.00	$0.00	$0.00	$53.21	$70.67
Groundman 0-12 months Exp	$27.47		$7.50	$0.82	$0.27	$0.00	$6.59	$1.00	$0.00	$0.00	$43.65	$57.38
Groundman 0-12 months Exp w/CDL	$30.22		$7.50	$0.91	$0.30	$0.00	$7.25	$1.00	$0.00	$0.00	$47.18	$62.29
Groundman 1 yr or more	$30.22		$7.50	$0.91	$0.30	$0.00	$7.25	$1.00	$0.00	$0.00	$47.18	$62.29
Groundman 1 yr or more w/CDL	$35.71		$7.50	$1.07	$0.36	$0.00	$8.57	$1.00	$0.00	$0.00	$54.21	$72.06
Equipment Mechanic A	$43.52		$7.50	$1.31	$0.44	$0.00	$10.44	$1.00	$0.00	$0.00	$64.21	$85.97
Equipment Mechanic B	$39.22		$7.50	$1.18	$0.39	$0.00	$9.41	$1.00	$0.00	$0.00	$58.70	$78.31
Equipment Mechanic C	$34.92		$7.50	$1.05	$0.35	$0.00	$8.38	$1.00	$0.00	$0.00	$53.20	$70.66
X-Ray Technician	$54.94		$7.50	$1.65	$0.55	$0.00	$13.19	$1.00	$0.00	$0.00	$78.83	$106.30
Apprentice	BHR	Percent										
1st 1000 hrs	$32.96	$60.00	$7.50	$0.99	$0.33	$0.00	$7.91	$1.00	$0.00	$0.00	$50.69	$67.17
2nd 1000 hrs	$35.71	$65.00	$7.50	$1.07	$0.36	$0.00	$8.57	$1.00	$0.00	$0.00	$54.21	$72.06
3rd 1000 hrs	$38.46	$70.00	$7.50	$1.15	$0.38	$0.00	$9.23	$1.00	$0.00	$0.00	$57.72	$76.95

4th 1000 hrs	$41.20	$75.00	$7.50	$1.24	$0.41	$0.00	$9.89	$1.00	$0.00	$0.00	$61.24	$81.84
5th 1000 hrs	$43.95	$80.00	$7.50	$1.32	$0.44	$0.00	$10.55	$1.00	$0.00	$0.00	$64.76	$86.74
6th 1000 hrs	$46.70	$85.00	$7.50	$1.39	$0.47	$0.00	$11.21	$1.00	$0.00	$0.00	$68.27	$91.62
7th 1000 hrs	$49.45	$90.00	$7.50	$1.48	$0.49	$0.00	$11.87	$1.00	$0.00	$0.00	$71.79	$96.52

(*)Special Calculation Note :

Other is Health Reimbursement Account

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

Operator "A": John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).
Operator "B": Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.
Operator "C": Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

Special Notes:

When Cable Splicer helpers are used, they must be a Journeyman Lineman.

Pipe installation, holiday testing, welding, cable splicing operation of vacuum pumps and cable pulling equipment and all work requiring the use of hand tools shall be done by Journeymen and Apprentices. Pipe coating, manhole preparations and conditioning, nitrogen connections and flowmeter installation shall be done by or under the direct supervision of a Journeyman.

At least two (2) Journeyman Linemen in addition to certified lineman welders shall be employed to install high voltage pipe.

When pulling cable, at least six (6) of the workmen shall be no less than Journeyman classifications. When pumping oil, only Journeyman Lineman or equipment operators shall be permitted to operate degasifying and oil pumping equipment

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 Outside (Central OH Chapter)

Type of Rate: Commercial

Change #: LCN01-2025ib

Craft: Electrical

Effective Date: 6/4/2025

Effective Date: 6/4/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Lineman	$46.03		$7.50	$1.38	$0.46	$0.00	$9.20	$0.50	$0.00	$0.00	$65.07	$88.09
Traffic Signal & Lighting Journeyman	$44.43		$7.50	$1.33	$0.44	$0.00	$8.89	$0.50	$0.00	$0.00	$63.09	$85.31
Equipment Operator	$40.44		$7.50	$1.21	$0.40	$0.00	$8.09	$0.50	$0.00	$0.00	$58.14	$78.36
Groundman 0-12 months (W/O CDL)	$24.52		$7.50	$0.74	$0.25	$0.00	$4.90	$0.50	$0.00	$0.00	$38.41	$50.67
Groundman 0-12 Months W/CDL	$26.78		$7.50	$0.80	$0.27	$0.00	$5.36	$0.50	$0.00	$0.00	$41.21	$54.60
Groundman greater than 1 Year W/CDL	$29.07		$7.50	$0.87	$0.29	$0.00	$5.81	$0.50	$0.00	$0.00	$44.04	$58.58
Traffic Signal Apprentices	$		$	$	$	$	$	$	$	$	$	$
1st 1,000 hours	$26.66		$7.50	$0.80	$0.27	$0.00	$5.33	$0.50	$0.00	$0.00	$41.06	$54.39
2nd 1,000 hours	$28.88		$7.50	$0.87	$0.29	$0.00	$5.78	$0.50	$0.00	$0.00	$43.82	$58.26
3rd 1,000 hours	$31.10		$7.50	$0.93	$0.31	$0.00	$6.22	$0.50	$0.00	$0.00	$46.56	$62.11
4th 1,000 hours	$33.32		$7.50	$1.00	$0.33	$0.00	$6.66	$0.50	$0.00	$0.00	$49.31	$65.97
5th 1,000 hours	$35.54		$7.50	$1.07	$0.36	$0.00	$7.11	$0.50	$0.00	$0.00	$52.08	$69.85
6th 1,000 hours	$39.99		$7.50	$1.20	$0.40	$0.00	$8.00	$0.50	$0.00	$0.00	$57.59	$77.59
Apprentice	BHR	Percent										
1st 1,000 Hours	$27.62	$60.00	$7.50	$0.83	$0.28	$0.00	$5.52	$0.50	$0.00	$0.00	$42.25	$56.06
2nd 1,000 Hours	$29.92	$65.00	$7.50	$0.90	$0.30	$0.00	$5.98	$0.50	$0.00	$0.00	$45.10	$60.06
3rd 1,000 Hours	$32.22	$70.00	$7.50	$0.97	$0.32	$0.00	$6.44	$0.50	$0.00	$0.00	$47.95	$64.06
4th 1,000 Hours	$34.52	$75.00	$7.50	$1.04	$0.35	$0.00	$6.90	$0.50	$0.00	$0.00	$50.81	$68.07

5th 1,000 Hours	$36.82	$80.00	$7.50	$1.10	$0.37	$0.00	$7.36	$0.50	$0.00	$0.00	$53.65	$72.07
6th 1,000 Hours	$39.13	$85.00	$7.50	$1.17	$0.39	$0.00	$7.82	$0.50	$0.00	$0.00	$56.51	$76.07
7th 1,000 Hours	$41.43	$90.00	$7.50	$1.24	$0.41	$0.00	$8.28	$0.50	$0.00	$0.00	$59.36	$80.07

(*)Special Calculation Note :

Other is Health Reimburstment Account

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Athens, Coshocton, Crawford, Delaware, Fairfield, Fayette, Franklin, Gallia, Guernsey, Highland, Hocking, Jackson, Knox, Lawrence, Licking, Madison, Marion, Meigs, Monroe, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Richland, Ross, Scioto, Tuscarawas, Union, Vinton, Washington

Special Jurisdictional Note :

Details :

A groundman when directed shall assist a Journeyman Lineman, Traffic Signal and Lighting Journeyman or Equipment Operator in the performance of his/her work on the ground, including the use of hand tools. Under no circumstances shall this classification climb poles, towers, or work from an elevated platform or bucket truck. This classification shall not perform work normally assigned to an Apprentice. No more than three (3) Groundmen shall work alone. Jobs with more that three Groundmen shall be supervised by a Groundcrew Foreman, Journeyman Lineman, Journeyman Traffic Signal Technician or an Equipment Operator. Scope of Work: installation and maintenance of highway and street lighting, highway and street sign lighting, electronic message boards and traffic control systems, camera systems, traffic signal work, substation and line construction including overhead and underground projects for private and industrial work as in accordance with the IBEW Constitution. This Agreement includes the operation of all tools and equipment necessary for the installation of the above projects.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 Outside Utility Power

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Electrical

Effective Date: 1/7/2026

Effective Date: 1/7/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Lineman	$52.03		$7.50	$1.56	$0.52	$0.00	$12.49	$1.00	$0.00	$0.00	$75.10	$101.12
Substation Technician	$52.03		$7.50	$1.56	$0.50	$0.00	$12.49	$1.00	$0.00	$0.00	$75.08	$101.09
Cable Splicer	$54.50		$7.50	$1.64	$0.55	$0.00	$13.08	$1.00	$0.00	$0.00	$78.27	$105.52
Operator A	$46.61		$7.50	$1.40	$0.47	$0.00	$11.19	$1.00	$0.00	$0.00	$68.17	$91.47
Operator B	$41.17		$7.50	$1.23	$0.41	$0.00	$9.87	$1.00	$0.00	$0.00	$61.18	$81.77
Operator C	$33.00		$7.50	$0.99	$0.33	$0.00	$7.92	$1.00	$0.00	$0.00	$50.74	$67.24
Groundman 0-12 months Exp	$26.02		$7.50	$0.78	$0.26	$0.00	$6.24	$1.00	$0.00	$0.00	$41.80	$54.81
Groundman 0-12 months Exp w/CDL	$28.62		$7.50	$0.86	$0.29	$0.00	$6.87	$1.00	$0.00	$0.00	$45.14	$59.45
Groundman 1 yr or more	$28.62		$7.50	$0.86	$0.29	$0.00	$6.87	$1.00	$0.00	$0.00	$45.14	$59.45
Groundman 1 yr or more w/CDL	$33.82		$7.50	$1.01	$0.34	$0.00	$8.12	$1.00	$0.00	$0.00	$51.79	$68.70
Equipment Mechanic A	$41.17		$7.50	$1.23	$0.41	$0.00	$9.87	$1.00	$0.00	$0.00	$61.18	$81.77
Equipment Mechanic B	$37.09		$7.50	$1.11	$0.37	$0.00	$8.90	$1.00	$0.00	$0.00	$55.97	$74.52
Equipment Mechanic C	$33.00		$7.50	$0.99	$0.33	$0.00	$7.92	$1.00	$0.00	$0.00	$50.74	$67.24
Line Truck w/auger	$36.40		$7.50	$1.09	$0.36	$0.00	$8.71	$1.00	$0.00	$0.00	$55.06	$73.26
Apprentice	BHR	Percent										
1st 1000 hrs	$31.22	$60.00	$7.50	$0.94	$0.31	$0.00	$7.49	$1.00	$0.00	$0.00	$48.46	$64.07
2nd 1000 hrs	$33.82	$65.00	$7.50	$1.01	$0.34	$0.00	$8.12	$1.00	$0.00	$0.00	$51.79	$68.70
3rd 1000 hrs	$36.42	$70.00	$7.50	$1.09	$0.36	$0.00	$8.74	$1.00	$0.00	$0.00	$55.11	$73.32

4th 1000 hrs	$39.02	$75.00	$7.50	$1.17	$0.39	$0.00	$9.37	$1.00	$0.00	$0.00	$58.45	$77.96
5th 1000 hrs	$41.62	$80.00	$7.50	$1.25	$0.44	$0.00	$9.99	$1.00	$0.00	$0.00	$61.80	$82.61
6th 1000 hrs	$44.23	$85.00	$7.50	$1.33	$0.44	$0.00	$10.61	$1.00	$0.00	$0.00	$65.11	$87.22
7th 1000 hrs	$46.83	$90.00	$7.50	$1.40	$0.47	$0.00	$11.24	$1.00	$0.00	$0.00	$68.44	$91.86

(*)Special Calculation Note :

Other: Health Reimbursement Account

Ratio :

(1) Journeyman Lineman to (1) Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

Operator "A": John Henry Rock Drill, D-6 (or equivalent) and above, Trackhoe Digger, (320 Track excavator), Cranes (greater then 25 tons and less than 45 tons).
Operator "B": Cranes (greater than 6 tons and up to 25 tons), Backhoes, Road Tractor, Dozer up to D-5, Pressure Digger- wheeled or tracked, all Tension wire Stringing equipment.
Operator "C": Trench, Backhoe, Riding type vibratory Compactor, Ground Rod Driver, Boom Truck (6 ton & below), Skid Steer Loaders, Material Handler.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 Underground Residential Distribution

Type of Rate: Commercial

Change #: LCN01-2026ib

Craft: Electrical

Effective Date: 1/7/2026

Effective Date: 1/7/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
URD Electrican	$39.42		$7.50	$1.18	$0.39	$0.00	$9.43	$1.00	$0.00	$0.00	$58.92	$78.63
Equipment Operator A	$35.24		$7.50	$1.06	$0.35	$0.00	$8.46	$1.00	$0.00	$0.00	$53.61	$71.23
Equipment Operator B	$32.34		$7.50	$0.97	$0.32	$0.00	$7.76	$1.00	$0.00	$0.00	$49.89	$66.06
Directional Drill Locator	$35.24		$7.50	$1.06	$0.35	$0.00	$8.46	$1.00	$0.00	$0.00	$53.61	$71.23
Directional Drill Operator	$32.34		$7.50	$0.97	$0.32	$0.00	$7.76	$1.00	$0.00	$0.00	$49.89	$66.06
Groundman 0-12 months Exp	$25.50		$7.50	$0.77	$0.26	$0.00	$6.12	$1.00	$0.00	$0.00	$41.15	$53.90
Groundman 0-12 months Exp w/CDL	$28.15		$7.50	$0.84	$0.28	$0.00	$6.76	$1.00	$0.00	$0.00	$44.53	$58.60
Groundman 1 yr or more	$28.15		$7.50	$0.84	$0.28	$0.00	$6.76	$1.00	$0.00	$0.00	$44.53	$58.60
Groundman 1 yr or more w/CDL	$33.47		$7.50	$1.00	$0.33	$0.00	$8.03	$1.00	$0.00	$0.00	$51.33	$68.06
Apprentice	BHR	Percent										
1st 1000 hrs	$31.54	$80.00	$7.50	$0.95	$0.32	$0.00	$7.57	$1.00	$0.00	$0.00	$48.88	$64.65
2nd 1000 hrs	$33.51	$85.00	$7.50	$1.01	$0.34	$0.00	$8.04	$1.00	$0.00	$0.00	$51.40	$68.16
3rd 1000 hrs	$35.48	$90.00	$7.50	$1.06	$0.35	$0.00	$8.51	$1.00	$0.00	$0.00	$53.90	$71.64
4th 1000 hrs	$37.45	$95.00	$7.50	$1.12	$0.37	$0.00	$8.99	$1.00	$0.00	$0.00	$56.43	$75.16

(*)Special Calculation Note :

Other: Health Reimburstment Account

Ratio :

(1) Journeyman Lineman to (1) Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

This work applies to projects designated for any outside Underground Residential Distribution construction work for electrical utilities, municipalities and rural electrification projects.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Electrical Local 71 Voice Data Video Outside

Type of Rate: Commercial

Change #: LCN02-2024ib

Craft: Electrical

Effective Date: 3/6/2024

Effective Date: 3/6/2024

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Electrical Installer Technician I	$35.39		$7.25	$1.06	$0.00	$0.00	$1.77	$0.00	$0.00	$0.00	$45.47	$63.17
Installer Technician II	$33.37		$7.25	$1.00	$0.00	$0.00	$1.67	$0.00	$0.00	$0.00	$43.29	$59.98
Installer Repairman	$33.37		$7.25	$1.00	$0.00	$0.00	$1.67	$0.00	$0.00	$0.00	$43.29	$59.98
Equipment Operator II	$24.98		$7.25	$0.75	$0.00	$0.00	$1.25	$0.00	$0.00	$0.00	$34.23	$46.72
Cable Splicer	$35.39		$7.25	$1.06	$0.00	$0.00	$1.77	$0.00	$0.00	$0.00	$45.47	$63.17
Ground Driver W/CDL	$16.69		$7.25	$0.50	$0.00	$0.00	$0.83	$0.00	$0.00	$0.00	$25.27	$33.62
Groundman	$14.57		$7.25	$0.44	$0.00	$0.00	$0.73	$0.00	$0.00	$0.00	$22.99	$30.28
Apprentice	BHR	Percent										
Trainee F	$17.70	$50.01	$7.25	$0.53	$0.00	$0.89	$0.00	$0.00	$0.00	$0.00	$26.37	$35.22
Trainee E	$20.53	$58.00	$7.25	$0.62	$0.00	$1.03	$0.00	$0.00	$0.00	$0.00	$29.43	$39.69
Trainee D	$23.36	$66.00	$7.25	$0.70	$0.00	$1.17	$0.00	$0.00	$0.00	$0.00	$32.48	$44.16
Trainee C	$26.19	$74.00	$7.25	$0.79	$0.00	$1.31	$0.00	$0.00	$0.00	$0.00	$35.54	$48.63
Trainee B	$29.02	$82.00	$7.25	$0.87	$0.00	$1.45	$0.00	$0.00	$0.00	$0.00	$38.59	$53.10
Trainee A	$31.85	$90.00	$7.25	$0.96	$0.00	$1.59	$0.00	$0.00	$0.00	$0.00	$41.65	$57.58

(*)Special Calculation Note :

Ratio :

1Trainee to 1 Journeyman

Jurisdiction (* denotes special jurisdictional note) :

Adams, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Delaware, Fairfield, Fayette, Franklin, Gallia, Geauga, Greene, Guernsey, Hamilton, Harrison, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Perry, Pickaway, Pike, Portage, Preble, Richland, Ross, Scioto, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Vinton, Warren, Washington, Wayne

Special Jurisdictional Note :

Details :

Cable Splicer: Inspect and test lines or cables, analyze results, and evaluate transmission characteristics. Cover conductors with insulation or seal splices with moisture-proof covering. Install, splice, test, and repair cables using tools or mechanical equipment. This will include the splicing of fiber. Installer Technician I: Must know all aspects of telephone and cable work. This is to include aerial, underground, and manhole work. Must know how to climb and run bucket. Must have all the tools required to perform these tasks. Must be able to be responsible for the safety of the crew at all times. Must also have CDL license and have at least 5 years experience. Installer Repairman: Perform tasks of repairing, installing, and testing phone and CATV services. Installer Technician II: Have at least three years of telephone and CATV experience. Must have the knowledge of underground, aerial, and manhole work. Must be able to climb and operate bucket. Must have CDL. Must have all tools needed to perform these tasks. Equipment Operator II: Able to operate a digger derrick or bucket truck. Have at least 3 years of experience and must have a valid CDL license. Groundman W/CDL: Must have a valid CDL license and be able to perform tasks such as: climbing poles, pulling down guys, making up material, and getting appropriate tools for the job. Must have at least 5 year's experience. Groundman: Perform tasks such as: climbing poles, pulling down guys, making up material, and getting appropriate tools for the job. Experience 0-5 years.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Elevator Local 44

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Elevator	1/29/2025	1/29/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Elevator Mechanic	$62.27		$16.27	$10.96	$0.80	$4.98	$10.40	$2.34	$0.00	$0.00	$108.02	$139.16
Assistant Mechanic	$49.82		$16.27	$10.96	$0.80	$3.99	$10.40	$1.80	$0.00	$0.00	$94.04	$118.95
Apprentice	BHR	Percent										
0-6 months Probation	$31.14	$50.01	$0.00	$0.00	$0.00	$1.87	$0.00	$0.00	$0.00	$0.00	$33.01	$48.58
1st year	$34.25	$55.00	$16.27	$10.96	$0.80	$2.06	$10.40	$1.24	$0.00	$0.00	$75.98	$93.10
2nd year	$40.48	$65.00	$16.27	$10.96	$0.80	$2.43	$10.40	$1.46	$0.00	$0.00	$82.80	$103.03
3rd year	$43.59	$70.00	$16.27	$10.96	$0.80	$2.63	$10.40	$1.57	$0.00	$0.00	$86.22	$108.01
4th year	$49.82	$80.00	$16.27	$10.96	$0.80	$2.99	$10.40	$1.80	$0.00	$0.00	$93.04	$117.94
Helper	$43.59	$70.00	$16.27	$10.96	$0.80	$3.49	$10.40	$1.57	$0.00	$0.00	$87.08	$108.87

(*)Special Calculation Note :

OTHER IS: HOLIDAY PAY

Ratio :

1 Journeyman to 1 Apprentice 1 Journeyman to 1 Helper 1 Journeyman to 1 Assistant Mechanic

Jurisdiction (* denotes special jurisdictional note) :

Allen, Auglaize, Crawford, Defiance, Erie, Fulton, Hancock, Hardin, Henry, Huron, Lucas, Mercer, Ottawa, Paulding, Putnam, Sandusky, Seneca, Van Wert, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

A Helper or Apprentice certified to weld shall be paid mechanic's rate when performing welding (excluding tack welding).

Prevailing Wage Rate
Skilled Crafts

Name of Union: Glazier Local 1020

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN02-2026ib	Glazier	7/15/2026	7/15/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Glazier	$25.00		$10.85	$7.16	$0.15	$0.00	$0.00	$4.00	$0.00	$0.00	$47.16	$59.66
Apprentice	BHR	Percent										
1st Year	$15.00	$60.00	$10.85	$7.16	$0.15	$0.00	$0.00	$4.00	$0.00	$0.00	$37.16	$44.66
2nd Year	$17.50	$70.00	$10.85	$7.16	$0.15	$0.00	$0.00	$4.00	$0.00	$0.00	$39.66	$48.41
3rd Year	$20.00	$80.00	$10.85	$7.16	$0.15	$0.00	$0.00	$4.00	$0.00	$0.00	$42.16	$52.16
4th Year	$22.50	$90.00	$10.85	$7.16	$0.15	$0.00	$0.00	$4.00	$0.00	$0.00	$44.66	$55.91

(*)Special Calculation Note :

Other is: In lieu of paid holidays and paid vacations $4.00 per hour premium is added

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Allen, Auglaize, Crawford, Hancock, Hardin, Logan, Mercer, Paulding, Putnam, Shelby, Van Wert, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Ironworker Local 172

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Ironworker	6/1/2026	6/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Ironworker	$44.07		$9.80	$9.50	$0.71	$0.00	$4.00	$0.00	$0.00	$0.00	$68.08	$90.12
Rigger, Welder, Reinforcing Sheeter, Fence Erector, & Machinery Mover	$44.07		$9.80	$9.50	$0.71	$0.00	$4.00	$0.00	$0.00	$0.00	$68.08	$90.12
Apprentice	BHR	Percent										
1st Year 0-1500 Hours	$30.85	$70.00	$9.80	$9.50	$0.71	$0.00	$4.00	$0.00	$0.00	$0.00	$54.86	$70.29
2nd Year 1501-3000 Hours	$35.26	$80.00	$9.80	$9.50	$0.71	$0.00	$4.00	$0.00	$0.00	$0.00	$59.27	$76.90
3rd Year 3001-4500 Hours	$39.67	$90.02	$9.80	$9.50	$0.71	$0.00	$4.00	$0.00	$0.00	$0.00	$63.68	$83.52

(*)Special Calculation Note :

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Champaign*, Clark*, Crawford*, Delaware, Fairfield, Fayette*, Franklin, Hardin*, Highland*, Hocking, Jackson*, Knox, Licking, Logan*, Madison*, Marion, Morrow, Muskingum*, Perry, Pickaway, Pike, Ross, Union, Vinton, Wyandot*

Special Jurisdictional Note :

Champaign County Twps included: Wayne, Rush, Goshen
Clark County Twps included: Vienna, Catawba and portions of Harmony and Pleasant
Crawford County Twps included: Bucyrus, Dallas, Jefferson, Jackson, Whetstone, Polk, Sandusky
Fayette County Twps included: Paint, Marion, Perry, Madison, Wayne, Union
Hardin County Twps included: McDonald, Taylorcreek, Hale, Dudley, Pleasant, Goshen, Blanchard, Lynn, Jackson, Buck, Cessna, Marion, Washington
Highland County Twps included: Madison. Jackson County Twps included: Liberty, Washington, Milton, Jackson, Coal, Wilkesville
Logan County Twps included: Monroe, Zane, Jefferson, Perry, Rush Creek, Bokes Creek
Madison County Twps included: Range, Paint, Fairfield, Sommerford, Jefferson, Pike, Canaan, Pleasant, Oak Run, Union, Deer Creek, Monroe, Darby
Muskingum County Twps include: Jackson, Licking, Hope Well, Newton, Clay, Cass, Muskingum falls, Springfield, Madison, Washington, Wayne, Brush Creek
Pike County Twps included: Perry, Benton, Mifflin, Sunfish, Newton, Prebble, Pee Pee, Seal, Beaver, Jackson
Wyandot County Twps included: Jackson, Marseilles, Mifflin, Pitt, Antrim

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Ironworker Local 55

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Ironworker	7/1/2026	7/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Ironworker	$40.00		$13.65	$11.00	$0.95	$0.00	$4.00	$0.00	$0.00	$0.00	$69.60	$89.60
Metal Fence & Guardrail Work	$29.00		$12.22	$11.00	$0.50	$0.00	$2.00	$0.00	$0.00	$0.00	$54.72	$69.22
Apprentice	BHR	Percent										
1st Year	$26.00	$65.00	$13.65	$0.00	$0.95	$0.00	$0.00	$0.00	$0.00	$0.00	$40.60	$53.60
2nd Year	$28.00	$70.00	$13.65	$11.00	$0.95	$0.00	$4.00	$0.00	$0.00	$0.00	$57.60	$71.60
3rd Year	$32.00	$80.00	$13.65	$11.00	$0.95	$0.00	$4.00	$0.00	$0.00	$0.00	$61.60	$77.60
4th Year	$36.00	$90.00	$13.65	$11.00	$0.95	$0.00	$4.00	$0.00	$0.00	$0.00	$65.60	$83.60

(*)Special Calculation Note :

Ratio :

4 Journeyman to 1 Apprentice
Ornamental Work 2 Journeymen to 1 Apprentice
Spinning Cables on Suspension Bridges 1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Crawford*, Defiance*, Erie*, Fulton, Hancock, Henry, Huron*, Lucas, Ottawa, Putnam*, Sandusky, Seneca, Williams*, Wood, Wyandot*

Special Jurisdictional Note :

Crawford: From where Hwy #598 & #30 meet through W. Liberty to the Northern Border & from said Hwy junction point due west to the border.
Defiance: South from where Route #66 meets the Northern Border to the Eastern County Border.
Erie: West of Columbus Ave North to Sandusky Bay, West of Columbus Ave to Route 4 to Route 99 -all areas West of said Routes.
Huron: West from the Northern Border through Monroeville and Willard territory West of Route #99.
Putnam: East from the Northern Border through Miller City to where #696 meets the Southern Border.
Williams: East from Pioneer through Stryker to Southern Border. Wyandot: North of Route #30

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Labor HevHwy 3

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Laborer	5/1/2026	5/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Laborer Group 1	$38.77		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$55.87	$75.25
Group 2	$38.94		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$56.04	$75.51
Group 3	$39.27		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$56.37	$76.00
Group 4	$39.72		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$56.82	$76.68
Watch Person	$33.50		$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$50.60	$67.35
Apprentice	BHR	Percent										
0-1000 hrs	$31.02	$80.00	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$48.12	$63.63
1001-2000 hrs	$32.95	$85.00	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$50.05	$66.53
2001-3000 hrs	$34.89	$90.00	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$51.99	$69.44
3001-4000 hrs	$36.83	$95.00	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$53.93	$72.34
More than 4000 hrs	$38.77	$100.00	$9.45	$4.60	$0.45	$0.00	$2.50	$0.00	$0.10	$0.00	$55.87	$75.25

(*)Special Calculation Note :

Tunnel Laborer rate with air-pressurized add $1.00 to the above wage rate.

Commercial Driver's License – Any Laborer required to utilize a valid Commercial Driver's License (CDL), are in compliance with necessary FMCSA regulations and approved by the Contractor to operate a Commercial Motor Vehicle (CMV), shall be paid one dollar ($1.00) per hour above the base rate for the entirety of their working shift.

Ratio :

1 Journeyman to 1 Apprentice
3 Journeymen to 1 Apprentice thereafter

Watchmen have no Apprentices

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Scioto, Seneca, Shelby, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wyandot

Special Jurisdictional Note :

Hod Carriers and Common Laborers - Heavy, Highway, Sewer, Waterworks, Utility, Airport, Railroad, Industrial and Building Site, Sewer Plant, Waste Water Treatment Facilities Construction

Details :

Group 1 Laborer (Construction); Plant Laborer or Yardman, Right-of-way Laborer, Landscape Laborer, Highway Lighting Worker, Signalization Worker, (Swimming) Pool Construction Laborer, Utility Man, *Bridge Man, Handyman, Joint Setter, Flagperson, Carpenter Helper, Waterproofing Laborer, Slurry Seal, Seal Coating, Surface Treatment or Road Mix Laborer, Riprap Laborer & Grouter, Asphalt Laborer, Dump Man (batch trucks), Guardrail & Fence Installer, Mesh Handler & Placer, Concrete Curing Applicator, Scaffold Erector, Sign Installer, Hazardous Waste (level D), Diver Helper, Zone Person and Traffic Control. *Bridge Man will perform work as per the October 31, 1949, memorandum on concrete forms, by and between the United Brotherhood of Carpenters and Joiners of America and the Laborers' International Union of North America, which states in; "the moving, cleaning, oiling and carrying to the next point of erection, and the stripping of forms which are not to be re-used, and forms on all flat arch work shall be done by members of the Laborers' International Union of North America."

Group 2 Asphalt Raker, Screwman or Paver, Concrete Puddler, Kettle Man (pipeline), All Machine-Driven Tools (Gas, Electric, Air), Mason Tender, Brick Paver, Mortar Mixer, Skid Steer, Sheeting & Shoring Person, Surface Grinder Person, Screedperson, Water Blast, Hand Held Wand, Power Buggy or Power Wheelbarrow, Paint Striper, Plastic fusing Machine Operator, Rodding Machine Operator, Pug Mill Operator, Operator of All Vacuum Devices Wet or Dry, Handling of all Pumps 4 inches and under (gas, air or electric), Diver, Form Setter, Bottom Person, Welder Helper (pipeline), Concrete Saw Person, Cutting with Burning Torch, Pipe Layer, Hand Spiker (railroad), Underground Person (working in sewer and waterline, cleaning, repairing and reconditioning). Tunnel Laborer (without air),Caisson, Cofferdam (below 25 feet deep), Air Track and Wagon Drill, Sandblaster Nozzle Person, Hazardous Waste (level B), ***Lead Abatement, Hazardous Waste (level C) ***Includes the erecting of structures for the removal, including the encapsulation and containment of Lead abatement process.

Group 3 Blast and Powder Person, Muckers will be defined as shovel men working directly with the miners, Wrencher (mechanical joints & utility pipeline), Yarner, Top Lander, Hazardous Waste (level A), Concrete Specialist, Curb Setter and Cutter, Grade Checker, Concrete Crew in Tunnels. Utility pipeline Tappers, Waterline, Caulker, Signal Person will receive the rate equal to the rate paid the Laborer classification for which the Laborer is signaling.

Group 4 Miner, Welder, Gunite Nozzle Person A.) The Watchperson shall be responsible to patrol and maintain a safe traffic zone including but not limited to barrels, cones, signs, arrow boards, message boards etc. The responsibility of a watchperson is to see that the equipment, job and office trailer etc. are secure.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Labor Local 1216 Building

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Laborer	5/1/2026	5/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Laborer Group 1	$34.87		$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$50.42	$67.85
Group 2	$35.07		$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$50.62	$68.16
Group 3	$35.37		$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$50.92	$68.60
Group 4	$32.20		$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$47.75	$63.85
Apprentice	BHR	Percent										
0-1000 hrs	$27.90	$80.00	$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$43.45	$57.40
1001-2000 hrs	$29.64	$85.00	$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$45.19	$60.01
2001-3000 hrs	$31.38	$89.98	$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$46.93	$62.62
3001-4000 hrs	$33.13	$95.00	$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$48.68	$65.25
4001+ hrs	$34.87	$100.00	$9.45	$4.60	$0.40	$0.00	$1.00	$0.00	$0.10	$0.00	$50.42	$67.85

(*)Special Calculation Note :

Ratio :

1 Journeyman to 1 Apprentice
4 Journeymen to 1 Apprentice thereafter

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Knox, Morrow, Richland

Special Jurisdictional Note :

Details :

Group 1 Concrete Handler, Finisher tender, Building and Construction Laborer, Signalman, Flagman, Tool Cribman, Carpenter Tender, Utility Construction Laborer, Guardrail Erector, and Hazardous Waste (Level C,D)

Group 2 Gunite Operator , Bottom Men, Tunnel Laborer, Pipe Layer, Air and Power Driven Tools, Burner on Demolition work, Swinging Scaffold, Mucker, Caisson Worker, Cofferdam Worker, Powder Man and Dynamite Blaster, Creosote Worker, Form Setter, Plasterer Tender, Hod Carrier, Laser Beam Set-up Man, and Hazardous Waste (Level A, B)

Group 3 Fork Lift, Scaffold Builders, Mortar Mixer, Mason Tender, Stone Mason Tender

Group 4 Watchman

Hazardous Waste Removal and Lead Abatement For laborers working in an exclusive or "hot" area with toxic or hazardous materials, one of the following personal protective equipment ensembles will be required for necessary protection against toxic contaminants. Level A Protective equipment is required when the area has been determined to contain extremely toxic contaminants of contaminants unknown but may be expected to be extremely toxic and/or immediately Dangerous to life and health (IDLH). This ensemble includes a full encapsulated chemical suit (moon suit)., Self-Contained Breathing Apparatus (SUBA), or Airline Fed Respirator, and various types and numbers of boots and gloves; cool vests and voice-activated radios are optional equipment sometimes worn. This level places the greatest physical and mental stress on the worker. Level B Protective equipment includes a chemically resistant splash suit and SCBA or airline Respirator. This ensemble is required when the situation is very hazardous, such as oxygen deficient atmospheres, IDLH atmospheres, or confined space entries, but the risk of skin exposure is nit as great as in Level D situations Level C Protective equipment includes a protective suit and an Air Purifying Respirator (APR) with the appropriate filter canisters. The ensemble is used when the contaminants are reliably known not to be hazardous to the skin and not IDLH (immediately Dangerous to Life or Health) and correct filter protection is available. This ensemble offers adequate protection for many jobs. Level D Normal work clothes to normal skin protection such as gloves, face shields, goggles, coveralls and occasionally respiratory protection.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Operating Engineers - Building Local 18 - Zone III

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Operating Engineer	5/1/2026	5/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Operator Group A	$47.29		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$64.74	$88.39
Operator Group B	$47.17		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$64.62	$88.20
Operator Group C	$46.13		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$63.58	$86.65
Operator Group D	$44.95		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$62.40	$84.88
Operator Group E	$39.49		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$56.94	$76.69
Master Mechanic	$48.29		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Lift Director	$48.29		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Cranes & Mobile Concrete Pumps 150'-180'	$47.79		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.24	$89.14
Cranes & Mobile Concrete Pumps 180'-249'	$48.29		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Cranes & Mobile Concrete Pumps 249' and over	$48.54		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.99	$90.26
Apprentice	BHR	Percent										
1st Year	$23.65	$50.02	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$41.10	$52.92
2nd Year	$28.37	$60.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$45.82	$60.00
3rd Year	$33.10	$70.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$50.55	$67.10
4th Year	$37.83	$80.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$55.28	$74.19
Field Mechanic Trainee	$	$	$	$	$	$	$	$	$	$	$	$
1st Year	$28.37	$60.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$45.72	$59.91
2nd Year	$33.10	$70.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$50.45	$67.00
3rd Year	$37.83	$80.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$55.18	$74.09
4th Year	$42.56	$90.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$59.91	$81.19

(*)Special Calculation Note :

Other: Education & Safety
Misc: National Training

Note: There will be a 10% increase for the apprentices on top of the percentages listed above provided they are operating mobile equipment.

Ratio :

For every (3) Operating Engineer Journeymen employed by the company there may be employed (1) Registered Apprentice or trainee Engineer through the referral when they are available. An apprenice, while employed as part of a crew per Article VIII, paragraph 77, will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wyandot

Special Jurisdictional Note :

Details :

Group A- Barrier Moving Machines; Boiler Operators or Compressor Operators, when compressor or boiler is mounted on crane (Piggyback Operation); Boom Trucks (all types); Cableways Cherry Pickers; Combination - Concrete Mixers & Towers; All Concrete Pumps with Booms; Cranes (all types); Compact Cranes, track or rubber over 4,000 pounds capacity; Cranes self-erecting, stationary, track or truck (all configurations); Derricks (all types); Draglines; Dredges (dipper, clam or suction) 3-man crew; Elevating Graders or Euclid Loaders; Floating Equipment; Forklift (rough terrain with winch/hoist); Gradalls; Helicopter Operators, hoisting building materials; Helicopter Winch Operators, Hoisting building materials; Hoes (All types); Hoists (with two or more drums in use); Horizonal Directional Drill; Hydraulic Gantry (lift system); Laser Finishing Machines; Laser Screed and like equipment; Lift Slab or Panel Jack Operators; Locomotives (all types); Maintenance Operator/Technician(Mechanic Operator/Technician and/or Welder); Mixers, paving (multiple drum); Mobile Concrete Pumps, with booms; Panelboards, (all types on site); Pile Drivers; Power Shovels; Prentice Loader; Rail Tamper (with automatic lifting and aligning device); Rotary Drills (all), used on caissons for foundations and sub-structure; Side Booms; Slip Form Pavers; Straddle Carriers (Building Construction on site); Trench Machines (over 24" wide); Tug Boats.

Group B - Articulating/end dumps (minus $4.00/hour from Group B rate); Asphalt Pavers; Bobcat-type and/or skid steer loader with hoe attachment greater than 7000 lbs.; Bulldozers; CMI type Equipment; Concrete Saw, Vermeer-type; Endloaders; Hydro Milling Machine; Kolman-type Loaders (Dirt Loading); Lead Greasemen; Mucking Machines; Pettibone-Rail Equipment; Power Graders; Power Scoops; Power Scrapers; Push Cats;, Rotomills (all), grinders and planers of all types.

Group C - A-Frames; Air Compressors, Pressurizing Shafts or Tunnels; All Asphalt Rollers; Bobcat-type and/or Skid Steer Loader with or without attachments; Boilers (15 lbs. pressure and over); All Concrete Pumps (without booms with 5 inch system); Fork Lifts (except masonry); Highway Drills - all types (with integral power); Hoists (with one drum); House Elevators (except those automatic call button controlled), Buck Hoists, Transport Platforms, Construction Elevators; Hydro Vac/Excavator (when a second person is needed, the rate of pay will be "Class E"); Man Lifts; Material hoist/elevators; Mud Jacks; Pressure Grouting; Pump Operators (installing or operating Well Points or other types of Dewatering Systems); Pumps (4 inches and over discharge); Railroad Tie (Inserter/Remover); Rotovator (Lime-Soil Stabilizer); Submersible Pumps (4"and over discharge); Switch & Tie Tampers (without lifting and aligning device); Trench Machines (24" and under); Utility Operators.

Group D - Backfillers and Tampers; Ballast Re-locator; Batch Plant Operators; Bar and Joint Installing Machines; Bull Floats; Burlap and Curing Machines; Clefplanes; Compressors, on building construction; Concrete Mixers, more than one bag capacity; Concrete Mixers, one bag capacity (side loaders); All Concrete Pumps (without boom with 4" or smaller system); Concrete Spreader; Conveyors, used for handling building materials; Crushers; Deckhands; Drum Fireman (in asphalt plants); Farm type tractors pulling attachments; Finishing Machines; Form Trenchers; Generators: Gunite Machines; Hydro-seeders; Pavement Breakers (hydraulic or cable); Post Drivers; Post Hole Diggers; Pressure Pumps (over 1/2") discharge); Road Widening Trenchers; Rollers (except asphalt); Self-propelled sub-graders; Shotcrete Machines; Tire Repairmen; Tractors, pulling sheepsfoot post roller or grader; VAC/ALLS; Vibratory Compactors, with integral power; Welders.

Group E – Allen Screed Paver (concrete); Boilers (less than 15 lbs. pressure); Cranes-Compact, track or rubber (under 4,000 pounds capacity); Directional Drill "Locator"; Fueling and greasing +$3.00; Inboard/outboard Motor Boat Launches; Light Plant Operators; Masonry Fork Lifts; Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson, Submersible Pumps (under 4" discharge).

Master Mechanics - Master Mechanic

Cranes 150' – 180' - Boom & Jib 150 - 180 feet Cranes 180' – 249' - Boom & Jib 180 - 249 feet Cranes 250' and over - Boom & Jib 250 feet or over

Prevailing Wage Rate
Skilled Crafts

Name of Union: Operating Engineers - HevHwy Zone II

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Operating Engineer	5/1/2026	5/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Operator Class A	$47.29		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$64.74	$88.39
Operator Class B	$47.17		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$64.62	$88.20
Operator Class C	$46.13		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$63.58	$86.65
Operator Class D	$44.95		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$62.40	$84.88
Operator Class E	$39.49		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$56.94	$76.69
Master Mechanic	$48.29		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Lift Director	$48.29		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Crane and Mobile Concrete Pump 150' - 179'	$47.79		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.24	$89.14
Crane and Mobile Concrete Pump 180' - 249'	$48.29		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.74	$89.89
Crane and Mobile Concrete Pump 250' and Ove	$48.54		$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$65.99	$90.26
Apprentice	BHR	Percent										
1st Year	$23.64	$50.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$41.09	$52.91
2nd Year	$28.37	$60.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$45.82	$60.00
3rd Year	$33.10	$70.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$50.55	$67.10
4th Year	$37.83	$80.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.10	$55.28	$74.19
Field Mech Trainee	$	$	$	$	$	$	$	$	$	$	$	$
1st year	$28.37	$60.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$45.72	$59.91
2nd year	$33.10	$70.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$50.45	$67.00
3rd year	$37.83	$80.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$55.18	$74.09
4th year	$42.56	$90.00	$10.01	$6.25	$1.00	$0.00	$0.00	$0.09	$0.00	$0.00	$59.91	$81.19

(*)Special Calculation Note :

Other: Education & Safety Fund
Misc: National Training

**Apprentices wilt receive a 10% increase on top of the percentages listed above provided they are operating mobile equipment.

Ratio :

For every (3) Operating Engineer Journeymen employed by the company, there may be employed (1) Registered Apprentice or Trainee Engineer through the referral when they are available. An Apprentice, while employed as part of a crew per Article VIII, paragraph 68 will not be subject to the apprenticeship ratios in this collective bargaining agreement

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Coshocton, Crawford, Darke, Defiance, Delaware, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lucas, Madison, Marion, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

Class A - Air Compressors on Steel Erection; Asphalt Plant Engineers (Cleveland District Only); Barrier Moving Machine; Boiler Operators, Compressor Operators, or Generators, when mounted on a rig; Boom Trucks (all types); Cableways; Cherry Pickers; Combination- Concrete Mixers & Towers; Concrete Plants (over 4 yd capacity); Concrete Pumps; Cranes (all types); Compact Cranes track or rubber over 4,000 pounds capacity; Cranes self-erecting stationary, track or truck; Derricks (all types); Draglines; Dredges dipper, clam or suction; Elevating Graders or Euclid Loaders; Floating Equipment (all types); Gradalls; Helicopter Crew (Operator- hoist or winch); Hoes (all types); Hoisting Engines; Hoisting Engines, on shaft or tunnel work; Hydraulic Gantry (lifting system); Industrial-type Tractors; Jet Engine Dryer (D8 or D9) diesel Tractors; Locomotives (standard gauge); Maintenance Operators/Technicians (class A); Mixers, paving (single or double drum); Mucking Machines; Multiple Scrapers; Piledriving Machines (all types); Power Shovels, Prentice Loader; Quad 9 (double pusher); Rail Tamper (with automatic lifting and aligning device); Refrigerating Machines (freezer operation); Rotary Drills, on caisson work; Rough Terrain Fork Lift with winch/hoist; Side Booms; Slip Form Pavers; Survey Crew Party Chiefs; Tower Derricks; Tree Shredders; Trench Machines (over 24” wide); Truck Mounted Concrete Pumps; Tug Boats; Tunnel Machines and /or Mining Machines; Wheel Excavators.

Class B - Asphalt Pavers; Automatic Subgrade Machines, self-propelled (CMI-type); Bobcat-type and /or Skid Steer Loader with hoe attachment greater than 7000 lbs.; Boring Machine Operators (more than 48 inches); Bulldozers; Concrete Saws, Vermeer type; Endloaders; Horizontal Directional Drill (50,000 ft. lbs. thrust and over); Hydro Milling Machine; Kolman-type Loaders (production type-dirt); Lead Greasemen; Lighting and Traffic Signal Installation Equipment includes all groups or classifications; Maintenance Operators/Technicians, Class B; Material Transfer Equipment (shuttle buggy) Asphalt; Pettibone-Rail Equipment; Power Graders; Power Scrapers; Push Cats; Rotomills (all), Grinders and Planners of all types, Groovers (excluding walk-behinds); Trench Machines (24 inch wide and under).

Class C - A-Frames; Air Compressors, on tunnel work (low Pressure); Articulating/straight bed end dumps if assigned (minus $4.00 per hour); Asphalt Plant Engineers (Portage and Summit Counties only); Bobcat-type and/or skid steer loader with or without attachments; Drones; Highway Drills (all types); HydroVac/Excavator (when a second person is needed, the rate of pay will be “Class E”); Locomotives (narrow gauge); Material Hoist/Elevators; Mixers, concrete (more than one bag capacity); Mixers, one bag capacity (side loader); Power Boilers (over 15 lbs. pressure); Pump Operators (installing or operating well Points); Pumps (4 inch and over discharge); Railroad Tie Inserter/Remover; Rollers, Asphalt; Rotovator (lime-soil Stabilizer); Switch & Tie Tampers (without lifting and aligning device); Utilities Operators, (small equipment); Welding Machines and Generators.

Class D – Backfillers and Tampers; Ballast Re-locator; Bar and Joint Installing Machines; Batch Plant Operators; Boring Machine Operators (48 inch or less); Bull Floats; Burlap and Curing Machines; Concrete Plants (capacity 4 yds. and under); Concrete Saws (multiple); Conveyors (highway); Crushers; Deckhands; Farm type tractors, with attachments (highway); Finishing Machines; Firemen, Floating Equipment (all types); Fork Lifts (highway), except masonry; Form Trenchers; Hydro Hammers; Hydro Seeders; Pavement Breakers (hydraulic or cable); Plant Mixers; Post Drivers; Post Hole Diggers; Power Brush Burners; Power Form Handling Equipment; Road Widening Trenchers; Rollers (brick, grade, macadam); Self-Propelled Power Spreaders; Self-Propelled Sub-Graders; Steam Firemen; Survey Instrument men; Tractors, pulling sheepsfoot rollers or graders; Vibratory Compactors, with integral power.

Class E - Compressors (portable, Sewer, Heavy and Highway); Cranes-Compact, track or rubber under 4,000 pound capacity; Drum Firemen (asphalt plant); Fueling and greasing (Primary Operator with Specialized CDL Endorsement Add $3.00/hr); Generators; Inboard-Outboard Motor Boat Launches; Masonry Fork Lifts; Oil Heaters (asphalt plant); Oilers/Helpers; Power Driven Heaters (oil fired); Power Scrubbers; Power Sweepers; Pumps (under 4 inch discharge); Signalperson; Survey Rodmen or Chairmen; Tire Repairmen; VAC/ALLS.

Master Mechanic - Master Mechanic

Cranes and Mobile Concrete Pumps 150' -179' - Boom & Jib 150 - 179 feet Cranes and Mobile Concrete Pumps 180' - 249' - Boom & Jib 180 - 249 feet Cranes and Mobile Concrete Pumps 250' and over - Boom & Jib 250 feet or over

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 639 Sign and Display

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Painter	6/18/2025	6/18/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Top Mechanic Class A	$27.53		$4.50	$0.00	$0.00	$0.00	$0.00	$1.45	$0.00	$0.00	$33.48	$47.25
Top Mechanic Class B	$27.53		$4.50	$0.75	$0.00	$0.53	$0.00	$1.45	$0.00	$0.00	$34.76	$48.53
Top Helper Class A	$22.33		$4.50	$0.00	$0.00	$0.00	$0.00	$1.20	$0.00	$0.00	$28.03	$39.20
Top Helper Class B	$22.33		$4.50	$0.75	$0.00	$0.43	$0.00	$1.20	$0.00	$0.00	$29.21	$40.38
Helper Class A	$17.19		$4.50	$0.00	$0.00	$0.00	$0.00	$0.90	$0.00	$0.00	$22.59	$31.19
Helper Class B	$17.19		$4.50	$0.75	$0.00	$0.30	$0.00	$0.90	$0.00	$0.00	$23.64	$32.24
New Hire (90 Days)	$15.75		$4.50	$0.00	$0.00	$0.00	$0.00	$0.55	$0.00	$0.00	$20.80	$28.68
Apprentice	BHR	Percent										

(*)Special Calculation Note :

Other: Sick, Personal & Holiday Pay Swing Stage Rate: Employees shall receive a differential of $1.50 per hour for all hours worked on scaffolds four sections or higher, including any boom lifts and swing stage scaffolds. In addition, the rigging and derigging of hanging/suspended swing stage systems and rappelling/bolson chair work of a single employee will qualify for $1.50 differential, will be paid to a single lead Top Mechanic or single lead Top Helper on any given swing stage job, even when it includes multiple running rigs on a single jobsite.

Ratio :

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Cuyahoga, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Geauga, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lake, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

The work performed by employees covered by this rate shall include cleaning and refinishing of architectural metals using chemicals, solvents, coatings and hand-applied lacquer thinner, removing scratches from mirror finished metals, burnishing of bronze, statuary finishes on exterior and interior surfaces during the course of the restoration and maintenance of architectural metals, and other specialty metal finishing work, and the use of all tools required to perform such work, including but not limited to polishes, spray equipment and scaffolding. Class A: Less Than 1 Year of Service Class B: More Than 1 Year of Service Top Mechanic: Top Mechanic shall be responsible for ensuring the highest quality of workmanship by Helpers, and be highly competent and knowledgeable in the following areas: coatings, both solvent and waterborne, spraying ability, stainless steel, aluminum and bronze finishing, scaffolding and swing stage work. The Top Mechanic shall also be responsible for providing necessary training of employees in lower classifications and for directing all employees in his/her crew to perform their responsibilities in a productive and efficient manner. Top Helper: For existing Top Helpers at the time of this Agreement shall, in addition to performing the responsibilities of a Helper, be responsible and accountable for the setup, breakdown, safety and quality of the Company's product. Helper: A Helper shall be responsible for performing tasks in refinishing, compliance with safety procedures, setting up and breaking down job sites, setting up and breaking down scaffolding and swing stages, preparing surfaces for refinishing, including but not limited to masking and stripping, cleaning, oxidizing, polishing and scratch removal on various finishes.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 639 Zone 2 Sign

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Painter	5/28/2025	5/28/2025

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Painter Sign Journeyman Tech/Team Leader Class A	$26.56	$3.36	$0.21	$0.00	$0.00	$0.00	$0.72	$0.00	$0.00	$30.85	$44.13
Painter Sign Journeyman Tech/Team Leader Class B	$26.56	$3.36	$0.21	$0.00	$0.51	$0.00	$0.72	$0.00	$0.00	$31.36	$44.64
Painter Sign Journeyman Tech/Team Leader Class C	$26.56	$3.36	$0.21	$0.00	$1.02	$0.00	$0.72	$0.00	$0.00	$31.87	$45.15
Painter Sign Journeyman Tech/Team Leader Class D	$26.56	$3.36	$0.21	$0.00	$1.53	$0.00	$0.72	$0.00	$0.00	$32.38	$45.66
Sign Journeyman Class A	$26.27	$3.36	$0.21	$0.00	$0.00	$0.00	$0.71	$0.00	$0.00	$30.55	$43.69
Sign Journeyman Class B	$26.27	$3.36	$0.21	$0.00	$0.51	$0.00	$0.71	$0.00	$0.00	$31.06	$44.20
Sign Journeyman Class C	$26.27	$3.36	$0.21	$0.00	$1.01	$0.00	$0.71	$0.00	$0.00	$31.56	$44.70
Sign Journeyman Class D	$26.27	$3.36	$0.21	$0.00	$1.52	$0.00	$0.71	$0.00	$0.00	$32.07	$45.21
Tech Sign Fabrication/ Erector Class A	$20.67	$3.36	$0.21	$0.00	$0.00	$0.00	$0.56	$0.00	$0.00	$24.80	$35.14
Tech Sign Fabrication/ Erector Class B	$20.67	$3.36	$0.21	$0.00	$0.40	$0.00	$0.56	$0.00	$0.00	$25.20	$35.54

Tech Sign Fabrication/ Erector Class C	$20.67		$3.36	$0.21	$0.00	$0.80	$0.00	$0.56	$0.00	$0.00	$25.60	$35.94
Tech Sign Fabrication/ Erector Class D	$20.67		$3.36	$0.21	$0.00	$1.19	$0.00	$0.56	$0.00	$0.00	$25.99	$36.33
Apprentice	BHR	Percent										

(*)Special Calculation Note :

Other is for paid holidays.

Ratio :

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Auglaize, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Greene, Hamilton, Hancock, Hardin, Henry, Highland, Holmes, Huron, Jackson, Knox, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Mercer, Miami, Montgomery, Morrow, Muskingum, Ottawa, Paulding, Perry, Pickaway, Pike, Preble, Putnam, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Trumbull, Tuscarawas, Union, Van Wert, Warren, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

Class A: less that 1 year. Class B: 1-3 years. Class C; 3-10 years. Class D: More than 10 years.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 788

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Painter	7/23/2025	7/23/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Painter Brush Roll	$30.23		$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$48.75	$63.86
REFINERY RATE	$		$	$	$	$	$	$	$	$	$	$
Painter Brush Roll	$32.02		$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$50.54	$66.55
POWERHOUSE RATE	$		$	$	$	$	$	$	$	$	$	$
Painter Brush Roll	$34.90		$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$53.42	$70.87
Apprentice	BHR	Percent										
1st Year	$19.65	$65.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$38.17	$47.99
2nd Year	$22.67	$75.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$41.19	$52.53
3rd Year	$25.70	$85.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$44.22	$57.07
4th Year	$28.72	$95.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$47.24	$61.60

(*)Special Calculation Note :

Apprentice rate based upon % of each classification.

A. $0.50 per hour shall be added to the rate of pay for the classification of work, while working: Swing stage, Boatswain Chair, Needle Beam &Horizontal Cable.
B. $1.00 per hour shall be added to the rate of pay for the classification of work, while operating: Any spray equipment, Sandblasting, Cob blasting, High Pressure Water blasting (4000 PSI), and for Automatic Taping &Finishing Tools for Drywall.
C. $0.50 per hour shall be added to the rate of pay for the classification of work, for tending: three (3) or more sprayers.
D. $1.00 per hour shall be added to the rate of pay for the classification of work, for the application of: Catalyzed Epoxy, including latex Epoxy that is deemed hazardous, Lead Abatement, or for work or material, where special precautions beyond normal work duties must be taken. Questionable work or material shall be approved by the Business Representative and/or Joint Trade Board.
E. $1.00 per hour shall be added to the rate of pay for the classification of work, for working on: Stacks, Tanks, and Towers over forty (40) feet in height.
F. $0.40 per hour shall be added to the rate of pay for the classification of work, for Paperhanging.
G. $1.00 per hour shall be added to the rate of pay for the classification of work, for Spray Painting.
H. $1.50 per hour shall be added to the rate of pay for the classification of work, for Drywall Finishing.

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Erie, Hancock, Huron, Marion, Morrow, Ottawa, Richland, Sandusky, Seneca, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 788 Drywall

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Painter	7/23/2025	7/23/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Painter Drywall Finisher	$31.73		$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$50.25	$66.11
REFINERY RATE	$		$	$	$	$	$	$	$	$	$	$
Painter Drywall Finisher	$33.52		$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$52.04	$68.80
POWERHOUSE RATE	$		$	$	$	$	$	$	$	$	$	$
Painter Drywall Finisher	$36.40		$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$54.92	$73.12
Apprentice	BHR	Percent										
1st Year	$20.62	$65.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$39.14	$49.45
2nd Year	$23.80	$75.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$42.32	$54.22
3rd Year	$28.56	$90.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$47.08	$61.36

(*)Special Calculation Note :

Apprentice rate based upon % of each classification.

A. $0.50 per hour shall be added to the rate of pay for the classification of work, while working: Swing stage, Boatswain Chair, Needle Beam & Horizontal Cable.
B. $1.00 per hour shall be added to the rate of pay for the classification of work, while operating: Any spray equipment, Sandblasting, Cob blasting, High Pressure Water blasting (4000 PSI), and for Automatic Taping &Finishing Tools for Drywall.
C. $0.50 per hour shall be added to the rate of pay for the classification of work, for tending: three (3) or more sprayers.
D. $1.00 per hour shall be added to the rate of pay for the classification of work, for the application of: Catalyzed Epoxy, including latex Epoxy that is deemed hazardous, Lead Abatement, or for work or material, where special precautions beyond normal work duties must be taken. Questionable work or material shall be approved by the Business Representative and/or Joint Trade Board.
E. $1.00 per hour shall be added to the rate of pay for the classification of work, for working on: Stacks, Tanks, and Towers over forty (40) feet in height.
F. $0.40 per hour shall be added to the rate of pay for the classification of work, for Paperhanging.
G. $1.00 per hour shall be added to the rate of pay for the classification of work, for Spray Painting.

Ratio :

1 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Erie, Hancock, Huron, Marion, Morrow, Ottawa, Richland, Sandusky, Seneca, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Painter Local 788 Hvy Hwy

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Painter	7/30/2025	7/30/2025

	BHR	Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
		H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification											
Class 1: Bridge Blaster	$41.71	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$60.23	$81.08
Class 2: Bridge Painter, Rigger, Containment Builder, Spot Blaster	$38.71	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$57.23	$76.58
Class 3: Equipment Operator/ Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control Boat Person, Driver (0-5 Years Exp.)	$31.71	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$50.23	$66.08
Class 3: Equipment Operator/ Field Mechanic, Grit Reclamation, Paint Mixer, Traffic Control Boat Person, Driver (5 Plus Years Exp.)	$34.71	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$53.23	$70.58
Class 4: Concrete Sealing, Concrete Blasting/Power Washing/ Etc.	$34.71	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$53.23	$70.58

Class 5: Quality Control/Quality Assurance, Traffic Safety, Competent Person	$34.71		$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$53.23	$70.58
Apprentice	BHR	Percent										
1st Year	$29.20	$70.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$47.72	$62.32
2nd Year	$33.37	$80.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$51.89	$68.57
3rd Year	$37.54	$90.00	$9.52	$8.55	$0.45	$0.00	$0.00	$0.00	$0.00	$0.00	$56.06	$74.83

(*)Special Calculation Note :

Apprentice pay based upon percentage of each classification.

Ratio :

1 Apprentice to 1 Journeyman

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Erie, Hancock, Huron, Marion, Morrow, Ottawa, Richland, Sandusky, Seneca, Wyandot

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Plasterer Local 132 (Columbus)

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Plasterer	6/1/2025	6/1/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Plasterer	$31.68		$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$47.14	$62.98
Fireproofing Gunner	$32.68		$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$48.14	$64.48
Apprentice	BHR	Percent										
1st 800 hrs	$22.18	$70.00	$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$37.64	$48.72
2nd 800 hrs	$23.44	$74.00	$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$38.90	$50.62
3rd 800 hrs	$24.71	$78.00	$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$40.17	$52.53
4th 800 hrs	$25.98	$82.00	$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$41.44	$54.43
5th 800 hrs	$27.24	$86.00	$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$42.70	$56.33
6th 800 hrs	$28.51	$90.00	$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$43.97	$58.23
7th 800 hrs	$29.78	$94.00	$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$45.24	$60.13
8th 800 hrs	$31.05	$98.00	$8.20	$4.70	$0.50	$0.00	$2.00	$0.06	$0.00	$0.00	$46.51	$62.03

(*)Special Calculation Note :

*Other is International Training Fund

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Coshocton, Crawford, Delaware, Fairfield, Fayette, Franklin, Guernsey, Hocking, Knox, Licking, Madison, Marion, Morrow, Muskingum, Perry, Pickaway, Richland, Ross, Union, Vinton, Wyandot

Special Jurisdictional Note :

Details :

Fireproofing Gunner: If any mechanical means is used in the gauging of lime for any finish coat, the mixing shall be gauged by a member of the crew who is to apply the respective gauging. This clause applies on jobs where cementitious and fibrous type fireproofing is the material being applied. There shall be an equal number of plasterers to nozzles used. Working on swing stage, slip scaffold or window jack scaffold shall receive the following rates: $0 above the regular rate for heights up to forty-nine (49) feet above grade level $0.75 above the regular rate for heights over fifty (50) feet above grade level

Prevailing Wage Rate
Skilled Crafts

Name of Union: Plumber Pipefitter Local 42

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Plumber Pipefitter	7/1/2026	7/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Plumber Pipefitter	$44.87		$13.02	$12.73	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$72.20	$94.63
Plumber Pipefitter Heavy Industrial	$45.37		$13.02	$12.73	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$72.70	$95.38
Apprentice Heavy Industrial	$		$	$	$	$	$	$	$	$	$	$
1st Year	$23.89		$8.92	$0.00	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$34.39	$46.34
2nd Year	$28.04		$13.02	$8.51	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$51.15	$65.17
3rd Year	$32.58		$13.02	$8.51	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$55.69	$71.98
4th Year	$36.11		$13.02	$9.51	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$60.22	$78.28
5th Year	$39.65		$13.02	$10.51	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$64.76	$84.58
Apprentice	BHR	Percent										
1st Year	$23.68	$52.78	$8.92	$0.00	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$34.18	$46.02
2nd Year	$27.78	$61.92	$13.02	$8.51	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$50.89	$64.78
3rd Year	$32.26	$71.90	$13.02	$8.51	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$55.37	$71.50
4th Year	$35.75	$79.68	$13.02	$9.51	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$59.86	$77.73
5th Year	$39.24	$87.46	$13.02	$10.51	$1.58	$0.00	$0.00	$0.00	$0.00	$0.00	$64.35	$83.97

(*)Special Calculation Note :

Ratio :

1 Journeyman to 1 Apprentice
2 Journeymen to 2 Apprentices
3 Journeymen to 3 Apprentices
4-6 Journeymen to 4 Apprentices
7-10 Journeymen to 5 Apprentices
11-13 Journeymen to 6 Apprentices
14-15 Journeymen to 7 Apprentices
16-18 Journeymen to 8 Apprentices
19-20 Journeymen to 9 Apprentices
21-23 Journeymen to 10 Apprentices
24-26 Journeymen to 11 Apprentices
27-30 Journeymen to 12 Apprentices
31-34 Journeymen to 13 Apprentices
35-38 Journeymen to 14 Apprentices
39-40 Journeymen to 15 Apprentices
Then 1 Journeyman to 5 Apprentices thereafter

Water Treatment Work described below is a ratio of: 1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Crawford, Erie, Huron, Knox, Lorain, Morrow, Richland, Wyandot

Special Jurisdictional Note :

Details :

Includes but not limited to: all water services from main to building including water meters and water meter foundations, all lawn sprinkler work including piping, fittings, and lawn sprinkler heads, all power plant piping of every description. All fire extinguishing systems and piping whether by water, steam, gas, or chemical, fire alarm piping and control tubing. On Water Treatment Plants, waste water treatment plants, prefabricated water treatment plants, lift stations, elevated water tanks, meter vaults, underground work on site at treatment, water mains and fire protection external mains, all construction work on public utilities obtained by employer other than plumbing and heating. On all construction projects wherein the work involves sanitary sewers, storm sewers and water lines (site work) performed outside the structure of the building.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Roofer Local 88

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
ORC01-2026ib	Roofer	6/17/2026	6/17/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Roofer	$35.00		$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$60.42	$77.92
HELPERS	$		$	$	$	$	$	$	$	$	$	$
Helper -500 Hrs. 1st 6 months	$20.00		$2.25	$0.00	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$25.96	$35.96
Helper - 500 Hrs. 2nd 6 months	$22.75		$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$48.17	$59.55
2nd year Helper	$24.50		$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$49.92	$62.17
3rd year Helper	$26.25		$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$51.67	$64.80
4th year Helper	$28.00		$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$53.42	$67.42
5th year Helper	$29.75		$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$55.17	$70.05
Apprentice	BHR	Percent										
1st 6 months w/500 hrs	$22.75	$65.00	$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$48.17	$59.55
2nd 6 months w/500 hrs	$24.50	$70.00	$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$49.92	$62.17
3rd 6 months w/500 hrs	$26.25	$75.00	$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$51.67	$64.80
4th 6 months w/500 hrs	$28.00	$80.00	$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$53.42	$67.42
5th 6 months w/500 hrs	$29.75	$85.00	$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$55.17	$70.05
6th 6 months w/500 hrs	$31.50	$90.00	$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$56.92	$72.67
7th 6 months w/500 hrs	$33.25	$95.00	$10.91	$10.80	$0.40	$0.00	$3.10	$0.21	$0.00	$0.00	$58.67	$75.30

(*)Special Calculation Note :

Other: $0.07 Drug Education, $0.05 Construction Industry Development Board, $0.09 International Training Fund
Roofers working in any form of coal tar pitch, whether hot or cold, installing and/or removing will be paid $.25 more per hour.

Ratio :

1 Journeyman to 1 Apprentice to 1 Helper
No helper shall be used on any one job unless 1 Journeyman and 1 Apprentice are working on said job

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Carroll, Coshocton, Crawford, Holmes, Huron, Medina, Portage, Richland, Stark, Summit, Tuscarawas, Wayne

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Sheet Metal Local 33 (Akron)

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026sks	Sheet Metal Worker	6/10/2026	6/10/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Sheet Metal Worker	$39.19		$10.30	$14.36	$0.97	$0.00	$8.00	$0.00	$0.00	$0.00	$72.82	$92.41
Apprentice	BHR	Percent										
1st Year	$23.51	$60.00	$10.30	$4.91	$0.21	$0.00	$0.00	$0.00	$0.00	$0.00	$38.93	$50.69
2nd Year	$25.47	$65.00	$10.30	$6.58	$0.97	$0.00	$4.00	$0.00	$0.00	$0.00	$47.32	$60.05
3rd Year	$27.43	$70.00	$10.30	$6.99	$0.97	$0.00	$4.00	$0.00	$0.00	$0.00	$49.69	$63.40
4th Year	$31.35	$80.00	$10.30	$7.80	$0.97	$0.00	$4.00	$0.00	$0.00	$0.00	$54.42	$70.09

(*)Special Calculation Note :

No special calculations for this skilled craft wage rate are required at this time.

Ratio :

1 Journeymen to 1 Apprentice
2 Journeymen to 1 Apprentice
3 Journeymen to 2 Apprentice
4 Journeymen to 2 Apprentice
5-7 Journeymen to 3 Apprentice
8-10 Journeymen to 4 Apprentice
11-13 Journeymen to 5 Apprentice
14-15 Journeymen to 6 Apprentice and maintaining a 3 to 1 apprentice ratio thereafter.

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Carroll, Coshocton, Crawford, Holmes, Medina, Portage, Richland, Stark, Summit, Tuscarawas, Wayne

Special Jurisdictional Note :

Details :

Scope of Work: This Agreement covers the rates of pay and conditions of employment of all employees of the Employer engaged in, but not limited to, the a) manufacture, fabrication, assembling, handling, erection, installation, dismantling, conditioning, adjustment, alteration, repairing and servicing of all ferrous or non-ferrous metal work and all other materials used in lieu thereof and of all HVAC systems, air-veyor systems, exhaust systems, and air handling systems regardless of material used, including the setting of all equipment and all reinforcements in connection therewith; (b) all lagging over insulation and all duct-lining; (c) testing, servicing, and balancing of all air-handling equipment and duct work; (d) the preparation of all shop and field sketches, whether manually drawn or computer assisted, used in fabrication and erection, including those taken from original architectural and engineering drawings or sketches, and (e) metal roofing; and (f) all other work included in the jurisdictional claims of Sheet Metal Worker's International Association. Industrial Door-Installation and service of overhead doors roll up doors, docks and dock leveling.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Sheet Metal Local 33 Industrial Door

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2025ib	Sheet Metal Worker	8/1/2025	8/1/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Sheet Metal Worker	$26.53		$8.71	$5.66	$0.19	$0.00	$2.61	$0.61	$0.00	$0.00	$44.31	$57.58
Apprentice	BHR	Percent										
Probationary Period (60 Days)	$13.80	$52.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$13.80	$20.70
61st day -12 months	$15.39	$58.00	$8.71	$1.96	$0.19	$0.00	$1.68	$0.35	$0.00	$0.00	$28.28	$35.98
2nd Year	$18.04	$68.00	$8.71	$1.96	$0.19	$0.00	$1.90	$0.41	$0.00	$0.00	$31.21	$40.23
3rd Year	$19.37	$73.00	$8.71	$1.96	$0.19	$0.00	$2.05	$0.45	$0.00	$0.00	$32.73	$42.41
4th Year	$21.22	$80.00	$8.71	$1.96	$0.19	$0.00	$2.17	$0.49	$0.00	$0.00	$34.74	$45.35
5th Year	$22.82	$86.00	$8.71	$1.96	$0.19	$0.00	$2.31	$0.52	$0.00	$0.00	$36.51	$47.92

(*)Special Calculation Note :

Other: Holiday Pay

Ratio :

1-2 Journeyman to 1 Trainee
3-4 Journeymen to 2 Trainee
5-6 Journeymen to 3 Trainees
7-8 Journeymen to 4 Trainees
9-10 Journeymen to 5 Trainees
11-13 Journeymen to 6 Trainees
14-16 Journeymen to 7 Trainees
17-19 Journeymen to 8 Trainees
Maintaining a 3 Journeymen to 1 Trainee ratio thereafter

Jurisdiction (* denotes special jurisdictional note) :

Ashland, Ashtabula, Carroll, Columbiana, Coshocton, Crawford, Cuyahoga, Defiance, Erie, Fulton, Geauga, Hancock, Henry, Holmes, Huron, Lake, Lorain, Lucas, Mahoning, Medina, Ottawa, Paulding, Portage, Putnam, Richland, Sandusky, Seneca, Stark, Summit, Trumbull, Tuscarawas, Wayne, Williams, Wood

Special Jurisdictional Note :

Details :

Prevailing Wage Rate
Skilled Crafts

Name of Union: Sprinkler Fitter Local 669

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCR01-2025ib	Sprinkler Fitter	8/6/2025	8/6/2025

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Sprinkler Fitter	$48.28		$12.40	$7.40	$0.54	$0.00	$7.74	$0.00	$0.00	$0.00	$76.36	$100.50
Apprentice	BHR	Percent										
CLASS 1	$24.14	$50.00	$9.03	$0.00	$0.54	$0.00	$0.00	$0.00	$0.00	$0.00	$33.71	$45.78
CLASS 2	$27.04	$56.00	$9.03	$0.00	$0.54	$0.00	$0.00	$0.00	$0.00	$0.00	$36.61	$50.13
CLASS 3	$29.45	$61.00	$12.40	$7.40	$0.54	$0.00	$1.15	$0.00	$0.00	$0.00	$50.94	$65.66
CLASS 4	$31.38	$65.00	$12.40	$7.40	$0.54	$0.00	$1.15	$0.00	$0.00	$0.00	$52.87	$68.56
CLASS 5	$33.31	$69.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$55.05	$71.70
CLASS 6	$36.21	$75.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$57.95	$76.05
CLASS 7	$38.14	$79.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$59.88	$78.95
CLASS 8	$40.56	$84.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$62.30	$82.58
CLASS 9	$42.97	$89.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$64.71	$86.19
CLASS 10	$44.90	$93.00	$12.40	$7.40	$0.54	$0.00	$1.40	$0.00	$0.00	$0.00	$66.64	$89.09

(*)Special Calculation Note :

Ratio :

1 Journeyman to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

Sprinkler Fitter work shall consist of the installation, dismantling, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems including the unloading, handling by hand, power equipment and installation of all piping or tubing, appurtenances and equipment pertaining thereto, including both overhead and underground water mains, fire hydrants and hydrant mains, standpipes and hose connections to sprinkler systems used in connection with sprinkler and alarm systems. Also all tanks and pumps connected thereto, also included shall be CO-2 and Cardox Systems, Dry Chemical Systems, Foam Systems and all other fire protection systems.

Prevailing Wage Rate
Skilled Crafts

Name of Union: Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,908,957 - Bldg & HevHwy Class 1

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Truck Driver	5/1/2026	5/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Truck Driver CLASS 1	$34.90		$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$55.75	$73.20
Apprentice	BHR	Percent										
First 6 months	$27.92	$80.00	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$48.77	$62.73
7-12 months	$29.67	$85.02	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$50.52	$65.36
13-18 months	$31.41	$90.00	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$52.26	$67.97
19-24 months	$33.16	$95.02	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$54.01	$70.59
25-30 months	$34.90	$100.00	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$55.75	$73.20

(*)Special Calculation Note :

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

CLASS 1: Drivers on trucks, including but not limited to: 4-wheel service trucks; 4-wheel dump trucks; batch trucks; drivers on tandems; truck sweepers (not to include power sweepers and scrubbers) Drivers on tractor – trailer combinations including but not limited to the following: Semi-tractor trucks; pole trailers; ready-mix trucks; fuel trucks; all trucks five (5) axle and over; drivers on belly dumps; truck mechanics (when needed).

Prevailing Wage Rate
Skilled Crafts

Name of Union: Truck Driver Locals 20,40,92,100,175,284,348,377,637,697,908,957 - Bldg & HevHwy Class 2

Type of Rate: Commercial

Change #:	**Craft:**	**Effective Date:**	**Effective Date:**
LCN01-2026ib	Truck Driver	5/1/2026	5/1/2026

	BHR		Fringe Benefit Payments						Irrevocable Fund		Total PWR	Overtime Rate
			H&W	Pension	App Tr.	Vac.	Annuity	Other	LECET (*)	MISC (*)		
Classification												
Truck Driver CLASS 2	$35.91		$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$56.76	$74.72
Apprentice	BHR	Percent										
First 6 months	$28.72	$79.99	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$49.57	$63.93
7-12 months	$30.52	$85.00	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$51.37	$66.63
13-18 months	$32.32	$90.00	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$53.17	$69.33
19-24 months	$34.11	$95.00	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$54.96	$72.02
25-30 months	$35.91	$100.00	$10.75	$9.60	$0.50	$0.00	$0.00	$0.00	$0.00	$0.00	$56.76	$74.72

(*)Special Calculation Note :

Ratio :

3 Journeymen to 1 Apprentice

Jurisdiction (* denotes special jurisdictional note) :

Adams, Allen, Ashland, Ashtabula, Athens, Auglaize, Belmont, Brown, Butler, Carroll, Champaign, Clark, Clermont, Clinton, Columbiana, Coshocton, Crawford, Darke, Defiance, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Gallia, Greene, Guernsey, Hamilton, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Jefferson, Knox, Lawrence, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Meigs, Mercer, Miami, Monroe, Montgomery, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble, Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Tuscarawas, Union, Van Wert, Vinton, Warren, Washington, Wayne, Williams, Wood, Wyandot

Special Jurisdictional Note :

Details :

CLASS 2: Drivers on articulated dump trucks; rigid-frame rock trucks; distributor trucks; low boys/drag driver on the construction site only and heavy duty equipment (irrespective of load carried) when used exclusively for transportation on the construction site only.

SECTION 011000 - SUMMARY

GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:
   1. Work covered by Contract Documents.
   2. Work by Owner.
   3. Owner-furnished products.
   4. Access to site.
   5. Coordination with occupants.
   6. Work restrictions.
   7. Specification and drawing conventions.
   8. Miscellaneous Provisions:
      a. Permits.

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

1.3 PROJECT INFORMATION

A. Anticipated Total Project Cost: $1,400,000

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and consists of the following:
   1. As described in Contract Documents.

B. Type of Contract
   1. The Work to be awarded to Single Prime Contractor(s).
      a. Designation of Work in Contract Documents as by different trade’s such as HVAC, Plumbing, Electrical, Site, General, etc. indicates scoping of subcontract work and does not indicate separate contract work.

1.5 WORK BY OWNER

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

B. Concurrent Work: Owner will perform the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
   1. Technology cabling and technology racks and ports.
   2. Security.

C. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.
   1. Loose Furnishings

1.6 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.
   1. Owner-Furnished Products:
      a. Toilet Accessories:
         1) Soap Dispensers
         2) Paper Towel Dispensers
         3) Toilet Paper Dispensers.
      b. Appliances:
         1) Refrigerator
         2) Range
         3) Microwave oven
         4) Washer dryer
      c. Storm Shelter
         1) Class A First Aid kit
      d. Weather vane

1.7 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Driveways, Walkways and Entrances: Keep driveways**,** loading areas and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

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

1.8 COORDINATION WITH OCCUPANTS

A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
   1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
   2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
   3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
   4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.
   5. Contractor will be responsible for relocating and/or protecting existing furnishings/equipment as required by construction activities.

1.9 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

B. Specific Work Restrictions:
   1. Only as limited by the Authorities having jurisdiction.

C. Nonsmoking Building/Site: Smoking is not permitted.

D. Controlled Substances: Use of tobacco products and other controlled substances on the Project site is not permitted.

E. Employee Identification: Provide identification tags for Contractor personnel working on the Project site. Require personnel to utilize identification tags at all times.

F. Employee Screening: Comply with Owner's requirements regarding drug and background screening of Contractor personnel working on the Project site.
   1. Maintain list of approved screened personnel with Owner's Representative.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
   3. Keynoting: Materials and products are identified by reference keynotes.

1.11 MISCELLANEOUS PROVISIONS

A. Permits
   1. Commercial Building Permit will be obtained and paid for by the Owner through the Richland County Building Department.
   2. All other permits, licenses, temporary occupancy certificates and inspections are to be obtained and paid for by the Contractor.
   3. Submittals by Contractor may be required for final permit approval.
   4. Construction start to be coordinated with the Authorities Having Jurisdiction and Building Permit approval.

PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:
   1. Quantity allowances.
   2. Contingency allowances.

C. Related Requirements:

   1. Section 012200 "Unit Prices" for procedures for using unit prices, including adjustment of quantity allowances when applicable.
   2. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

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1.5 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include [**taxes,**]freight[**,**] and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.8 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.9 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting

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losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance 1: Contingency Allowance: Include a contingency allowance of $25,000.00 for use according to Owner's written instructions.

B. Allowance 2: Quantity Allowance: Include 100 cu. yd. (382 cu. m) of unsatisfactory soil excavation and disposal off-site and replacement with satisfactory soil material or engineered fill, as specified in Section 312000 "Earth Moving."
   a. Coordinate quantity allowance adjustment with unit-price requirements in Section 012200 "Unit Prices."

END OF SECTION 012100

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SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.
2. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
3. Section 014000 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 "Schedule of Unit Prices" Article contain requirements for materials described under each unit price.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Removal of unsatisfactory soil and replacement with satisfactory soil material.
   1. Description: Unsatisfactory soil excavation and disposal off-site and replacement with satisfactory fill material or engineered fill, as required, in accordance with Section 312000 "Earth Moving."
   2. Unit of Measurement: cubic yard (cubic meter) of soil excavated, based on in-place surveys of volume before and after removal.
   3. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in Section 012100 "Allowances."

END OF SECTION 012200

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SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other Work of the Contract.

C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate 1:
   a. Formed metal siding in lieu of Fiber cement siding and trim .

B. Alternate 2:
   a. Standing Seam metal Roofing in lieu of asphalt shingles.

C. Alternate 3:
   1. Additional Garage Bay

D. Alternate 4:
   1. Emergency Generator

E. Alternate 5:
   a. Solid Surfacing countertop in lieu of plastic laminate countertop

F. Alternate 6
   a. Aluminum Windows in lieu of fiberglass clad wood windows.

G. Alternate 7
   a. Front porch including exterior concrete, wood posts, fiber cement trim, ceiling and lighting, wood framing and sheathing, asphalt shingles and gutters and downspout.

END OF SECTION 012300

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SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:
1. Division 01 Section "Allowances" for products selected under an allowance.
2. Division 01 Section "Alternates" for products selected under an alternate.
3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
4. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 SUBMITTALS

A. Substitution Requests: Submit digital copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use CSI Form 13.1A. A facsimile of form provided in the Project Manual.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section.

Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

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

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
   a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
   b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.
   c. All construction materials and manufactured products, including all substitutions, except for concrete and asphalt, used for the construction of this project must comply with the Build America, Buy America Act (BABAA) of 2021 and be accompanied by the manufacturer’s BABAA compliance certificate. Substitutions will be rejected by the Architect if they are not provided with the corresponding manufacturer’s BABAA compliance certificate.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

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

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
   1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
      a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      b. Substitution request is fully documented and properly submitted.
      c. Requested substitution will not adversely affect Contractor's construction schedule.
      d. Requested substitution has received necessary approvals of authorities having jurisdiction.
      e. Requested substitution is compatible with other portions of the Work.
      f. Requested substitution has been coordinated with other portions of the Work.
      g. Requested substitution provides specified warranty.
      h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 30 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
   1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
      a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
         1) Owner’s additional responsibilities will be included in Change Order to Contractor accepting Substitution.
      b. Requested substitution does not require extensive revisions to the Contract Documents.
      c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      d. Substitution request is fully documented and properly submitted, the same as required for substitution for cause.
      e. Requested substitution will not adversely affect Contractor's construction schedule.

f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

Advancement of Construction Technology

SUBSTITUTION REQUEST

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitution: _____ ($ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

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September 1996
CSI Form 13.1A

SUBSTITUTION REQUEST
(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

_____

_____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

_____

_____

_____

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

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

1.3 MINOR CHANGES IN THE WORK

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

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. AIA Document G709 Work Changes Proposal Request will be utilized. Form included in project manual.
   1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in Proposal Request or 3 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.
      d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect utilizing the Statement of Claim Form included in the Project Manual.
   1. Complete Statement of Claim Form as directed by Instructions for Completing the Statement of Claim Form.
      a. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and

finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

b. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: Refer to Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.6 CHANGE ORDER PROCEDURES

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

1. All Change Orders require USDA Rural Development review and concurrence prior to execution.

1.7 PENDING CHANGE ORDERS

A. Pending Change Order: Architect may issue a Pending Change Order. instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

DRAFT

AIA® Document G710™ – 1992

Architect's Supplemental Instructions

PROJECT *(Name and address)*:

ARCHITECT'S SUPPLEMENTAL INSTRUCTION NO:

OWNER *(Name and address)*:

DATE OF ISSUANCE:

CONTRACT FOR:

FROM ARCHITECT *(Name and address)*:

CONTRACT DATE:

TO CONTRACTOR *(Name and address)*:

ARCHITECT'S PROJECT NUMBER:

OWNER: ☐
ARCHITECT: ☐
CONSULTANT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

ATTACHMENTS:
(Here insert listing of documents that support description.)

ISSUED BY THE ARCHITECT:

_____ _____
(Signature) *(Printed name and title)*

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DRAFT

AIA® Document G709™ – 2001

Work Changes Proposal Request

PROJECT *(Name and address):*

PROPOSAL REQUEST NUMBER:

DATE OF ISSUANCE:

OWNER *(Name and address)*:

CONTRACT FOR:

CONTRACT DATE:

FROM ARCHITECT *(Name and address)*:

ARCHITECT'S PROJECT NUMBER:

TO CONTRACTOR *(Name and address):*

OWNER: ☐
ARCHITECT: ☐
CONSULTANT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

Please submit an itemized proposal for changes in the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein. Within ( ) days, the Contractor must submit this proposal or notify the Architect, in writing, of the date on which proposal submission is anticipated.

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

DESCRIPTION *(Insert a written description of the Work)*:

ATTACHMENTS *(List attached documents that support description)*:

REQUESTED BY THE ARCHITECT:

(Signature)

(Printed name and title)

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections:
1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
4. Division 01 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of the submittal schedule.
5. Division 01 Section “Closeout Procedures” for submittals required for Substantial Completion and Final Completion.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule
1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
a. Application for Payment forms with continuation sheets.
b. Submittal schedule.
c. Items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date but no later than the date required by the Notice of Award/Notice to Proceed. Provide preliminary Schedule of Values as requested during bid review period for in evaluation of bid.
a. A copy of the contractor’s schedule of values must be provided to the USDA Rural Development Construction Analyst for review.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
   1. Identification: Include the following Project identification on the schedule of values:
      a. Contractor's name and address.
      b. Date of submittal.
   2. Arrange schedule of values consistent with format of AIA Document G703.
   3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
      a. Related Specification Section or Division.
      b. Description of the Work.
      c. Change Orders (numbers) that affect value.
      d. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
         1) Labor.
         2) Materials.
         3) Equipment.
   4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents and provide a separate line item per specification section minimum. Provide multiple line items for individual line item amounts in excess of five percent of Contract Sum.
   5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
   6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
      a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
   7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
   8. Provide separate line items for labor associated with an activity and material associated with an activity.
   9. In addition to the Contractor’s construction activities, the Schedule of Values must include the following line items.
      a. Progress meeting attendance.
      b. Record drawing updates.
      c. Bonds.
      d. Insurance.
      e. Tests.
      f. Mobilization.
      g. Project superintendent.
      h. Demobilization.
      i. Submittals.
      j. Daily clean-up.
      k. Closeout.
   10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
   11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

12. Architect can utilize information contained in the schedule of values for verification of subsequent Contractor proposals.

1.5 APPLICATIONS FOR PAYMENT

A. Provide Contractor's Payment Application Checklist and Certification with each application for payment. Sample form included after this section.

B. Per RD Instructions, USDA / RD will review and concur with all Partial Applications for Payment prior to the distribution of all funding, regardless of source. The application for payment must also be provided to the RD Construction Analyst for their review and comment.

C. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
   1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

D. Payment Application Times: The date for each progress payment is indicated in the General Conditions. The period of construction work covered by each Application for Payment is the period indicated in the General Conditions.

E. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment. Copy of form is included in the Project Manual at the end of this section.
   1. Provide Owner's Purchase Order Number on Pay application.

F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
   1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
   2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
   3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

G. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
   1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
   2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
   3. Provide summary documentation for stored materials indicating the following:
      a. Materials previously stored and included in previous Applications for Payment.
      b. Work completed for this Application utilizing previously stored materials.
      c. Additional materials stored with this Application.
      d. Total materials remaining stored, including materials with this Application.

4. USDA Rural Development will only approve payment for offsite stored materials if accompanied by written special request and supplemental documentation as shown above.

H. Transmittal: Submit four signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
   1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

I. Waivers of Mechanic's Lien: With each Application for Payment (except Initial Application for payment), submit waivers of mechanic's liens from subcontractors, and suppliers for construction period covered by the previous application.
   1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
   2. When an application shows completion of an item, submit conditional final or full waivers.
   3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
   4. Submit final Application for Payment with or proceeded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
   1. List of subcontractors.
   2. Schedule of values.
   3. Contractor's construction schedule.
   4. Submittal schedule.
   5. Certificates of insurance and insurance policies.
   6. Performance and payment bonds.
   7. Schedule of tests and inspections.

K. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

L. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
   1. Evidence of completion of Project closeout requirements.
   2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
   3. Updated final statement, accounting for final changes to the Contract Sum.
   4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
   5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
   6. AIA Document G707, "Consent of Surety to Final Payment."
   7. Evidence that claims have been settled.
   8. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
   1. General project coordination procedures.
   2. Administrative and supervisory personnel.
   3. Requests for Interpretation (RFIs).
   4. Project meetings.

B. Related Sections:
   1. Division 01 Section "Summary" for a description of the division of work among separate contracts and responsibility for coordination activities not in this Section.
   2. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
   3. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
   4. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the contract documents.

1.4 COORDINATION

1. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
   a. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   b. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   c. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work.

Each contractor shall coordinate its operations with operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

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

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Project closeout activities.
7. Startup and adjustment of systems.
8. Project closeout activities.

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

1.5 KEY PERSONNEL

A. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 REQUESTS FOR INTERPRETATION (RFIs)

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

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

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

C. RFI Forms: Form bound in the Project Manual

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for coordination information already indicated in the Contract Documents.
    d. Requests for adjustments in the Contract Time or the Contract Sum.
    e. Requests for interpretation of Architect's actions on submittals.
    f. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, they are to submit a proposal according to Contract Modifications Procedures” to the Architect within 10 days of receipt of the RFI response. Notification of additional cost after the specified notice time will result in no additional cost to Contractor’s Contract.

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

F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
   1. Project name.
   2. Name and address of Contractor.
   3. Name and address of Architect.
   4. RFI number including RFIs that were dropped and not submitted.
   5. RFI description.
   6. Date the RFI was submitted.
   7. Date Architect's response was received.
   8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.7 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
   1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
      a. As opportunity permits, the RD Construction Analyst and / or Loan Specialist may attend project meetings.
   2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
   3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
   1. Conduct the conference to review responsibilities and personnel assignments.
   2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
      a. The RD Construction Analyst and / or Loan Specialist will attend the Preconstruction Conference.
   3. Agenda: Discuss items of significance that could affect progress, including the following:
      a. Introductions
         1) Designation of key personnel and their duties.
      b. Contract Information
         1) Owner/Contractor Agreement
         2) Notice of Commencement
         3) Sales Tax Exemption Certificate
         4) W9
      c. Pre-construction Submittals

1) Insurance certificates
2) Worker's Comp certificates
3) List of subcontractors and vendors
4) Schedule of Values
5) Construction Schedule
6) Submittal Schedule
7) Schedule of Tests and Inspections
8) Project Manager and Field Superintendent's Qualifications (Resume)

d. Construction Schedule
e. Coordinating Contractor
f. Processing of field decisions and change orders
g. Submittals
h. Procedures for maintaining record drawings/specifications
i. Use of premises:
1) General
2) Field Office
3) Staging and storage areas
4) Restrooms
5) Telephones
6) Parking
7) Deliveries
8) Dumpster

j. Hour restrictions
k. Proper conduct
l. Safety, OSHA and first aid procedures
m. Security procedures
n. Housekeeping procedures
o. Permits
p. Applications for Payment
q. Closeout
r. Miscellaneous
s. Set date and time for first construction progress meeting

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes. RD must receive a copy of the meeting minutes after completion of the conference.

C. Project Closeout Conference: Architect will schedule and conduct a review of Closeout requirements prior to the scheduled date of Substantial Completion at a regularly scheduled job progress meeting.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
a. Procedures required prior to inspection for Substantial Completion.
1) Request for Substantial Completion Inspection. Form included in project manual.
2) Contractor's Punchlist. Form included in project manual.

3) Advise Owner of pending insurance changeover requirements.
4) Warranties.
   a) Contractor's Warranty.
   b) Manufacturer's Warranty.
5) Occupancy Permits, Operating Certificates and Other Releases.
6) Project Record Documents.
7) Operation and Maintenance (O & M) Manual.
8) Completed Testing.
9) Removal of Temporary Facilities.
10) Completed Owner's Demonstration (Training) Attendance Sheet. Form included in project manual.
11) Final Cleaning. Properly Completed and Executed Pay Application.

b. Procedures required prior to inspection for Final Completion.
1) Punchlist items completed by Contractor.
2) Contractor's Final Inspection Pre-Certification Letter. Form included in project manual.
3) Final Change Order(s).
4) Final Application for Payment.
5) Certificate of Insurance for Complete Operations.
6) Asbestos Free Certificate. Form included in project manual.
7) Receipt for Keys. Form included in project manual.
8) Affidavit of Final Payment/Waiver of Liens. Form included in project manual.
   a) Prime Contractor's Affidavit.
   b) Subcontractor's Affidavit.
9) Consent of Surety of Final Payment

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

D. Progress Meetings: Architect will conduct progress meetings at regular intervals as defined in Owner/Contractor Agreement.
1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
   a. As opportunity permits, the RD Construction Analyst and / or Loan Specialist may attend progress meetings.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Approve Previous Meeting Minutes
   b. Review Open Old Business
   c. Contractor's Construction Schedule – Review Progress During Last Work Period:
      1) Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

2) Include review of RFI and Submittal Information (shown on Schedule)

d. Contractor's Construction Schedule – Review Planned for Next Work Period:
   1) Review progress planned to occur before next meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
   2) Include review of RFI and Submittal Information (shown on Schedule).

e. Coordination
   1) Contractors performing concurrent work will be present at progress meeting to report on their Contractor's Construction Schedule as required. Items of coordination between this project and concurrent Work will be addressed in these meetings.
   2) Items of coordination with the building occupants will be addressed in this meeting and multiple Owner representatives may be present in meetings as required to accommodate this process. Items of discussion and resolution may include but are not limited to the following:
      a) Maintaining Owner operations.
      b) Building and site access.
      c) Site utilization including but not limited to dumpster locations, storage areas, lay down areas and staging areas.
      d) Work hours.
      e) Shutdowns and interruptions.

f. New Business.

g. Set time and date for next meeting.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Post Occupancy Closeout Meetings: Architect to conduct closeout meetings at weekly intervals. These meetings will start the first full week after the date established for Final Completion, if closeout has not been completed by this date and will continue until closeout is complete.
   1. Attendees: Contractor, subcontractor, supplier, and other entity that has not completed their work towards closeout, Owner and Architect's consultants. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   2. Agenda: Review and correct or approve minutes of the previous closeout meeting. Identify closeout procedures that are left to complete and determine a schedule for completion.
   3. Contractor's Responsibilities: Contractor's will be responsible to pay hourly rates of Architect and Architect's Consultant's for meeting attendance and preparation of agendas, minutes and change orders. The Architect will invoice the Owner for this time and the Contractor shall reimburse the Owner for such cost, and/or the Owner may set off the amount payable to the Architect from the amount due the Contractor under the contract documents.

F. Warranty Inspection: One month prior to the expiration of the Contractor's Warranty the RD Construction Analyst, Owner, Architect, and Contractor will conduct a Warranty Inspection of the project to review any / all required warranty repairs or replacements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

Request For Interpretation (RFI)

Client Name: RFI #:

Project Name: Project #:

To: From:

Date: Contract for: <Select>

Specification Section: Paragraph: Drawing Number: Detail Number:

Request:

What was Bid and why?

Contractor Recommendations:

Associated Cost: Associated Time:

☐ Attachments

Signed by: _____ Date: _____

Architect's Response:

Architect's Signature: _____ Date of Response: _____

☐ Attachments

Copies: ☐ Owner ☐ Consultants ☐ ☐ ☐ File

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Contractor's construction schedule.
   2. Daily construction reports.
   3. Field condition reports.
   4. Special reports.

B. Related Sections:
   1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
   2. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.
   1. Float time belongs to Owner.
   2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Resource Loading: The allocation of manpower (crew size and man hours) and equipment necessary for the completion of an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:
   1. PDF electronic file.

B. Contractor's Construction Schedule: Of size required to display entire schedule for entire construction period.
   1. Submit a electronic copy of schedule labeled to comply with requirements for submittals. Include date on label.
   2. Submit to Architect for review. A copy of the Contractor's proposed construction will be provided to the RD Construction Analyst for their reference and use.

C. Daily Construction Reports: Submit only when specifically asked to do so.

D. Field Condition Reports: Submit at time of discovery of differing conditions.

E. Special Reports: Submit at time of unusual event.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from entities involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for the Notice of Award/Notice to Proceed to date of final completion.
   1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
   1. Activity Duration: Define activities so no activity is longer than 7 days, unless specifically allowed by Architect.
   2. Procurement Activities: Include procurement process activities for all long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
   3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
   4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
   5. Punch List and Final Completion:
      a. Include not more than 45 days for punch list and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
   1. Work Restrictions: Show the effect of the following items on the schedule:
      a. Coordination with other construction activities.
      b. Limitations of continued occupancies.
      c. Uninterruptible services.
      d. Use of premises restrictions.
      e. Seasonal variations.
      f. Environmental control.
   2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
      a. Subcontract awards.
      b. Submittals.
      c. Purchases.
      d. Fabrication.
      e. Sample testing.
      f. Deliveries.
      g. Installation.
      h. Tests and inspections.
      i. Adjusting.
      j. Curing.
      k. Startup and placement into final use and operation.
   3. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
      a. Substantial Completion.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice of Award/Notice to Proceed, Substantial Completion, and Final Completion**.**

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
   1. Unresolved issues.

2. Unanswered RFIs.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.

G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. CPM Schedule: Prepare Contractor's construction schedule using a resource-loaded**,** time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule as required by the Notice of Award/Notice to Proceed.
   a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to correlate with Contract Time.

C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the start-up network diagram, prepare a skeleton network to identify probable critical paths. Provide a minimum of one activity group per project manual technical specification section per applicable building site. Include all applicable activities for each activity group.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
   a. Review of Construction Documents.
   b. Review of site/building existing conditions.
   c. Preparation and processing of RFI’s required based on your review of Construction Documents and of site/building existing conditions. (Plan for the necessity of RFI’s and show on the schedule in the proper sequence to alleviate disruption and ensure completion by the milestone requirements).
   d. Preparation and processing of submittals.
   e. Plan for a minimum of one resubmittal per required technical specification submittal.
   f. Mobilization and demobilization.
   g. Purchase of materials.
   h. Delivery.
   i. Fabrication.
   j. Utility interruptions.

k. Installation.
l. Contractor's Punch list preparation and processing and other activities as required by Substantial Completion requirements.
m. Architect's Substantial Completion inspection.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates. Include two weeks minimum float built into the critical path before the Substantial Completion Milestone date:
   a. Owner shall be entitled to utilize areas during the period identified for construction in those areas up to the total amount of float without additional time or compensation to the Contractor.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
   a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
5. Resource-Loading of CPM Schedule: Assign resource loading (crew size and man hours) to construction activities on the CPM schedule. Do not assign to submittal activities.

D. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.

E. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.

11. Emergency procedures.
12. Orders and requests of authorities having jurisdiction.
13. Change Orders received and implemented.
14. Construction Change Directives received and implemented.
15. Services connected and disconnected.
16. Equipment or system tests and startups.
17. Partial completions and occupancies.
18. Substantial Completions authorized.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At intervals consistent with intervals for progress meetings, update schedule to reflect actual construction progress and activities. Issue schedule before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect**,** Owner, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections:
1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Division 01 Section "Project Record Documents" for submitting record Drawings.
5. Division 01 Section "Closeout Procedures" for submitting required closeout documentation.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals or as follows:
1. Product Data.
2. Shop Drawings.
3. Samples.
4. Contractor’s Construction Schedules.
5. Submittal Schedules.
6. Schedule of Tests and Inspections.
7. Applications for Payment.
8. Schedule of Values.
9. Subcontractor Lists.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals or as follows:
1. MSDS.
2. Maintenance Data.

3. Manufacturer’s Instructions
4. Insurance Certificates and Bonds.
5. Warranties.
6. Buy America Build America (BABA) Product Certifications

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.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.
   1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
   2. Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
      a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
   3. Format: Arrange the following information in a tabular format:
      a. Scheduled date for first submittal.
      b. Specification Section number and title.
      c. Submittal category: Action, informational.
      d. Name of subcontractor.
      e. Description of the Work covered.
      f. Scheduled date for Architect's final release or approval.
      g. Scheduled dates for purchasing.
      h. Scheduled dates for installation.
      i. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
   3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
   4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

5. Submit all submittals involving review of color, pattern, and texture at the same time. Architect and Owner will not review submittals involving review of color, pattern, and texture until all such submittals have been submitted.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.

D. Identification and Information:

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Include the following information for processing and recording action taken:
   a. Project name.
   b. Date.
   c. Name of Contractor.
   d. Name of subcontractor.
   e. Name of supplier.
   f. Name of manufacturer.
   g. Submittal number or other unique identifier, including revision identifier.
      1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
   h. Number and title of appropriate Specification Section.
   i. Drawing number and detail references, as appropriate.
   j. Location(s) where product is to be installed, as appropriate.
   k. Other necessary identification.

E. Options: Identify options requiring selection by the Architect.

F. Deviations: Identify deviations from the Contract Documents on submittals.

G. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.

1. Transmittal Form: Use CSI Form 12.1A facsimile of sample form included in Project Manual.
2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
   1. Submit electronic submittals via email as PDF electronic files.
      a. Email each submittal utilizing “Request a Delivery Receipt” and “Request A Read Receipt” options. Verify receipt by Architect for all submittals.
      b. Title email utilizing the following format:
         1) Project Name-Specification Section Number-Submittal type.
   2. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
   3. Action Submittals: Submit electronic copy of each submittal, unless otherwise indicated. Architect**,** will return electronic copy.
   4. Informational Submittals: Submit electronic copy of each submittal, unless otherwise indicated. Architect will not return copies.
   5. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
   6. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
      a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
   7. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Include the following information, as applicable:

a. Manufacturer's catalog cuts.
b. Manufacturer's product specifications.
c. Standard color charts.
d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.
i. All construction materials and manufactured products, including all substitutions, except for concrete and asphalt, used for the construction of this project must comply with the Build America, Buy America Act (BABAA) of 2021 and be accompanied by the manufacturer's BABAA compliance certificate for the Architect's review. See BABAA Spec Language Example. The lack of a BABAA compliance certificate is grounds for rejection of a product by the Architect. RD does not review and concur with product submittals for BABAA compliance.

4. Submit Product Data before or concurrent with Samples.
5. Submit Product Data in the following format:
   a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Identification of products.
      b. Schedules.
      c. Compliance with specified standards.
      d. Notation of coordination requirements.
      e. Notation of dimensions established by field measurement.
      f. Relationship and attachment to adjoining construction clearly indicated.
   2. Submit Shop Drawings in the following format:
      a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
   1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
   2. Identification: Attach label on unexposed side of Samples that includes the following:
      a. Generic description of Sample.
      b. Product name and name of manufacturer.
      c. Sample source.
      d. Number and title of applicable Specification Section.
   3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
      a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
      b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
   4. Samples for Initial Selection:

a. Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   1) Number of Color Charts: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will inform Contractor of with options/colors selected.

E. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

F. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

G. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. 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. Use CSI Form 1.5A. Include the following information in tabular form:
   1. Name, address, and telephone number of entity performing subcontract or supplying products.
   2. Number and title of related Specification Section(s) covered by subcontract.
   3. Drawing number and detail references, as appropriate, covered by subcontract.
   4. Submit subcontract list in the following format:
      a. PDF electronic file.

I. Material Safety Data Sheets (MSDS): Submit directly to Owner with no copies submitted to Architect.
   1. Architect will not review submittals that contain MSDS information and will return entire submittal back to Contractor for resubmittal.

J. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal and indicate corrections or modifications required, and return it. Architect will indicate action, as follows:
   1. Reviewed
   2. Rejected
   3. Furnish as corrected
      a. This means that submittal does not need to be revised and resubmitted but work needs to meet requirements indicated as corrected.
   4. Revise and resubmit
   5. Submit specified item

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

E. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

F. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

Advancement of Construction Technology

SUBMITTAL TRANSMITTAL

Project: _____ Date: _____

_____ A/E Project Number: _____

TRANSMITTAL A To (Contractor): _____ Date: _____ Submittal No. _____

From (Subcontractor): _____ By: _____ ☐ Resubmission

Qty.	Reference / Number	Title / Description / Manufacturer	Spec. Section Title and Paragraph / Drawing Detail Reference

☐ Submitted for review and approval
☐ Resubmitted for review and approval
☐ Complies with contract requirements
☐ Will be available to meet construction schedule
☐ A/E review time included in construction schedule

☐ Substitution involved - Substitution request attached
☐ If substitution involved, submission includes point-by-point comparative data or preliminary details
☐ Items included in submission will be ordered immediately upon receipt of approval

Other remarks on above submission:

☐ One copy retained by sender

TRANSMITTAL B To (A/E): _____ Attn: _____ Date Rec'd by Contractor: _____

From (Contractor): _____ By: _____ Date Trnsmt'd by Contractor: _____

☐ Approved
☐ Approved as noted

☐ Revise / Resubmit
☐ Rejected / Resubmit

Other remarks on above submission:

☐ One copy retained by sender

TRANSMITTAL C To (Contractor): _____ Attn: _____ Date Rec'd by A/E: _____

From (A/E): _____ ☐ Other By: _____ Date Trnsmt'd by A/E: _____

☐ Approved
☐ Approved as noted
☐ Not subject to review
☐ No action required
☐ Revise / Resubmit
☐ Rejected / Resubmit
☐ Approved as noted / Resubmit

☐ Provide file copy with corrections identified
☐ Sepia copies only returned

☐ Point-by-point comparative data required to complete approval process

☐ Submission Incomplete / Resubmit

Other remarks on above submission:

☐ One copy retained by sender

TRANSMITTAL D To (Subcontractor): _____ Attn: _____ Date Rec'd by Contractor: _____

From (Contractor): _____ By: _____ Date Trnsmt'd by Contractor: _____

Copies: ☐ Owner ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ One copy retained by sender

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September 1996
CSI Form 12.1A

Advancement of Construction Technology

SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS LIST

Project: _____ From (Contractor): _____

_____ Date: _____

To (A/E): _____ A/E Project Number: _____

_____ Contract For: _____

List Subcontractors and Major Material Suppliers proposed for use on this Project as required by the Construction Documents. Attach supplemental sheets if necessary.

Section Number	Section Title	Firm	Address	Phone Number (Fax Number)	Contact

☐ Attachments

Signed by: Date:

Copies: ☐ Owner ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ File

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. All construction materials and manufactured products, including all substitutions, except for concrete and asphalt, used for the construction of this project must comply with the Build America, Buy America Act (BABAA) of 2021 and be accompanied by the manufacturer's BABAA compliance certificate for the Architect's review. See BABAA Spec Language Example. The lack of a BABAA compliance certificate is grounds for rejection of a product by the Architect. RD does not review and concur with product submittals for BABAA compliance.

C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

D. Related Sections:
   1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
   2. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and

completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
   1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.

I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement and refer conflicting requirements to Architect with RFI for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making tests and inspections.
   6. Description of the Work and test and inspection method.
   7. Identification of product and Specification Section.
   8. Complete test or inspection data.
   9. Test and inspection results and an interpretation of test results.
   10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
   11. Comments and professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting and reinspecting.

B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
   1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
   2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

G. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
   1. Contractor responsibilities include the following:
      a. Provide test specimens representative of proposed products and construction.
      b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
      c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
      d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
      e. When testing is complete, remove test specimens, assemblies, mockups; do not reuse products on Project.
   2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.8 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

   1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
   2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor**,** and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
   1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
   2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
   3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
   4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
   5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
   6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
   4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
   5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
   6. Do not perform any duties of Contractor.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
   1. Access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
   4. Facilities for storage and field curing of test samples.
   5. Delivery of samples to testing agencies.
   6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
   7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.
   1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

J. “Build America, Buy America Act (BABAA)”: Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials are produced in the United States.
   1. Construction Materials: Those articles, materials, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand or gravel; or aggregate binding agents or additives – that

are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber or drywall.

2. Manufactured Product: Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the product.
3. Manufacturer's Certification: Documentation provided by a Manufacturer, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

B.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ICC	International Code Council www.iccsafe.org	(888) 422-7233

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Sections:
1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.

C. Water Service: Pay water service use charges for water used by all entities for construction operations.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

A. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils (0.25 mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.

B. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect and construction personnel office activities and to accommodate project meetings specified in other Division 01 Sections. Keep office clean and orderly.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
   1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

   1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
   2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of [**8**] <**Insert number**> at each return air grille in system and remove at end of construction [**and clean HVAC system as required in Division 01 Section "Closeout Procedures"**].

C. Air Filtration Units: HEPA primary and secondary filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.
1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
1. Connect temporary sewers to municipal systemas directed by authorities having jurisdiction.

C. Water Service:
1. Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Heating and Cooling: Provide temporary heating[and cooling] required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

F. Telephone Service: Provide Superintendent with cellular telephone.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:
1. Provide temporary office on site.
a. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.

2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas where required for construction activities.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary parking areas for construction personnel.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
   a. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
   1. Comply with work restrictions specified in Division 01 Section "Summary."

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings [and authorities having jurisdiction, whichever is more stringent.

   1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant- protection zones.
   2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
   3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from the project site during the course of the project.
   4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.adjacent. Provide temporary weathertight enclosure for building exterior.

H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
   1. Prohibit smoking in construction areas.
   2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
   1. Protect porous materials from water damage.
   2. Protect stored and installed material from flowing or standing water.
   3. Keep porous and organic materials from coming into prolonged contact with concrete.
   4. Remove standing water from decks.
   5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
   1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
   2. Keep interior spaces reasonably clean and protected from water damage.
   3. Periodically collect and remove waste containing cellulose or other organic matter.
   4. Discard or replace water-damaged material.
   5. Do not install material that is wet.
   6. Discard, replace or clean stored or installed material that begins to grow mold.
   7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
   1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
   2. Use permanent HVAC system to control humidity.
   3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
      a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for [48] <Insert time period> hours are considered defective.
      b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight hour period. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
      c. Remove materials that can not be completely restored to their manufactured moisture level within [48] <Insert time period> hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
   1. Materials and facilities that constitute temporary facilities are property of Contractor.
   2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

   At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section Includes: General protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary controls, utilities, support facilities, and, temporary erosion and sedimentation controls.
2. Section 311000 "Site Clearing" for removing existing trees and shrubs.
3. Section 329200 Turf and Grasses for Top Soil Analysis for recommendation for soil admentments for proper planting soil

1.2 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at a height 6 inches (150 mm) above the ground for trees up to and including 4-inch (100-mm) size at this height and as measured at a height of 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated.

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 ACTION SUBMITTALS

A. Product Data:

1. General protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction

B. Tree-Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

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C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

D. Mitigation Requirements: As required by jurisdiction or as developed by arborist, for mitigation of damage to trees and other plantings. Include the following:

1. Local ordinances governing tree mitigation.
2. Standards established under the approved tree mitigation report developed by the arborist.
3. "Digital Guide for Plant Appraisal" by Council of Tree and Landscape Appraisers.

1.4 INFORMATIONAL SUBMITTALS

A. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

B. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

C. Quality-control program.

1.5 QUALITY ASSURANCE

A. Arborist Qualifications: Licensed arborist in jurisdiction where Project is located.

B. Tree-Service Firm Qualifications: An experienced tree-service firm that has successfully completed temporary tree- and plant-protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

C. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection-zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.6 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.

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6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

D. Take precautions to protect plants from airborne contaminants, such as paint or fireproofing overspray.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill Soil: Planting soil of suitable moisture content and granular texture for placing around tree; free of stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
1. Planting Soil: Planting soil as recommended in Soil Analysis report specified in 329200 Turf and Grasses.

B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood.
2. Size Range: 3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum.
3. Color: Natural.

C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements: Previously used materials may be used.

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch (50-mm) maximum opening in pattern and weighing a minimum of 0.4 lb/ft. (0.6 kg/m); remaining flexible from minus 60 to plus 200 deg F (minus 16 to plus 93 deg C); inert to most chemicals and acids; minimum tensile yield strength of 2000 psi (13.8 MPa) and ultimate tensile strength of 2680 psi (18.5 MPa); secured with plastic bands or galvanized-steel or stainless steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches (2400 mm) apart.

   a. Height: 48 inches (1200 mm).
   b. Color: High-visibility orange, nonfading.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree trunk at 54 inches (1372 mm) above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.3 TREE PROTECTION

A. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Apply 2-inch (50-mm) uniform thickness of organic mulch unless otherwise indicated. Do not place mulch within **6** inches (150 mm) of tree trunks.
2. Install temporary root-protection matting over mulch to the extent indicated.

3.4 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
1. Plastic Fencing: Stretch fabric taut and secure to posts without bows or sags.

B. Maintain protection zones free of weeds and trash.

C. Maintain hydration of plants to assure plant survival.

3.5 REGRADING

A. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

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B. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.6 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.7 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours in accordance with arborist's written instructions.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 66 percent dead or in an unhealthy condition or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

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1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures [**6 inches (150 mm)**] [**4 inches (100 mm)**] <**Insert dimension**> or smaller in caliper size.
2. Large Trees: Provide two new tree(s) of 2-inch (50-mm) caliper size for each tree being replaced that measures more than 6 inches (150 mm) in caliper size.

3. Plant and maintain new trees as specified in Section 329300 "Plants."

C. Soil Aeration: Aerate surface soil compacted during construction. Aerate 10 ft. (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Drill 2-inch- (50-mm-) diameter holes a minimum of 12 inches (300 mm) deep at 24 inches (600 mm) o.c. Backfill holes with an equal mix of augered soil and sand.

END OF SECTION 015639

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Sections:
   1. Division 01 Section "Allowances" for products selected under an allowance.
   2. Division 01 Section "Alternates" for products selected under an alternate.
   3. Division 01 Section "Substitution Procedures" for requests for substitutions.
   4. Division 01 Section "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
   2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
      a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
      b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
   1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
   2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:
   1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
   2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
   3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:
   1. Store products to allow for inspection and measurement of quantity or counting of units.

2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
5. Protect stored products from damage and liquids from freezing.
6. Provide a secure location and enclosure at Project site for storage of materials and equipment. Coordinate location with Owner.

D. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to Divisions 02 through 49. Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
7. All construction materials and manufactured products, including all substitutions, except for concrete and asphalt, used for the construction of this project must comply with the Build America, Buy America Act (BABAA) of 2021 and be accompanied by the manufacturer's BABAA compliance certificate for the Architect's review. The lack of a BABAA compliance certificate is grounds for rejection of a product by the Architect. RD does not review and concur with product submittals for BABAA compliance.

B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:
   a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
   b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
4. Manufacturers:
   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
   b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Selection of other products that require modifications to other adjacent construction due to differences between the products are to be considered during bidding and will not result in additional cost to the Owner. Modifications required to other construction including the work of other contracts are the responsibility of the contractor selecting the product that causes the need for

modification. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
   1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
   1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
   2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
   3. Evidence that proposed product provides specified warranty.
   4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
   5. Samples, if requested.

B. All construction materials and manufactured products, including all substitutions, except for concrete and asphalt, used for the construction of this project must comply with the Build America, Buy America Act (BABAA) of 2021 and be accompanied by the manufacturer’s BABAA compliance certificate. Substitutions will be rejected by the Architect if they are not provided with the corresponding manufacturer’s BABAA compliance certificate.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering and surveying.
   3. Installation of the Work.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Protection of installed construction.
   7. Correction of the Work.

B. Related Sections:
   1. Division 01 Section "Closeout Procedures" for recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
   2. Division 01 Section “Cutting and Patching” for cutting and patching.

1.3 INFORMATIONAL SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewerstorm sewer, and water-service piping; underground electrical services, and other utilities.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
   1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
      a. Description of the Work.
      b. List of detrimental conditions, including substrates.
      c. List of unacceptable installation tolerances.
      d. Recommended corrections.
   2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
   3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
   4. Examine walls and floors, for suitable conditions where products and systems are to be installed.
   5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for interpretation to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Lay out the Work using accepted surveying practices.as required and as follows:
1. Establish benchmarks and control points to set lines and levels and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, including those required for mechanical and electrical work.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of [two] <**Insert number**> permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
   1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
   2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
   3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
      a. Utilize containers intended for holding waste materials of type to be stored.
   4. Coordinate progress cleaning for joint-use areas where more than one installer has worked.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   1. Remove liquid spills promptly.
   2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
   1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:
   1. Divisions 02 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.4 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operating elements include but are not limited to the following:
   1. Primary operational systems and equipment.
   2. Air or smoke barriers.
   3. Fire-suppression systems.
   4. Mechanical systems piping and ducts.
   5. Control systems.
   6. Communication systems.
   7. Conveying systems.
   8. Electrical wiring systems.

C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their

capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Miscellaneous elements include but are not limited to the following:

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
   1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   3. Concrete and/or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   4. Excavating and Backfilling: Comply with requirements where required by cutting and patching operations.
   5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
   6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
   1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
   2. Exposed Finish Surfaces(interior or exterior): Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
      a. Clean piping, conduit, and similar features before applying paint or other finishing materials.

   3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

      a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

   4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
6. Site Improvements: Where site improvements are removed patch to match existing adjacent surfaces. Grade so that patched area does not trap or divert surface runoff water improperly.
    a. Where patching occurs in lawn areas, provide top soil and seed to match existing adjacent areas. Grade so that patch does not trap or divert surface runoff water improperly.
    b. Where patching occurs in planting bed, provide top soil, mulch and plants required so patch matches existing area.
    c. Where patching occurs in paving, match existing paving including surface marking (striping) and joint patterns.
        1) Where patching occurs in asphalt, replace with new materials to achieve uniform color and appearance.
        2) Where patching occurs in concrete, remove concrete back to nearest joint (control or isolation) and replace with new materials to achieve uniform color and appearance.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final completion procedures.
   3. Warranties.
   4. Final cleaning.

B. Related Sections:
   1. Division 01 Section "Execution" for progress cleaning of Project site.
   2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
   3. Division 01 Section "Project Record Documents" for submitting Record Drawings.
   4. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
   5. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following.
   1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete. Form included in project manual.
   2. Advise Owner of pending insurance changeover requirements.
   3. Submit specific warranties, final certifications, and similar documents.
   4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, and similar final record information.
   6. Deliver tools, spare parts, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable. Submit completed receipt for extra materials signed by Owner. Form included in project manual.
   7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit completed Owner's Training Attendance sheet. Form included in project manual.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
15. Submit Substantial Completion Application for Payment. Submit application according to Division 01 Section "Payment Procedures."

B. Inspection: Submit a written request for inspection for Substantial Completion "Request for Substantial Completion Inspection" Form included in project manual. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued. Coordinate submission to ensure that Certificate of Substantial Completion can be issued by Architect by Milestone Date for Substantial Completion.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
1. Complete all Work.
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list). The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Resolve all final Change Order(s)
4. Submit a final Application for Payment according to Division 01 Section "Payment Procedures." Include all required waivers and consent of surety to final payment.
5. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
6. Submit Asbestos Free Certificate. Form contained in Project Manual.
7. Return borrowed keys to Owner. Submit completed Receipt of Key Return signed by Owner. Form included in project manual.
8. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. Inspection: Submit a written request for final inspection ("Contractor's Final Inspection Pre-Certification Letter") for acceptance. Form included in project manual. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements.

Architect will review final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Coordinate submission to ensure that Final Completion can be certified by Architect by Milestone Date for Final Completion.
2. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Sample form included at the end of this section.

1. Submit list of incomplete items in the following format:
    a. PDF electronic file.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    e. Remove snow and ice to provide safe access to building.
    f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    h. Sweep concrete floors broom clean in unoccupied spaces.
    i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
    j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    k. Remove labels that are not permanent.
    l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
        1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
    m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    n. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
    o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

q. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.
   1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report upon completion of cleaning.

r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

s. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls."

END OF SECTION 017700

PROJECT SUBSTANTIAL /FINAL COMPLETION CLOSEOUT CHECKLIST

Project: Life First EMS Station

Contractor: <Contractor's Company Name>

Part 1-Prior to Substantial Completion
Before Substantial Completion can be achieved the following information must be properly submitted to the Architect in accordance with the terms of the Contract Documents:

	Item	Project Manual Section
☐	**Request for Substantial Completion Inspection** (See form provided)	017700
☐	**Contractor's Punchlist** (See form provided)	017700
☐	**Advise Owner of pending insurance changeover requirements**	017700
☐	**Warranties** (include in O & M Manual under separate tab)	017700
☐	**Occupancy Permits, Operating Certificates and Other Releases**	017700
☐	**Project Record Drawings**	017700 and 017839
☐	**Operation and Maintenance (O & M) Manual**	017700 and 017823
☐	**Complete Startup and Testing** (File information in O & M Manual)	017700
☐	**Removal of Temporary Facilities**	017700
☐	**Receipt for Extra Materials**	017700
☐	**Completed Owner's Demonstration (Training) Attendance Sheet** (See form provided)	017700
☐	**Final Cleaning**	017700
☐	**Properly Completed and Executed Pay Applications** (All Pay Applications except Final pay Application)	012900

Part 2-Following Substantial Completion-Prior to Final Completion

Following the issuance of the Substantial Completion Certificate (by the Architect) the following must be submitted to the Architect.

☐	**Punchlist Items Completed by Contractor**	017700
☐	**Contractor's Final Inspection Pre-Certification Letter** (See form provided)	017700
☐	**Contractor's BABAA Certification letter as well as all manufacturer's BABAA compliance certificates for all construction materials and manufactured products utilized in the construction of the Owner's project.**	
☐	**Letterhead document attesting per BABAA Certificate C that, *"I hereby certify that to the best of my knowledge and belief all Iron, Steel, Manufactured Products, and Construction Materials installed on this project by my company and by any and all subcontractors and suppliers for this project comply with the Build America, Buy America Act (BABAA) requirements of the Infrastructure Investment and Jobs Act of 2021 (Pub. L. 117- 58, §§ 70901-70953), or are the subject of a waiver approved by the Secretary of Agriculture or designee."***	
☐	**Final Change Order(s)** (If applicable)	
☐	**Final Application for Payment**	012900
☐	**Certificate of Insurance for Products and Completed Operations**	General Conditions
☐	**Asbestos Free Certificate** (See form provided)	General Conditions.
☐	**Receipt for Keys** (See form provided)	017700
☐	**Affidavit of Final Payment/Waiver of Liens** (AIA G706A form)	General Conditions
	☐ **Prime Contractor's Affidavit**	
	☐ **Subcontractor's Affidavit**	
☐	**Consent of Surety to Final Payment** (AIA G707 form)	General Conditions

Final payment to the contractor will only be made following the receipt and acceptance of the above documents.

(ON CONTRACTOR'S LETTERHEAD)

Request for Substantial Completion Inspection

Date: <Date>

<Triad's Project Representative's Name>
TRIAD Architects LTD
172 East State St., Suite 600
Columbus OH 43215

Project:

Dear <Triad's Project Representative's Last Name>:

Please be advised that as of <Month> <Day>, 20 , <Contractor's Company Name> is ready for the Substantial Completion Inspection. We have attached our punchlist of items that remain to be completed or corrected, per specification section 017700, and the reason why these items cannot be completed, if not complete with the estimated cost of completion.

We have attached the completed Project Closeout Checklist. Final cleaning has been completed, and all temporary facilities have been removed.

Signed: _____

Printed Name: _____

Client:
Project:
Punchlist
Contractor:
Date:

Item Number	Description Of Item	Reason why item is not complete	Value of Item	Date Completed	

According to the terms of the Owner/Contractor agreement failure to include any item on this list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents.

Receipt for Extra Materials

Contractor: <Contractor's Company Name> Date: <Date>

Project:

Sheet 1 of _____

Description of Item	Specification Section	Quantity Furnished	Owner Initials	Date Received

(Reproduce this form as many times as necessary, number consecutively)

The above listed items were turned over to the Owner, in good condition, and in the quantities listed above.

Signed:_____ Signed:_____

(Contractor's Representative) (Owner's Representative)

Owner Demonstration (Training) Attendance Sheet

Project:
Contractor: <<Contractor>> Date:_____

Name	Phone	Signature

(On Contractor’s Letterhead)

Final Inspection Pre-Certification Letter

Date: <Date>

<Triad's Project Representative's Name>
TRIAD Architects LTD
172 East State St., Suite 600
Columbus, OH 43215

Re:
Project:
Subject: Final Inspection Pre-Certification

<Triad's Project Representative's Name>:

The undersigned certifies that we have carefully reviewed the Contract Documents, and that the work under our contract for this project has been completed in compliance with and in accordance to the Contract Documents. In addition, we hereby certify that all deficiencies as noted on the Certificate of Substantial Completion have been corrected.

Furthermore, we hereby certify that all systems have been tested, adjusted, and are fully operational.

Finally, we hereby certify that all work has been installed per applicable building codes, and that our work is ready for Final Inspection.

Sincerely yours,

<Contractor's Company Name>

CONTRACTOR'S ASBESTOS-FREE CERTIFICATE

The undersigned Contractor certifies that:

1. it has disclosed to the Architect in writing every incident in which to its knowledge it discovered Asbestos Containing Materials ("ACM") during the course of the Contractor's Work at the _____ Project site; and

2. all materials incorporated by the undersigned into the Project are asbestos-free.

_____
(CONTRACTOR)

By: _____
(SIGNATURE)

_____
(TYPED OR PRINTED NAME)

Title: _____

Date: _____

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
   1. Operations and Maintenance Manual including:
      a. Operation information for systems, subsystems, and equipment.
      b. Maintenance information for the care and maintenance of products, materials, and finishes and systems and equipment.
      c. BABAA Certifications

B. Related Sections include the following:
   1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
   2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
   3. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
   4. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit draft PDF copy allowing the amount of time needed for architect’s review and contractor’s subsequent revisions.. Include a complete operation and maintenance directory. Architect will notify Contractor whether general scope and content of manual are acceptable.
   1. Correct or modify each manual to comply with Architect's comments. Resubmit to allow for Architect’s approval to be completed before Substantial Completion milestone.

B. Final Submittal: Scan corrected manuals into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document. Submit digitally.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
   1. Title page.
   2. Table of contents.
   3. Manual contents.

B. Title Page: Include the following information:
   1. Subject matter included in manual.
   2. Name and address of Project.
   3. Name and address of Owner.
   4. Date of submittal.
   5. Name, address, and telephone number of Contractor.
   6. Name and address of Architect.
   7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
   1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Arrange contents alphabetically by system, subsystem, and equipment.

2.2 OPERATION INFORMATION

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
   1. System, subsystem, and equipment descriptions.
   2. Performance and design criteria if Contractor is delegated design responsibility.
   3. Operating standards.
   4. Operating procedures.

5. Precautions against improper use.
6. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:
1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Engineering data and tests.
8. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:
1. System break-in procedures.
2. Routine and normal operating instructions.
3. Regulation and control procedures.
4. Special operating instructions and procedures.

2.3 PRODUCT MAINTENANCE INFORMATION

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:
1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

2.4 SYSTEMS MAINTENANCE INFORMATION

A. Content: For each system, subsystem, , include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
   1. Standard printed maintenance instructions and bulletins.
   2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
   3. Identification and nomenclature of parts and components.
   4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
   1. Test and inspection instructions.
   2. Troubleshooting guide.
   3. Precautions against improper maintenance.
   4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   5. Adjusting, and checking instructions.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

   1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
   2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

H. BABAA: Per RD Instructions, one of the manuals presented to the Owner by the Contractor shall include the Contractor’s BABAA Certification letter (see above) as well as all manufacturer’s BABAA compliance certificates for all construction materials and manufactured products utilized in the construction of the Owner’s project.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Product Maintenance Information: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Operation and Maintenance Information: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
   1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
   2. Prepare separate information for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

C. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
   1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

D. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
   1. Do not use original Project Record Documents as part of operation and maintenance manuals.
   2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."

E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
   1. Record Drawings.

B. Related Sections include the following:
   1. Division 01 Section "Closeout Procedures" for general closeout procedures.
   2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
   3. Divisions 02 through 49 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Documents (Drawings): Comply with the following:
   1. Scan annotated Project Record Documents into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
   1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
      a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
      b. Accurately record information in an understandable drawing technique.
      c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
   2. Content: Types of items requiring marking include, but are not limited to, the following:
      a. Dimensional changes to Drawings.

b. Revisions to details shown on Drawings.
c. Depths of foundations below first floor.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Pending Change Order.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.
o. Changes made by addendum.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Pending Change Order numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Include identification on cover sheets.
2. Identification: As follows:
a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Contractor.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Demonstration of operation of systems.
   2. Training in operation and maintenance of systems.

B. Related Sections include the following:
   1. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

A. Attendance Record: For each training module, submit list of participants and length of instruction time. See form included in Project Manual as part of Division 1 Section “Closeout”.

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

D. Note: Per RD Instructions, one of the manuals presented to the Owner by the Contractor shall include the Contractor's BABAA Certification letter (see above) as well as all manufacturer's BABAA compliance certificates for all construction materials and manufactured products utilized in the construction of the Owner's project.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
   1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
      a. System descriptions.
      b. Performance and design criteria if Contractor is delegated design responsibility.
      c. Operating standards.
      d. Regulatory requirements.
      e. Equipment function.
      f. Operating characteristics.
      g. Limiting conditions.
   2. Documentation: Review the following items in detail:
      a. Emergency manuals.
      b. Operations manuals.
      c. Maintenance manuals.
      d. Project Record Documents.
      e. Identification systems.
      f. Warranties and bonds.
      g. Maintenance service agreements and similar continuing commitments.
   3. Emergencies: Include the following, as applicable:
      a. Instructions on meaning of warnings, trouble indications, and error messages.
      b. Instructions on stopping.
      c. Shutdown instructions for each type of emergency.
      d. Operating instructions for conditions outside of normal operating limits.
      e. Sequences for electric or electronic systems.
      f. Special operating instructions and procedures.
   4. Operations: Include the following, as applicable:
      a. Startup procedures.
      b. Equipment or system break-in procedures.
      c. Routine and normal operating instructions.
      d. Regulation and control procedures.
      e. Control sequences.

f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.
7. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.
8. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
   1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
   1. Schedule training with Owner with at least seven days' advance notice.

D. Cleanup: Collect used and leftover educational materials and remove from Project site or give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 017900

SECTION 02 41 00 - SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition of buildings, foundations, utility structures, paving, utilities, and associated items.

2. Filling voids created as a result of removals or demolition.

B. Related Requirements:

1. Section 31 10 00 – Site Clearing

2. Section 31 20 00 – Earthwork

3. Section 31 25 00 – Erosion & Sediment Controls

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable State and local codes for demolition of structures, safety of adjacent structures, dust control, runoff control, and pollution prevention.

B. Obtain required permits and licenses from appropriate authorities. Pay associated fees including disposal charges.

C. Notify affected utility companies before starting work and comply with their requirements.

D. Do not close or obstruct public or private roadways, sidewalks, or fire hydrants without appropriate permits or written authorization.

E. If hazardous, contaminated materials, or other environmental related conditions are discovered, stop work immediately and notify the Architect for action to be taken. Do not resume work until specifically authorized by the Architect.

F. Test soils around buried tanks for contamination. Coordinate notification for mobilization to site and required observation of tank removal with Architect.

1.3 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions that will remain after demolition. Submit record as part of closeout submittals.

1.4 PROJECT CONDITIONS

A. Structures to be demolished will be discontinued in use and vacated prior to start of work.

B. Owner assumes no responsibility for condition of structures to be demolished.

C. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as reasonably practical. Variations within structures may occur by Owner's removal and salvage operations prior to start of demolition work.

D. Unless otherwise indicated in Contract Documents or specified by the Owner, items of salvageable value to Contractor shall be removed from site and structures. Storage or sale of removed items on site will not be permitted and shall not interfere with other work specified.

E. Explosives shall not be brought to site or used.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Fill material shall be as specified in Section 31 20 00 Earthwork.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide, erect, and maintain erosion control devices, temporary barriers, and security devices at locations indicated on Construction Drawings.

B. Protect existing landscaping materials, appurtenances, and structures, which are not to be demolished. Repair damage to existing items to remain caused by demolition operations. Repair shall meet or exceed existing conditions and shall be coordinated with the Architect.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring as necessary.

D. Mark location of utilities. Protect and maintain in safe and operable condition utilities that are to remain. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities and Owner.

E. Notify adjacent property owners of work that may affect their property, potential noise, utility outages, or other disruptions. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon, or limit access to their property. Coordinate notice with Owner.

F. Existing Utilities: Locate, identify, disconnect, and seal or cap off at source indicated utilities serving buildings and utility structures to be demolished.

1. Contractor shall arrange to shut off indicated utilities with respective utility companies.

2. If removal or relocation of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.

3. Remove utilities to source per the requirements of the authorities having jurisdiction.

4. Where utilities are removed, also remove all protective encasements and conduit.

G. Existing Utilities: Do not start demolition work until utility disconnecting, sealing and removal to source have been completed and verified in writing.

3.2 GENERAL DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent buildings or pavements to remain.

B. Cease operations immediately if adjacent buildings appear to be in danger. Notify Architect. Do not resume operations until approved by Architect.

C. Conduct operations with minimum of interference to public or private access. Maintain ingress and egress at all times.

D. Use water to minimize dust. Provide hoses and water connections for this purpose.

E. Comply with governing regulations pertaining to environmental protection.

F. Clean adjacent buildings and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

G. Keep public streets free of mud, dirt, dust and other debris.

3.3 DEMOLITION

A. Demolish site improvements designated to be removed as shown on the drawings. Site improvements shall include but not be limited to buildings, retaining walls, foundations, pavements, curbs and gutters, drainage structures, utilities, signage or landscaping.

B. Disconnect and cap or remove utilities to be abandoned as shown on the drawings.

C. Fill or remove underground tanks, piping, and appurtenances as specified.

D. Demolish buildings completely and remove from site using methods as required to complete work within limitations of governing regulations. Small buildings may be removed intact when acceptable to Owner and authorities having jurisdiction.

E. Locate demolition equipment and remove materials to prevent excessive loading to supporting walls, floors, or framing.

F. Demolish and remove any concrete and masonry slabs or foundation visible on the surface or identified on the drawing to be removed.

3.4 FILLING BASEMENTS AND VOIDS

A. Unless otherwise directed, completely fill below grade areas and voids resulting from demolition or removal of buildings, foundations, utility structures, underground fuel storage tanks, wells, cisterns, etc., using materials and methods specified in Section 31 20 00 Earthwork.

B. Areas to be filled shall be free of standing water, frost, frozen or unsuitable material, trash, and debris prior to fill placement.

C. Place fill materials in accordance with Section 31 20 00 Earthwork unless subsequent excavation for new work is required.

D. Grade surface to match adjacent grades and to provide adequate and correctly routed flow of surface drainage after fill placement and compaction.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from site debris, rubbish, and other materials resulting from demolition operations. Leave areas of work in clean condition.

B. No burning of any material, debris, or trash on-site or off-site will be allowed except when allowed by appropriate governing authority and Owner. If allowed as stated above, burning shall be performed in manner prescribed by governing authority. Attend burning materials until fires have burned out and have been completely extinguished.

C. Transport materials removed from demolished items with appropriate vehicles and dispose off-site to areas that are approved for disposal by governing authorities and appropriate property owners.

END OF SECTION 02 41 00

SECTION 032000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete.

B. Section 042000 - Unit Masonry: Reinforcement for masonry.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code for Structural Concrete—Code Requirements and Commentary; 2025.

B. ACI MNL-66 - ACI Detailing Manual; 2020.

C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2026.

D. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2026.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.

F. CRSI (DA4) - Manual of Standard Practice; 2024.

1.04 SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. See Section 013000 - Administrative Requirements, for submittal procedures.

D. Shop Drawings: Comply with requirements of ACI MNL-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

1.05 CLOSEOUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.06 DELIVERY, STORAGE, AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
   1. Plain billet-steel bars.

B. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
   1. Form: Flat Sheets.

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch (1.29 mm).
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is not permitted.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Maintain concrete cover around reinforcing as follows:
   1. Supported Slabs and Joists: 3/4 inch (20 mm).
   2. Footings and Concrete Formed Against Earth: 3 inch (75 mm).

D. Comply with applicable code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 014000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION

SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Elevated concrete slabs.

C. Floors and slabs on grade.

D. Concrete foundations.

E. Joint devices associated with concrete work.

F. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 032000 - Concrete Reinforcing.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code for Structural Concrete—Code Requirements and Commentary; 2025.

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

C. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.

D. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

E. ACI PRC-308 - Curing of Concrete—Guide; 2026.

F. ACI PRC-347 - Guide to Formwork for Concrete; 2014 (Reapproved 2021).

G. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials and Commentary; 2010 (Reapproved 2015).

H. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

I. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.

J. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2024a.

K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2026.

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

M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2026.

N. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2024.

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

P. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2025a.

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

R. ASTM C989/C989M - Standard Specification for Slag Cement for Use in Concrete and Mortars; 2025.

S. 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.

T. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

1.04 SUBMITTALS

A. Certificate of Compliance with Build America/Buy America Grant Requirements.

B. See Section 013000 - Administrative Requirements for submittal procedures.

C. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

D. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI CODE-318, Chapter 5 - Concrete Quality, Mixing and Placing.

E. Samples: Submit samples of underslab vapor retarder to be used.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.

PART 2 PRODUCTS

2.01 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI PRC-347 to provide formwork that will produce concrete complying with tolerances of ACI SPEC-117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   2. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches (38 mm) of concrete surface.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 032000.

B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

C. Fly Ash: ASTM C618, Class C or F.
   1. Max 25%

D. Ground Granulated Blast Furnace Slag: ASTM C989/C989M.
   1. Max 30%-50% replacement.
   2. Free of unburnt carbon, metallic or reactive sulphhide.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

E. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

F. Accelerating Admixture: ASTM C494/C494M Type C.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Retarder:

1. Sheet Material: ASTM E1745, Class C; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.

2.06 BONDING AND JOINTING PRODUCTS

2.07 CURING MATERIALS

A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

2.08 CONCRETE MIX DESIGN

A. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.

B. Normal Weight Concrete:
1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch (27.6 MPa).
2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.
3. Water-Cement Ratio: Maximum 45 percent by weight.
4. Total Air Content for all concrete permanitly exposed: 5-7 percent, determined in accordance with ASTM C173/C173M.
5. Maximum Aggregate Size: 5/8 inch (16 mm).

C. Lean Concrete:
1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 1,500 pounds per square inch (10.3 MPa).

2.09 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 PREPARATION

A. Formwork: Comply with requirements of ACI SPEC-301. Design and fabricate forms to support all applied loads until concrete is cured and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.

E. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.02 PLACING CONCRETE

A. Place concrete in accordance with ACI PRC-304.

3.03 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

3.04 CURING AND PROTECTION

A. Comply with requirements of ACI PRC-308. 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.

3.05 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

END OF SECTION

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Lintels.
3. Mortar and grout materials.
4. Reinforcement.
5. Ties and anchors.
6. Accessories.
7. Mortar and grout mixes.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Masonry Units: Indicate sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type of the following:

1. Masonry units.

a. Include data on material properties.
b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.

2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Mortar admixtures.
4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
5. Grout mixes. Include description of type and proportions of ingredients.
6. Reinforcing bars.

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7. Joint reinforcement.
8. Anchors, ties, and metal accessories.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

C. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined in accordance with TMS 602.

D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

E. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.
1. This does not include mortar or grout.

F. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

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B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

F. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) in accordance with TMS 602.

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2. Determine net-area compressive strength of masonry by testing masonry prisms in accordance with ASTM C1314.

2.2 MANUFACTURERS

2.3 The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

1. Where fire-resistance-rated construction is indicated, use the equivalent thickness method for masonry units in accordance with ACI 216.1.

2.5 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, and other special conditions.

B. CMUs: ASTM C90, normal weight.
1. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less than nominal dimensions.

2.6 LINTELS

A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

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2.7 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C91/C91M.

E. Mortar Cement: ASTM C1329/C1329M.

F. Preblended Dry Mortar Mix: Packaged blend made from portland cement and hydrated lime and admixtures and complying with ASTM C1714/C1714M.

1. Preblended Dry Portland Cement Mortar Mix:

G. Aggregate for Mortar: ASTM C144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. White-Mortar Aggregates: Natural white sand or crushed white stone.

H. Aggregate for Grout: ASTM C404.

I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying withASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

J. Water: Potable.

2.8 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60 (Grade 420).

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

1. Interior Walls: Mill galvanized carbon steel.
2. Exterior Walls: Hot-dip galvanized carbon steel.

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3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
4. Wire Size for Cross Rods: **0.148-inch (3.77-mm)** diameter.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (406 mm) o.c.
6. Provide in lengths of not less than 10 ft. (3 m), with prefabricated corner and tee units.

D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods.

2.9 ACCESSORIES

A. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.10 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. For reinforced masonry, use portland cement-lime, masonry cement or mortar cement mortar.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

1. For masonry below grade or in contact with earth, use Type S.
2. For reinforced masonry, use Type S.

D. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C476, paragraph 4.2.1.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured in accordance with ASTM C143/C143M.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (13 mm) or minus 1/4 inch (6.4 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (13 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6.4 mm) in a story height or 1/2 inch (13 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), or 1/2-inch (13-mm) maximum.
2. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), 3/8 inch in 20 ft. (10 mm in 6 m), or 1/2-inch (13-mm) maximum.

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3. For conspicuous vertical lines, such as external corners, do not vary from plumb by more than 1/8 inch in 10 ft. (3.2 mm in 3 m), 1/4 inch in 20 ft. (6.4 mm in 6 m), or 1/2-inch (13-mm) maximum.
4. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), 3/8 inch in 20 ft. (10 mm in 6 m), or 1/2-inch (13-mm) maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3.2 mm), with a maximum thickness limited to 1/2 inch (13 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3.2 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (10 mm) or minus 1/4 inch (6.4 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3.2 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3.2 mm).

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses. Avoid using less-than-half-size units, particularly at corners, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (102-mm) horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches (102 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (102-mm) horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Fill cores in hollow CMUs with grout where indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in grouted masonry, including starting course on footings.
3. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
4. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

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B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (152 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls.

B. Provide continuity at corners by using prefabricated L-shaped units.

3.7 LINTELS

A. Provide masonry lintels where indicated and where openings of more than 24 inches (610 mm) for block-size units.

3.8 REINFORCED UNIT MASONRY

A. Placing Reinforcement: Comply with requirements in TMS 602.

B. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements will be at Contractor's expense.

B. Inspections: Special inspections in accordance with Level 2 in TMS 402.

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

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3.10 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
4. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.11 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches (102 mm) in each dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Section 312000 "Earth Moving."
3. Do not dispose of masonry waste as fill within 18 inches (457 mm) of finished grade.

C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Metal bollards.

B. Related Requirements:
   1. Section 099114 “Exterior Painting” for finishing of metal bollards.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
   1. Metal bollards.

1.5 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of other construction including, but not limited to, curbs, walls, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

A. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.4 FABRICATION, GENERAL

A. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

2.5 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

3.2 INSTALLING METAL BOLLARDS

A. Anchor bollards in concrete. Slope grout up approximately 1/8 inch (3 mm) toward bollard.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

END OF SECTION 055000

SECTION 061000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural dimension lumber framing.

B. Structural composite lumber framing.

C. Sheathing.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Setting anchors in concrete.

1.03 REFERENCE STANDARDS

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

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 C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2025.

D. ASTM D5456 - Standard Specification for Evaluation of Structural Composite Lumber Products; 2024.

E. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2024, with Errata.

F. AWPA M4 - Standard for the Handling, Storage, Field Fabrication and Field Treatment of Preservative-Treated Wood Products; 2023.

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

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

I. PS 2 - Performance Standard for Wood Structural Panels; 2019.

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

1.04 SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. See Section 013000 - Administrative Requirements for submittal procedures.

D. Product Data: Provide technical data on insulated sheathing and application instructions.

E. Product Data: Submit technical data on wood treatment.

F. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.

1.05 CLOSEOUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.06 DELIVERY, STORAGE, AND HANDLING

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

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABBA) and the Manufacturer can provide the required certification shown above.

2.02 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Southern Pine #1, unless otherwise indicated.
   2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
   3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.03 STRUCTURAL COMPOSITE LUMBER

A. Structural Composite Lumber Materials: Factory-fabricated engineered wood products consisting of wood veneers, strands, or flakes pressed with moisture-resistant adhesive into blocks of material, evaluated in accordance with ASTM D5456.
   1. Laminated Veneer Lumber (LVL): Engineered wood products consisting of thin wood veneer bonded together with adhesive with grain of veneers running parallel to long dimension.
      a. Manufacturer's Published Modulus of Elasticity, E: 2,000,000 psi (13,790 MPa), minimum.
      b. Application: For headers and beams.

2.04 CONSTRUCTION PANELS

A. Roof Sheathing: PS 2 type, Exposure 1, rated Structural I Sheathing.
   1. Bond Classification: Exterior.
   2. Span Rating: 24.
   3. Performance Category: 5/8 PERF CAT.

B. Wall Sheathing: PS 2 type.
   1. Bond Classification: Exterior.
   2. Grade: Structural I Sheathing.
   3. Span Rating: 16.
   4. Performance Category: 7/16 PERF CAT.
   5. Edge Profile: Square edge.

C. Wall Sheathing: Insulating Air and Moisture Resistant Sheathing.
   1. Construction Panel: 7/16 inch (11 mm) oriented strand board (OSB).
   2. Insulation Board: Polyisocyanurate foam plastic with R Value of 6 attached to wall sheathing.

2.05 PRESSURE-PRESERVATIVE TREATMENT (PPT)

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

B. Kiln-dry wood after treatment with waterborne preservative to maximum moisture content of 19 percent for lumber and 15 percent for plywood.

C. Fabricate to maximum extent possible before treatment.

D. Label preservative-treated wood with marking as required by AWPA U1 and ICC (IBC). Unless otherwise permitted by standard U1 and the building code, include the following markings: AWPA U1, accredited inspection agency's mark, treating plant identification, type of preservative, preservative retention, and permitted end use.

E. Field Treatment for Cuts and Holes in Preservative-Treated Wood: Comply with AWPA M4.

2.06 ACCESSORIES

A. Metal and Finish of Fasteners:
   1. Preservative-Treated Wood:
      a. Nails, timber rivets, wood screws, and lag screws - general use: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
   2. Untreated Wood: Unfinished steel.

B. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.

C. Sill Gasket on Top of Foundation Wall: 1/4 inch (6 mm) thick, closed-cell neoprene foam.
   1. Width: 5-1/2 inches (140 mm).
   2. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.

PART 3 EXECUTION

3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

C. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

3.02 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.03 INSTALLATION OF CONSTRUCTION PANELS

A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. Nail panels to framing; staples are not permitted.

B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails.

END OF SECTION

SECTION 061753
SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop-fabricated wood trusses.

B. Truss bridging.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry.

1.03 REFERENCE STANDARDS

A. ANSI/TPI 1 - National Design Standard for Metal Plate Connected Wood Truss Construction; 2022.

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. SBCA (BCSI) - Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining and Bracing of Structural Building Components; 2025.

1.04 SUBMITTALS

A. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

B. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

C. See Section 013000 - Administrative Requirements, for submittal procedures.

D. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and bridging and bracing.
   1. Include identification of engineering software used for design.
   2. Provide shop drawings stamped or sealed by design engineer.

1.05 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Perform design by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

1.07 DELIVERY, STORAGE, AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

B. Handle trusses in accordance with SBCA (BCSI).

C. Store trusses in vertical position resting on bearing ends.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABBA) and the Manufacturer can provide the required certification shown above.

2.02 TRUSSES

A. Wood Trusses: Design and fabricate trusses in accordance with ANSI/TPI 1 and to achieve specified design requirements indicated.
   1. Connectors: Steel plate.
   2. Design Roof Live and Dead Load: See Construction Documents.
   3. Roof Deflection: 1/240, maximum.

2.03 MATERIALS

A. Lumber:
   1. Moisture Content: Between 7 and 9 percent.
   2. Lumber fabricated from old growth timber is not permitted.

B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G90/Z275 coating; die stamped with integral teeth; thickness as indicated.

C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

PART 3 EXECUTION

3.01 ERECTION

A. Install trusses in accordance with manufacturer's instructions, SBCA (BCSI).

B. Set members level and plumb, in correct position.

C. Install permanent bridging and bracing.

END OF SECTION

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior trim.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
2. Section 099123 "Interior Painting" for priming and backpriming of interior finish carpentry.

1.2 DEFINITIONS

A. MDF: Medium-density fiberboard.

B. MDO: Plywood with a medium-density overlay on the face.

C. PVC: Polyvinyl chloride.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Interior trim.

B. Product Data Submittals: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
1. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act

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(BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation.

1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
2. Provide for air circulation around stacks and under coverings.

B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

C. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber, mark grade stamp on end or back of each piece.

B. Hardboard: ANSI A135.4.

2.3 INTERIOR TRIM

A. Lumber Trim for Opaque Finish (Painted Finish):

1. Species and Grade:
   a. Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine; NeLMA, NLGA, or WWPA D Select (Quality).
   b. White woods; WWPA D Select.
   c. Douglas fir-larch or Douglas fir south; NLGA, WCLIB, or WWPA Superior or C & Btr finish.
   d. Spruce-pine-fir; NeLMA, NLGA, WCLIB, or WWPA 1 Common.
   e. Alder, aspen, basswood, cottonwood, gum, magnolia, soft maple, sycamore, tupelo, or yellow poplar; NHLA A Finish.
2. Maximum Moisture Content for Softwoods:15 percent with at least 85 percent of shipment at 12 percent or less.
3. Finger Jointing: Allowed.
4. Face Surface: Surfaced (smooth).
5. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

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B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

C. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

2.5 FABRICATION

A. Back out or kerf backs of the following members, except those with ends exposed in finished work:

1. Interior standing and running trim.

B. Ease edges of lumber less than 1 inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1 inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.

B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.

1. Use concealed shims where necessary for alignment.

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2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
4. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 INSTALLATION OF INTERIOR TRIM

A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.

1. Do not use pieces less than 24 inches (610 mm) long, except where necessary.
2. Stagger joints in adjacent and related standing and running trim.
3. **Cope** at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
4. Use scarf joints for end-to-end joints.
5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
6. Install trim after gypsum-board joint finishing operations are completed.
7. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
8. Fasten to prevent movement or warping.
9. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements.

1. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

B. Adjust joinery for uniform appearance.

3.6 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces.

B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

3.7 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

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B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

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SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cold-applied, emulsified-asphalt dampproofing.

B. Related Requirements:

   1. Section 033000 "Cast-in-Place Concrete" for vapor retarders under slabs-on-grade.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

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1.5 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.6 FIELD CONDITIONS

A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide auxiliary materials recommended in writing by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

A. VOC Content: Products are to comply with VOC content limits of authorities having jurisdiction unless otherwise indicated.

2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Trowel Coats: ASTM D1227, Type II, Class 1.

2.5 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

B. Emulsified-Asphalt Primer: ASTM D1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

C. Patching Compound: Epoxy or latex-modified repair mortar or Asbestos-free fibered masticof type recommended in writing by dampproofing manufacturer.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for surface smoothness, maximum surface moisture content, and other conditions affecting performance of the Work.

B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.

B. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging drains.

C. Clean substrates of projections and substances detrimental to dampproofing work; fill voids, seal joints, and remove bond breakers if any.

D. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections.

3.3 INSTALLATION, GENERAL

A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.

1. Apply dampproofing to provide continuous plane of protection.
2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches (150 mm) over outside face of footing.

3.4 INSTALLATION OF COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Concrete Foundations: Apply one trowel coat at not less than 4 gal./100 sq. ft. (1.6 L/sq. m).

B. Unparged Masonry Foundation Walls: primer and one trowel coat at not less than 5 gal./100 sq. ft. (2 L/sq. m).

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SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Glass-fiber blanket insulation.

B. Related Requirements:
1. Section 061600 "Sheathing" for foam-plastic board sheathing installed directly over wood or steel framing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Research Reports: For foam-plastic insulation, from ICC-ES.

C. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

D. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

1.5 As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This

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documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

C. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than Class A, 25 and 450 when tested in accordance with ASTM E84.

B. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.

C. Thermal-Resistance Value (R-Value): R-value as indicated on Drawings in accordance with ASTM C518.

2.2 MANUFACTURERS

2.3 The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION (XPS)

A. Extruded Polystyrene Board Insulation, Type IV: ASTM C578, Type IV, 25 psi (173 kPa) minimum compressive strength; unfaced.

1. See drawings for R-Value for continuous wall insulation for Contractor’s option for exterior wall assembly.

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2. For Exterior wall assembly at Storm Shelter: Utilize 2 .5 inch thick extruded polystyrene board insulation meeting Type IV and ASTM C578 with integral air and water barrier with increased R-Value at 5.6 per inch.
    a. Provide closed cell product with carbon black filler and extruded with an integral skin serving as air and water barrier.

2.5 GLASS-FIBER BLANKET INSULATION

A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.

2.6 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
3. Polyurethane Pour-In-Place Insulation: Closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84, specifically formulated for pour-in-place applications.

B. Miscellaneous Application Accessories:

1. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
2. Crack Sealer: Closed-cell insulating foam in aerosol dispenser recommended in writing by insulation manufacturer for filling gaps in board insulation.
3. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.
4. Detailing Foam Insulation for Voids: Urethane foam complying with AAMA 812, low expansion pressure suitable for filling insulation gaps and voids adjacent to openings to protect against water, air, and sound intrusion.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or those that interfere with insulation attachment.

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3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products, applications and applicable codes.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install insulation with manufacturer's R-value label exposed after insulation is installed.

D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

A. On horizontal surfaces, loosely lay insulation units in accordance with manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Adhesive Installation: Install with adhesive in accordance with manufacturer's written instructions.

3.5 INSTALLATION OF BOARD INSULATION ON CONCRETRE BLOCK

A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face and as recommended in writing by manufacturer.

1. Fit courses of insulation with edges butted tightly in both directions, and with faces flush.
2. Press units firmly against inside substrates.

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members in accordance with the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

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3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Detailing Foam Insulation for Voids: Apply in accordance with manufacturer's written instructions.

3.7 INSTALLATION OF BOARD INSULATION

A. Install board insulation in accordance with manufacturer's written instructions per project applications and conditions.

3.8 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

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3.5 PROTECTION

A. Correct dampproofing that does not comply with requirements; repair substrates, and reapply dampproofing.

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SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Building wrap.

1.2 ACTION SUBMITTALS

A. Product Data:

   1. For each type of product.

B. Product Data Submittals: For building wrap, include data on air and water-vapor permeance based on testing in accordance with referenced standards.

C. Shop Drawings: Show details of building wrap at terminations, openings, and penetrations. Show details of flexible flashing applications.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

B. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

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1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, certified, or licensed by the weather barrier system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver weather barrier materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.7 FIELD CONDITIONS

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

1.8 WARRANTY

A. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 WEATHER BARRIERS

A. Building Wrap: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.
   1. Building Wrap Type: Type II, ASTM E2556/E2556M.
   2. Composition Type: Polypropylene woven fabric with coating.
   3. Water-Vapor Permeance: Minimum 23 perms (1323 ng/Pa x s x sq. m) in accordance with ASTM E96/E96M, Desiccant Method (Procedure A).
   4. Air Permeance: Not more than 0.001 cfm/sq. ft. at 1.57 lbf/sq. ft. (0.005 L/s x sq. m at 75 Pa) when tested in accordance with ASTM E2178.
   5. Allowable UV Exposure Time: Not more than 270 days.

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6. Flame Propagation Test: Materials and construction to be as tested in accordance with NFPA 285.

2.3 ACCESSORY MATERIALS

A. Requirement: Provide primers, fasteners, seam tapes, flashing, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by weather barrier manufacturer to produce a complete weather barrier assembly and that are compatible with primary weather barrier material and adjacent construction to which they may seal.

PART 3 - EXECUTION

3.1 INSTALLATION OF WEATHER BARRIERS

A. Weather Barriers:
   1. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.

B. Install weather barrier accessories for a complete installation with weather barriers in accordance with manufacturers written instructions.

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SECTION 072600 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyethylene vapor retarders.
2. Fire-retardant, reinforced-polyethylene vapor retarders.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for under-slab vapor retarders.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Polyethylene vapor retarders.
2. Fire-retardant, reinforced-polyethylene vapor retarders.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This

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documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 POLYETHYLENE VAPOR RETARDERS

A. Polyethylene Vapor Retarders: ASTM D4397, 6-mil- (0.15-mm-) thick sheet, with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).

2.3 FIRE-RETARDANT, REINFORCED-POLYETHYLENE VAPOR RETARDERS

A. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester scrim and weighing not less than 20 lb/1000 sq. ft. (9 kg/100 sq. m), with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).
   1. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 200, respectively, per ASTM E84.

2.4 ACCESSORIES

A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

B. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

3.2 INSTALLATION OF VAPOR RETARDERS ON FRAMING

A. Place vapor retarders on side of construction indicated on Drawings.

B. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.

D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

F. Install fire retardant reinforced polyethylene vapor retarder where exposed and not covered by gypsum board.

3.3 PROTECTION

A. Protect vapor retarders from damage until concealed by permanent construction.

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SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass-fiber-reinforced asphalt shingles.
2. Underlayment materials.
3. Ridge vents.
4. Metal flashing and trim.

B. Related Requirements:

1. Section 077100 "Roof Specialties" for gutters and downspouts.

1.2 DEFINITIONS

A. Roofing Terminology: See ASTM D1079 for definitions of terms related to roofing Work in this Section.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Asphalt shingles.
2. Underlayment materials.
3. Ridge vents.
4. Asphalt roofing cement.
5. Elastomeric flashing sealant.

B. Shop Drawings: For metal flashing and trim.

C. Samples for Initial Selection:

1. For each type of asphalt shingle indicated.
2. For each type of accessory involving color selection.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's materials warranty.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

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C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For asphalt shingles to include in maintenance manuals.

B. Materials warranties.

C. Roofing Installer's warranty.

D. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

E. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Asphalt Shingles: 100 sq. ft. (9.3 sq. m) > of each type and in each color and blend, in unbroken bundles.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized installer who is trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions.

B. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double-stack rolls.

C. Protect unused roofing materials from weather, sunlight, and moisture when left overnight or when roofing Work is not in progress.

D. Handle, store, and place roofing materials in a manner to prevent damage to roof deck or structural supporting members.

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E. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Proceed with installation only when existing and forecasted weather conditions permit product installation and related Work to be performed in accordance with manufacturer's written instructions and warranty requirements.

1. Install self-adhering, polymer-modified bitumen sheet underlayment within the range of ambient and substrate temperatures recommended in writing by manufacturer.

1.10 WARRANTY

A. Materials Warranty: Manufacturer agrees to repair or replace asphalt shingles that fail within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Manufacturing defects.

2. Materials Warranty Period: 40 years from date of Substantial Completion, prorated, with first five years nonprorated.
3. Wind-Speed Warranty Period: Asphalt shingles will resist blow-off or damage caused by wind speeds of up to 80 mph (36 m/s) for five years from date of Substantial Completion.
4. Algae-Resistance Warranty Period: Asphalt shingles will not discolor for **10** years from date of Substantial Completion.
5. Workmanship Warranty Period: Two years from date of Substantial Completion.

B. Roofing Installer's Warranty: On warranty form at end of this Section, signed by Installer, in which Installer agrees to repair or replace components of asphalt shingle roofing that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of product from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Exterior Fire-Test Exposure: Provide asphalt shingles and related roofing materials identical to those of assemblies tested for Class A fire resistance in accordance with ASTM E108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

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B. Wind Resistance: Provide asphalt shingles that comply with requirements of ASTM D3161/D3161M, Class F, and with ASTM D7158/D7158M, Class H.

2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

A. Laminated-Strip Asphalt Shingles: ASTM D3462/D3462M, laminated, multi-ply overlay construction; glass-fiber reinforced, mineral-granule surfaced, and self-sealing.
   1. Butt Edge: Notched cut.
   2. Strip Size: Manufacturer's standard.
   3. Algae Resistance: Granules resist algae discoloration.
   4. Color and Blends: As selected by Architect from manufacturer's full range.

B. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles.

2.5 UNDERLAYMENT MATERIALS

A. Synthetic Underlayment: UV-resistant polypropylene, polyolefin, or polyethylene polymer fabric with surface coatings or treatments to improve traction underfoot and abrasion resistance; evaluated and documented to be suitable for use as a roof underlayment under applicable codes by a testing and inspecting agency acceptable to authorities having jurisdiction.

B. Self-Adhering, Polymer-Modified Bitumen Sheet: ASTM D1970/D1970M, minimum 40-mil-(1.0-mm-) thick sheet; glass-fiber-mat-reinforced, polymer-modified asphalt; with slip-resistant top surface and release backing; cold applied
   1. Top Surface: Granule.

2.6 RIDGE VENTS

A. Flexible Ridge Vent: Manufacturer's standard, compression-resisting, three-dimensional, open-nylon or polyester-mat filter bonded to a nonwoven, nonwicking, geotextile fabric cover.
   1. Minimum Net Free Area: 12.5 square inches per foot.
   2. Width: 11.25”.
   3. Thickness: 5/8”.

2.7 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D4586/D4586M Type II, asbestos free.

B. Elastomeric Flashing Sealant: ASTM C920, Type S, Grade NS, one-part, non-sag, elastomeric polymer sealant; of class and use classifications required to seal joints and remain watertight; recommended in writing by manufacturer for installation of flashing systems.

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C. Roofing Nails: ASTM F1667, aluminum, stainless steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, sharp-pointed, with a 3/8- to 7/16-inch- (10- to 11-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through sheathing less than 3/4 inch (19 mm) thick.

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

D. Underlayment Nails: Aluminum, stainless steel, or hot-dip galvanized-steel wire nails with low-profile metal or plastic caps, 1-inch- (25-mm-) minimum diameter.

1. Provide with minimum 0.0134-inch- (0.34-mm-) thick metal cap, 0.010-inch- (0.25-mm-) thick power-driven metal cap, or 0.035-inch- (0.89-mm-) thick plastic cap; and with minimum 0.083-inch- (2.11-mm-) thick ring shank or 0.091-inch- (2.31-mm-) thick smooth shank of length to penetrate at least 3/4 inch (19 mm) into roof sheathing or to penetrate through roof sheathing less than 3/4 inch (19 mm) thick.

2.8 METAL FLASHING AND TRIM

A. Comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."

1. Sheet Metal: .

B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item unless otherwise specified in this Section or indicated on Drawings.

1. Apron Flashings: Fabricate with lower flange a minimum of 4 inches (102 mm) over and 4 inches (102 mm) beyond each side of downslope asphalt shingles and 6 inches (152 mm) up the vertical surface.
2. Step Flashings: Fabricate with a headlap of 2 inches (51 mm) and a minimum extension of [5 inches (127 mm) > over the underlying asphalt shingle. Cricket and Backer Flashings: Fabricate with concealed flange extending a minimum of 18 inches (457 mm) beneath upslope asphalt shingles and 6 inches (152 mm) beyond each side of vertical face and 6 inches (152 mm) above the roof plane.

3. Drip Edges: Fabricate in lengths not exceeding 10 feet (3 m) with minimum 2-inch (51-mm) roof-deck flange and 1-1/2-inch (38-mm) fascia flange with 3/8-inch (10-mm) drip at lower edge.
4. Vent-Pipe Flashings: ASTM B749, Type L51121, at least 1/16 inch (1.6 mm) thick. Provide lead sleeve sized to slip over and turn down into pipe, soldered to skirt at slope of roof, and extending at least 4 inches (102 mm) from pipe onto roof.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provisions have been made for flashings and penetrations through asphalt shingles.
3. Verify that vent stacks and other penetrations through roofing are installed and securely fastened.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT MATERIALS

A. Comply with asphalt shingle and underlayment manufacturers' written installation instructions and with recommendations in NRCA's "The NRCA Roofing Manual: Steep-Slope Roof Systems" applicable to products and applications indicated unless more stringent requirements are specified in this Section or indicated on Drawings.

B. Synthetic Underlayment:

1. Install on roof deck parallel with and starting at the eaves.
    a. Lap sides and ends as recommended in writing by manufacturer, but not less than 4 inches (102 mm) for side laps and 6 inches (152 mm) for end laps.
    b. Stagger end laps between succeeding courses at interval recommended in writing by manufacturer, but not less than 72 inches (1829 mm).
    c. Fasten with underlayment nails in accordance with manufacturer's written instructions.
    d. Cover underlayment within period recommended in writing by manufacturer.
2. Install in single layer on roofs sloped at 4:12 and greater.
3. Install in double layer on roofs sloped at less than 4:12.
4. Install synthetic underlayment on roof deck not covered by self-adhering, polymer-modified bitumen sheet unless otherwise specified in this Section or indicated on Drawings.
    a. Lap sides of underlayment over self-adhering sheet not less than 4 inches (102 mm) in direction to shed water.
    b. Lap ends of underlayment not less than 6 inches (152 mm) over self-adhering sheet.

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5. Terminate synthetic underlayment extended up not less than 4 inches (102 mm) against sidewalls, and other roof projections.

C. Self-Adhering, Polymer-Modified Bitumen Sheet: Install, wrinkle free, on roof deck.

1. Comply with low-temperature installation restrictions of underlayment manufacturer.
2. Install lapped in direction that sheds water.
    a. Lap sides not less than 4 inches (102 mm).
    b. Lap ends not less than 6 inches (152 mm), staggered 24 inches (610 mm) between succeeding courses.
    c. Roll laps with roller.
3. Eaves: Extend from edges of eaves 24 inches (610 mm) beyond interior face of exterior wall.
4. Rakes: Extend from edges of rakes **24 inches (610 mm)** beyond interior face of exterior wall.
5. Valleys: Extend from lowest to highest point 18 inches (457 mm) on each side of centerline.
6. Hips: Extend 18 inches (457 mm)on each side.
7. Ridges: Extend **36 inches (914 mm)** on each side without obstructing continuous ridge vent slot.
8. Sidewalls: Extend 18 inches (457 mm) beyond sidewalls and return vertically against sidewalls not less than 4 inches (102 mm).
9. Roof-Penetrating Elements: Extend 18 inches (457 mm) beyond penetrating elements and return vertically against penetrating elements not less than 4 inches (102 mm).
10. Cover underlayment within seven days.

3.3 INSTALLATION OF METAL FLASHING AND TRIM

A. Install metal flashings and trim to comply with requirements in Section 076200 "Sheet Metal Flashing and Trim."

1. Install metal flashings in accordance with recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."
2. Bed flanges of metal flashings using asphalt roofing cement or elastomeric flashing sealant.

B. Apron Flashings: Extend lower flange over and beyond each side of downslope asphalt shingles and up the vertical surface.

C. Step Flashings: Install with a headlap of 2 inches (51 mm) and extend over underlying shingle and up the vertical face.

1. Install with lower edge of flashing just upslope of, and concealed by, butt of overlying shingle.
2. Fasten to roof deck only.

D. Cricket and Backer Flashings: Install against roof-penetrating elements extending concealed flange beneath upslope asphalt shingles and beyond each side.

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E. Rake Drip Edges: Install over underlayment materials and fasten to roof deck.

F. Eave Drip Edges: Install below underlayment materials and fasten to roof deck.

G. Pipe Flashings: Form flashing around pipe penetrations and asphalt shingles. Fasten and seal to asphalt shingles as recommended by manufacturer.

3.4 INSTALLATION OF ASPHALT SHINGLES

A. Install asphalt shingles in accordance with manufacturer's written instructions and recommendations in NRCA's "NRCA Guidelines for Asphalt Shingle Roof Systems."

B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip at least 7 inches (178 mm) wide with self-sealing strip face up at roof edge.

1. Extend asphalt shingles 1/2 inch (13 mm) over fasciae at eaves and rakes.
2. Install starter strip along rake edge.

C. Install first and remaining courses of laminated asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.

D. Fasten asphalt shingle strips with a minimum of four roofing nails, but not less than the number indicated in manufacturer's written instructions for roof slope and design wind speed indicated on Drawings and for warranty requirements specified in this Section.

1. Locate fasteners in accordance with manufacturer's written instructions.
2. Where roof slope is less than 4:12, hand seal self-sealing asphalt shingles to improve the shingles' positive bond by applying asphalt roofing cement spots between course overlaps after nailing the upper course.
3. When ambient temperature during installation is below 50 deg F (10 deg C), hand seal self-sealing asphalt shingles by applying asphalt roofing cement spots between course overlaps after nailing the upper course.

E. Closed-Cut Valleys: Extend asphalt shingle strips from one side of valley 12 inches (305 mm) beyond center of valley.

1. Use one-piece shingle strips without joints in valley.
2. Fasten with extra nail in upper end of shingle. Install asphalt shingle courses from other side of valley and cut back to a straight line 2 inches (51 mm) short of valley centerline.
3. Trim upper concealed corners of cut-back shingle strips.
4. Do not nail asphalt shingles within 6 inches (152 mm) of valley center.
5. Set trimmed, concealed-corner asphalt shingles in a 3-inch- (76-mm-) wide bed of asphalt roofing cement.

F. Ridge Vents: Install continuous ridge vents over asphalt shingles in accordance with manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

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G. Hip and Ridge Shingles: Maintain same exposure of cap shingles as roofing-shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds.

1. Fasten with roofing nails of sufficient length to penetrate sheathing.
2. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

3.5 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Roofing Installer," has performed roofing and associated work ("the work") on the following project:

1. Owner: <**Insert name of Owner**>.
2. Owner Address: <**Insert address**>.
3. Building Name/Type: <**Insert information**>.
4. Building Address: <**Insert address**>.
5. Area of the Work: <**Insert information**>.
6. Acceptance Date: <**Insert date**>.
7. Warranty Period: <**Insert time**>.
8. Expiration Date: <**Insert date**>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant the work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that, during Warranty Period, Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of the work as are necessary to correct faulty and defective work and as are necessary to maintain the work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to the work and other parts of the building, and to building contents, caused by:

    a. Lightning;
    b. Peak gust wind speed exceeding 80 mph (35.8 m/s);
    c. Fire;
    d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    e. Faulty construction of copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    f. Vapor condensation on bottom of roofing; and
    g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When the work has been damaged by any of foregoing causes, Warranty is to be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

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3. Roofing Installer is responsible for damage to the work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of the work.
4. During Warranty Period, if Owner allows alteration of the work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty becomes null and void on date of the alterations, but only to the extent the alterations affect the work covered by this Warranty. If Owner engages Roofing Installer to perform the alterations, Warranty does not become null and void unless Roofing Installer, before starting the alterations, notified Owner in writing, showing reasonable cause for claim, that the alterations would likely damage or deteriorate the work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a use or service more severe than originally specified, this Warranty becomes null and void on date of the change, but only to the extent the change affects the work covered by this Warranty.
6. Owner promptly notifies Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and affords reasonable opportunity for Roofing Installer to inspect the work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on the work and does not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty does not operate to relieve Roofing Installer of responsibility for performance of the work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <**Insert day**> day of <**Insert month**>, <**Insert year**>.

1. Authorized Signature: <**Insert signature**>.
2. Name: <**Insert name**>.
3. Title: <**Insert title**>.

END OF SECTION 073113

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SECTION 074113.16 - STANDING-SEAM METAL ROOF PANELS (ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standing-seam metal roof panels.
2. Underlayment.

B. Related Requirements:

1. Section 074293 "Soffit Panels" for metal panels used in horizontal soffit applications.
2. Section 077253 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface, allowing it to melt and drain off slowly.

1.2 DEFINITIONS

A. Structural Standing-Seam Metal Roof Panel System: A roof system designed to resist positive and negative loads applied normal to the metal roof panel surface without the benefit of a supporting deck or sheathing.

1.3 COORDINATION

A. Coordinate sizes and locations of roof penetrations with actual equipment provided.

B. Coordinate metal roof panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each specified system and assembly, including components and accessories.

1. For standing-seam metal roof panels. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal roof panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Initial Selection: Manufacturer's standard color charts, showing full range of available colors for each type of exposed finish.

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1. Include similar Samples of trim and accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For standing-seam metal roof panels, for tests performed by a qualified testing agency.

B. Field Quality Control Reports: For specified tests and inspections.

C. Sample Warranties: For specified special warranties.

D. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

E. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal roof panels.

B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 QUALITY ASSURANCE

A. Roof Installer Qualifications: Manufacturer approved.

B. Factory-Authorized Service Representative Qualifications: Manufacturer's authorized representative who is trained and approved by the manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal roof panels, and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.

B. Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal roof panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness, with positive slope for

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drainage of water. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal roof panels during installation.

E. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal roof panels to be performed in accordance with manufacturers' written installation instructions and warranty requirements.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of metal roof panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metal and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

C. Special Weathertightness Warranty: Manufacturer agrees to repair or replace standing-seam metal roof panel systems that fail to remain weathertight, including leaks, within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal roof panel systems capable of withstanding the effects of the following loads when tested in accordance with ASTM E1592:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings .
3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
4. Structural Standing-Seam Steel Roof Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E1514.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested in accordance with ASTM E283/E283M at the following test-pressure difference:

1. Test-Pressure Difference: 1.57 lbf/sq. ft. .

C. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 2.86 lbf/sq. ft..

D. Watertightness: No water penetration when tested in accordance with ASTM E2140 for hydrostatic-head resistance.

E. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

1. Uplift Rating: UL 90 .

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 STANDING-SEAM METAL ROOF PANELS, GENERAL

A. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with seamed joint type indicated and mechanically attaching panels to supports using concealed fasteners in side laps. Include all accessories required for weathertight installation.

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2.4 STANDING-SEAM METAL ROOF PANELS

A. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Interlock IL20 by Dimensional Metals Inc. or comparable product by one of the following:

    a. AEP Span a brand of ASC Profiles LLC, a part of BlueScope
    b. ATAS International, Inc.
    c. B&B Sheet Metal
    d. Berridge Manufacturing Company
    e. Bryer Co.
    f. Central States Inc.
    g. CENTRIA, a Nucor Brand
    h. Drexel Metals Corp.; a Carlisle Company
    i. Elevate; Amrize Building Envelope LLC
    j. Englert, Inc.
    k. Everlast Metals
    l. Fabral
    m. Garland Company, Inc. (The)
    n. Innovative Metals Company, Inc
    o. MBCI; Cornerstone Building Brands
    p. McElroy Metal, Inc
    q. Merchant & Evans Inc.
    r. Metal Sales Manufacturing Corporation
    s. Morin - A Kingspan Group Company
    t. Pac-Clad, Petersen; a Carlisle Company
    u. Sentrigard; NB Handy Company
    v. Sheffield Metals International
    w. Taylor Metal Products
    x. Ultra Seam Incorporated
    y. Union Corrugating Company; Cornerstone Building Brands
2. Panel Profile: Panel formed with vertical ribs at panel edges and striated pan profile between major ribs..
3. Panel Attachment Method: Designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.
4. Structural Support: Over solid deck .
5. Material: Metallic-coated steel .
6. Panel Coverage: 24 inches .
7. Panel Height: 1.75 inches .
8. Clips: One piece, fixed , designed to accommodate thermal movement.

    a. Steel Clips: 0.028-inch nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
    b. Clip Spacing: 24 inches.

2.5 METAL ROOF PANEL MATERIALS

A. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with minimum ASTM A792/A792M, Class AZ50 coating designation; structural quality. Sheet prepainted by the coil-coating process to comply with ASTM A755/A755M.

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1. Nominal Thickness: 0.022 inch .
2. Surface: Smooth, flat texture.
3. Exterior Finish: Two-coat fluoropolymer .

    a. Color: As selected by Architect from manufacturer's full range .

2.6 UNDERLAYMENT

A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
   1. Thermal Stability: Stable after testing at 220 deg F; ASTM D1970/D1970M.
   2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970/D1970M.

B. Felt Underlayment : ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felts.

C. Slip Sheet : Manufacturer's recommended slip sheet, of type required for application

2.7 ACCESSORIES

A. Roof Panel Accessories: Provide components required for a complete, weathertight metal roof panel system including trim, fasciae, fasteners, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

   1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.
   2. Backing Plates: Provide metal backing plates at roof panel end splices, fabricated from material recommended by manufacturer.
   3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

B. Flashing and Trim: Provide flashing and trim formed from same material as metal roof panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.

C. Gutters: Formed from same material as metal roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, of size and metal thickness in accordance with manufacturer's recommendations. Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels .

D. Downspouts: Formed from same material as metal roof panels. Fabricate in 10 ft. long sections, complete with formed elbows and offsets, of size and metal thickness in accordance with manufacturer's recommendations. Finish downspouts to match gutters.

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E. Roof Panel Fasteners: Self-tapping screws designed to withstand design loads.

F. Roof Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with metal roof panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.8 FABRICATION

A. Fabricate and finish metal roof panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide roof panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal roof panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for other than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with manufacturer's recommendations.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not permitted on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal roof panel manufacturer.

a. Size: As recommended by metal roof panel manufacturer for application, but not less than thickness of metal being secured.

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2.9 FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Roof Panels and Accessories:

1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions .
2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION (Not Used)

3.1 EXAMINATION

A. Examine substrates, areas, and conditions with Installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the Work.

1. Examine primary roof framing to verify that rafters and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

B. Examine roughing-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of metal roof panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

A. Self-Adhering, High-Temperature Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

1. Apply over the roof area indicated below:

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a. Roof perimeter for a distance up from eaves of 24 inches beyond interior wall line.
b. Valleys, from lowest point to highest point, for a distance on each side of 18 inches . Overlap ends of sheets not less than 6 inches.
c. Rake edges for a distance of 18 inches .
d. Hips and ridges for a distance on each side of 12 inches .
e. Roof-to-wall intersections for a distance from wall of 18 inches .

B. Felt Underlayment: Apply at locations indicated below , in shingle fashion to shed water, and with lapped joints of not less than 2 inches.
1. Apply on roof not covered by self-adhering sheet underlayment. Lap over edges of self-adhering sheet underlayment not less than 3 inches, in shingle fashion to shed water.

C. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.

D. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

3.3 INSTALLATION OF STANDING-SEAM METAL ROOF PANELS

A. Install metal roof panels in accordance with manufacturer's written installation instructions and approved Shop Drawings in orientation, sizes, and locations indicated. Anchor metal roof panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal roof panels.
2. Flash and seal metal roof panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal roof panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal roof panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal roof panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Roof Panel Fasteners:

1. Steel Roof Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal roof panel manufacturer.

D. Concealed Clip, Standing-Seam Metal Roof Panel: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.

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1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.

E. Roof Panel Joints: Fasten panel joints to substrate in accordance with manufacturer's written instructions.

1. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
2. Weathertight Installation:

    a. Apply a continuous ribbon of sealant or tape to seal joints of metal roof panels, using sealant or tape as recommended in writing by manufacturer as needed to make panels weathertight.
    b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Roof Panel Accessories : Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel system including trim, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.

G. Flashing and Trim: Comply with performance requirements and manufacturer's written installation instructions. Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weathertight.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve weathertight performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weathertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal weathertight with sealant. Provide for thermal expansion.

I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.

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1. \Connect downspouts to underground drainage system indicated.

J. Pipe and Conduit Penetrations: Fasten and seal to metal roof panels as recommended by manufacturer.

3.4 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 ft. on slope and location lines as indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.6 CLEANING

A. On completion of metal roof panel installation, clean finished surfaces as recommended in writing by metal roof panel manufacturer. Maintain in a clean condition during construction.

3.7 PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113.16

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SECTION 074213.13 - FORMED METAL WALL PANELS (ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Corrugated-profile, exposed-fastener metal wall panels.

B. Related Requirements:

1. Section 061600 "Sheathing" for structural wall sheathing.
2. Section 072100 "Thermal Insulation" for insulation.
3. Section 072500 "Weather Barriers" for weather-resistive barriers and sealing penetrations in barriers resulting from installation of wall panel support system.

1.2 DEFINITIONS

A. Wall Panel Assembly: Assembly consisting of wall panels, support systems, continuous insulation weather barriers, and sheathing substrate that has been shown to comply with assembly testing and performance requirements.

1.3 COORDINATION

A. Coordinate installation of wall panels and support system with insulation, weather barriers, flashings, and other adjoining construction to ensure proper sequencing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of specified product.

1. For formed metal wall panels, include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Initial Selection: Manufacturer's standard color charts, showing full range of available colors for each type of exposed finish.

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1. Include Samples of trim and accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each specified metal wall panel, for tests performed by manufacturer.

B. Wall Panel Assembly Test Reports: Certified test reports showing system compliance with specific performance or third-party listing documenting compliance in accordance with the IBC.

C. Field Quality Control Reports: For specified tests and inspections.

D. Sample Warranties: For specified special warranties.

E. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

F. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For formed metal wall panels.

B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package panels for protection during transportation and handling.

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B. Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal wall panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store panels to ensure dryness, with positive slope for drainage of water. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal wall panels during installation.

E. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of metal wall panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal wall panel systems, including associated support system, capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E1592 or ASTM E330/E330M:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

B. Air Infiltration: Not more than 0.06 cfm/sq. ft. when tested in accordance with ASTM E283/283M at the following test-pressure difference:

1. Test-Pressure Difference: 1.57 lbf/sq. ft. .

C. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft..

D. Thermal Movement: Allow for thermal movement from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 LAP-SEAM METAL WALL PANELS

A. Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

B. Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels :
1. Basis-of-Design Product: Subject to compliance with requirements, provide 7.2 Panel WP72 by Dimensional Metals, Inc. or comparable product by one of the following:

a. ATAS International, Inc.
b. Berridge Manufacturing Company
c. Bryer Co.
d. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
e. Central States Inc.

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f. CENTRIA, a Nucor Brand
g. Elevate; Amrize Building Envelope LLC
h. Englert, Inc.
i. Fabral
j. Firestone Metal Products
k. Flexospan Steel Buildings, Inc
l. MBCI; Cornerstone Building Brands
m. McElroy Metal, Inc
n. Metal Sales Manufacturing Corporation
o. Pac-Clad, Petersen; a Carlisle Company
p. Union Corrugating Company; Cornerstone Building Brands

2. Metal Wall Panels: Formed with raised, trapezoidal ribs .

a. Material: Metallic-coated steel .
b. Rib Spacing: 7.2 inches o.c.
c. Panel Coverage: 36 inches.
d. Panel Height: 1.5 inches.

2.4 METAL WALL PANEL MATERIALS

A. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

1. Nominal Thickness: 0.022 inch .
2. Exterior Finish: Two-coat fluoropolymer.
3. Color: As selected by Architect from manufacturer's full range .

2.5 ACCESSORIES

A. Structural Performance: Provide support system for metal wall panels capable of withstanding and transferring design loads to building structure within limits and under conditions indicated.

B. Wall Panel Assembly Accessories, General: Provide components required for a complete, weathertight wall panel system including trim, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated on Drawings.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal wall panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended in writing by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated on Drawings or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal wall panels

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as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal wall panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: Provide sealant types recommended in writing by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.6 FABRICATION

A. Fabricate and finish metal wall panels and accessories at the factory, by panel manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal wall panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with panel manufacturer's written recommendations that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels specified, with exposed edges folded back to form hems.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with manufacturer's written recommendations.
4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

a. Size: As recommended in writing by metal wall panel manufacturer for application but not less than thickness of metal being secured.

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2.7 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Metallic-Coated Steel Panels and Accessories:

1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions .

PART 3 - EXECUTION (Not Used)

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

a. Verify that water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF FORMED METAL WALL PANELS, GENERAL

A. Install in accordance with metal wall panel manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws.

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Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.

3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide watertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Metallic-Coated Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

3.3 INSTALLATION OF LAP-SEAM METAL WALL PANELS

A. Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended in writing by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

B. Watertight Installation:

1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
3. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

3.4 INSTALLATION OF ACCESSORIES

A. Install accessories with positive anchorage to building and weathertight mounting and provide

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for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.

B. Flashing and Trim: Comply with performance requirements and panel manufacturer's written installation instructions. Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve watertight performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant concealed within joints.

3.5 INSTALLATION TOLERANCES

A. Shim and align metal wall panel units within installed tolerance of 1/4 inch in 20 ft., non-accumulative, on level, plumb, and location lines as indicated on Drawings, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel assembly, including accessories.

1. After testing, repair leaks, repeat tests, and make further repairs until wall panel assembly installation is watertight.

a. Cost of retesting is Contractor's responsibility.

B. Remove and replace metal wall panel assembly where tests and inspections indicate that it does not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, will be required to determine if replaced or additional work complies with specified requirements.

D. Prepare test and inspection reports.

3.7 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are

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installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of panel installation, clean finished surfaces as recommended in writing by metal wall panel manufacturer.

B. After installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

3.8 PROTECTION

A. Maintain metal wall panels in a clean condition during the remainder of construction.

B. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.13

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SECTION 074646 - FIBER-CEMENT SIDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fiber-cement siding.
2. Fiber-cement soffit.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood blocking.
2. Section 072500 "Weather Barriers" for weather-resistive barriers.

1.2 COORDINATION

A. Coordinate siding installation with flashings and other adjoining construction to ensure proper sequencing.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Fiber-cement siding.
2. Fiber-cement soffit.

B. Product Data Submittals: For each type of fiber-cement siding and soffit. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Samples for Initial Selection: For fiber-cement siding and soffit including related accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of fiber-cement siding and soffit.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fiber-cement siding.

C. Research/Evaluation Reports: For each type of fiber-cement siding required, from ICC-ES.

D. Sample Warranty: For special warranty.

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E. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

F. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of fiber-cement siding and soffit, including related accessories, to include in maintenance manuals.

B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish full lengths of fiber-cement siding and soffit including related accessories, in a quantity equal to 2 percent of amount installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with labels intact until time of use.

B. Store materials on elevated platforms, under cover, and in a dry location.

C. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

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a. Structural failures including cracking and deforming.
b. Deterioration of materials beyond normal weathering.

2. Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain products, including related accessories, from single source from single manufacturer.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 FIBER-CEMENT SIDING

A. Fiber-Cement Siding: ASTM C1186, Type A, Grade II, fiber-cement board, noncombustible when tested in accordance with ASTM E136; with a flame-spread index of 25 or less when tested in accordance with ASTM E84.

B. Labeling: Provide fiber-cement siding that is tested and labeled in accordance with ASTM C1186 by a qualified testing agency acceptable to authorities having jurisdiction.

C. Nominal Thickness: Not less than 5/16 inch (8 mm).

D. Panel Texture: 48-inch- (1200-mm-) wide sheets with wood-grain texture.

E. Finish:
1. Drawing Designation FC-1: Prefinished factory applied, oven baked finish.
a. Color: White.
2. Drawing Designation FC-2: Factory Priming: Manufacturer's standard acrylic primer.

2.4 FIBER-CEMENT SOFFIT

A. Fiber-Cement Soffit: ASTM C1186, Type A, Grade II, fiber-cement board, noncombustible when tested in accordance with ASTM E136; with a flame-spread index of 25 or less when tested in accordance with ASTM E84.

B. Nominal Thickness: Not less than 5/16 inch (8 mm).

C. Pattern: 16-inch- (400-mm-) wide sheets with wood-grain texture.

D. Ventilation: Provide perforated soffit unless otherwise indicated.

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E. Factory Priming: Manufacturer's standard acrylic primer.

2.5 ACCESSORIES

A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.

1. Provide accessories matching color and texture of adjacent siding unless otherwise indicated.

B. Decorative Accessories: Provide the following fiber-cement decorative accessories as indicated:

1. Battens: 2 ½ inch-(64-mm) wide x ¾ inch- (19-mm) deep
2. Fasciae.
3. Moldings and trim.

C. Flashing: Provide aluminum flashing complying with Section 076200 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.

1. Finish for Aluminum Flashing: Siliconized polyester coating or High-performance organic finish.

D. Fasteners:

1. For fastening to wood, use siding nails of sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate.
2. For fastening fiber cement, use hot-dip galvanized fasteners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of fiber-cement siding and soffit and related accessories.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

3.3 INSTALLATION

A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

1. Do not install damaged components.

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2. Install fasteners no more than 24 inches (600 mm) o.c.
3. Coat edges of any field cuts to seal the edges.
4. Touch up color where required.

B. Install joint sealants as specified in Section 079200 "Joint Sealants" and to produce a weathertight installation.

3.4 ADJUSTING AND CLEANING

A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.

B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 074646

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SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Manufactured units for the following applications:
   1. Roof-edge drainage systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of roof specialty.

   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples for Verification:

   1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
   2. Include roof-edge drainage systems made from 12-inch (300-mm) lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roof specialties.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

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C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

C. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.7 COORDINATION

A. Coordinate roof specialties with roofing system, exterior wall system, air barrier, flashing, trim, and construction of roof deck, roof and wall panels, and other adjoining work to provide a leakproof, weathertight, secure, and noncorrosive installation.

1. Performance Coordination: Coordinate with the Work of roofing and exterior wall Sections to ensure that roof specialties provided under the Work of this Section meet or exceed specified roofing and exterior wall design performance requirements.

B. Confirm and coordinate compatibility of materials and comply with warranty requirements of roofing system manufacturer.

C. Coordinate roof specialties layout and seams with sizes and locations of joints and seams in adjacent materials.

1.8 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finishes or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

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a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 > years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain roof specialties from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Roof specialties to withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 ROOF-EDGE DRAINAGE SYSTEMS

A. Gutters: Manufactured in uniform section lengths not exceeding 12 ft. (3.6 m), with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
1. Formed Aluminum Sheet: 0.040 inch (1.02 mm) thick.
2. Gutter Profile: Style Kin accordance with SMACNA's "Architectural Sheet Metal Manual."
3. Corners: Factory mitered and mechanically clinched and sealed watertight.
4. Gutter Supports: Gutter brackets with finish matching the gutters.

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5. Gutter Accessories: Continuous screened leaf guard with sheet metal frameand splash guards per manufacturer’s standards.

B. Downspouts: Corrugated rectangular complete with machine-crimped elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Formed Aluminum Sheet: 0.032 inch (0.81 mm) thick.
2. Size: As indicated on Drawings.

C. Finishes:

1. Aluminum: Two-coat fluoropolymer

a. Color: White.

2.5 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Roof specialty manufacturer's recommended fasteners, designed to meet performance requirements, suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
1. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
2. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

C. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

D. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

E. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine walls, roof edges for suitable conditions for roof specialties.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install roof specialties in accordance with manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of sealant.
3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of roof specialties is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

B. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 ft. (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise indicated on Drawings.
2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

C. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended in writing by fastener manufacturer to achieve maximum pull-out resistance.

D. Seal concealed joints with butyl sealant as required by roof specialty manufacturer.

E. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.3 INSTALLATION OF ROOF-EDGE DRAINAGE SYSTEMS

A. Install components to produce a complete roof-edge drainage system in accordance with manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.

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B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 24 inches (610 mm) apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
   1. Install continuous leaf guards on gutters with noncorrosive fasteners, removable for cleaning gutters.
   2. Install splash guards where indicated on drawings.

C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c.
   1. Connect downspouts to underground drainage system indicated.

3.4 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

B. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 077100

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SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Penetration firestopping systems for the following applications:

a. Penetrations in fire-resistance-rated walls.

B. Related Requirements:

1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.

1) UL in its "Fire Resistance Directory."

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.

1. Verify sealant has a VOC content of 250 g/L or less.
2. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Manufactured Piping Penetration Firestopping System: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
   1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
   2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
   3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
   4. Sleeve: Molded-PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
   5. Stack Fitting: ASTM A48/A48M, gray-iron, hubless-pattern wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
   6. Special Coating: Corrosion resistant on interior of fittings.

E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.

   1. Permanent forming/damming/backing materials.
   2. Substrate primers.
   3. Collars.
   4. Steel sleeves.

2.4 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.5 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Contractor will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.

B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing:

1. UL-Classified Systems: W-J- 1001-1999.
2. Type of Fill Materials: As required to achieve rating.

C. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing:

1. UL-Classified Systems: W-J- 2001-2999.
2. Type of Fill Materials: As required to achieve rating.

D. Penetration Firestopping Systems for Electrical Cables:

1. UL-Classified Systems: W-J 3001-3999.
2. Type of Fill Materials: As required to achieve rating.

E. Penetration Firestopping Systems for Cable Trays with Electric Cables:

1. UL-Classified Systems: W-J- 4001-4999.
2. Type of Fill Materials: As required to achieve rating.

F. Penetration Firestopping Systems for Insulated Pipes:

1. UL-Classified Systems: W-J- 5001-5999.
2. Type of Fill Materials: As required to achieve rating.

G. Penetration Firestopping Systems for Miscellaneous Electrical Penetrants:

1. UL-Classified Systems: W-J- 6001-6999.
2. Type of Fill Materials: As required to achieve rating.

H. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants:

1. UL-Classified Systems: W-J- 7001-7999.
2. Type of Fill Materials: As required to achieve rating.

I. Penetration Firestopping Systems for Groupings of Penetrants:

1. UL-Classified Systems: W-J- 8001-8999.
2. Type of Fill Materials: As required to achieve rating.

END OF SECTION 078413

SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls and horizontal assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approvals according to FM Approvals 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:

1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:

a. Joint firestopping systems shall bear classification marking of a qualified testing agency.

1) UL in its "Fire Resistance Directory."

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 JOINT FIRESTOPPING SYSTEMS

A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.
1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wallin which it is installed.

C. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.

1. Verify sealant has a VOC content of 250 g/L or less.
2. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Accessories: Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing joint firestopping systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

C. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:

1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Inspecting Agency: Contractor will engage a qualified testing agency to perform tests and inspections according to ASTM E2393.

B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.

C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN or Category XHDG.

B. Wall-to-Wall, Joint Firestopping Systems:

1. UL-Classified Systems: WW-D- 0000-0999.
2. Assembly Rating: 1 hour.
3. Nominal Joint Width: As indicated.

C. Floor-to-Wall, Joint Firestopping Systems:

1. UL-Classified Systems: FW-D- 0000-0999.
2. Assembly Rating: 1 hour.
3. Nominal Joint Width: As indicated.

D. Head-of-Wall, Fire-Resistive Joint Firestopping Systems:

1. UL-Classified Systems: HW-D- 0000-0999.
2. Intertek Group-Listed Systems: .
3. Assembly Rating: 1 hour.
4. Nominal Joint Width: As indicated.

E. Bottom-of-Wall, Joint Firestopping Systems:

1. UL-Classified Systems: BW-D- 0000-0999 1000-1999.
2. Assembly Rating: 1 hour.
3. Nominal Joint Width: As indicated.

END OF SECTION 078443

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Mildew-resistant joint sealants.
3. Latex joint sealants.

B. Related Requirements:
1. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Silicone joint sealants.
2. Mildew-resistant joint sealants.
3. Latex joint sealants.

B. Samples for Initial Selection: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

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1.4 CLOSEOUT SUBMITTALS

A. Manufacturers' special warranties.

B. Installer's special warranties.

C. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

D. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

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B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

B. Silicone, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

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B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

2.5 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

2.6 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

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1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces.
1. Joint Sealant: Silicone, S, NS, 100/50, NT.
2. Joint Locations:
   a. Joints between metal panels.
   b. Joints between different materials.

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c. Perimeter joints between materials and frames of doors, windows and louvers.
d. Other joints as indicated on Drawings.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Sealant: Silicone, S, NS, 100/50, T.
2. Joint Locations:
a. Bedding of thresholds in exterior doors.
b. Isolation joints in cast-in-place concrete slabs.
c. Other joints as indicated on Drawings.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Sealant: Acrylic Latex.
2. Joint Locations:
a. Perimeter joints between interior wall surfaces and frames of interior doors windows.
b. Other joints as indicated on Drawings.
3. Joint-Sealant Color: Paintable.

D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic and traffic surfaces.
1. Joint Sealant: Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT.
2. Joint Locations:
a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints.
c. Other joints as indicated on Drawings.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

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SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Acoustical joint sealants.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for elastomeric, and latex joint sealants for nonacoustical applications.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants, showing full range of available colors for each product exposed to view.

C. Acoustical Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Warranty Documentation:

1. Manufacturers' special warranties.
2. Installer's special warranties.

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B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained between 40 and 95 deg F (4 and 35 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.6 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 35 and 100 deg F (2 and 38 deg C)

1.7 WARRANTY

A. Installer's Special Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Manufacturer's Special Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 ACOUSTICAL JOINT SEALANTS

A. Acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies in accordance with ASTM E90.

B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
   1. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.3 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by acoustical joint-sealant manufacturer where required for adhesion of sealant to joint substrates.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.

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B. Joint Priming: Prime joint substrates where recommended by acoustical joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.

B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C919, ASTM C1193, and manufacturer's written instructions for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.

C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

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SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard exterior hollow metal doors and frames.
2. Standard interior hollow metal doors and frames.
3. Borrowed lite frames.

B. Related Requirements:

1. Section 087111 "Door Hardware (Descriptive Specification)" for door hardware for hollow metal doors.

1.2 COORDINATION

A. Coordinate installing anchors for hollow metal frames, including sleeves, concrete inserts, and anchor bolts.

B. Coordinate requirements for installing door hardware.

1.3 DEFINITIONS

A. Minimum Steel Sheet Thickness: Minimum thickness of base metal without coatings in accordance with ANSI/SDI A250.8.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, and finishes.
2. Include information indicating compliance with performance requirements indicated.

B. Shop Drawings:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and base-metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and base-metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each wall opening condition.
6. Details of frame anchors, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.

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C. Product Schedule: For hollow metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings used on the Drawings and in schedules. Coordinate with final door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

A. Field Quality-Control Reports: For hollow metal doors and frames.

B. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

C. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Documented as complying with requirements in NFPA 80.

B. Egress Door Inspector Qualifications: Documented as complying with requirements in NFPA 101.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic, canvas, or other material that can entrap moisture.

1. Provide additional protection to prevent damage to factory-applied color finishes.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

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D. Immediately remove and replace damaged or wet packaging or protective material.

E. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain hollow metal doors and frames from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Complying with requirements in NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicatedin schedules , based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

1. Temperature-Rise Limit:, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for Wind Zone **4**.

1. Basic Protection: Conduct large-missile testing on assemblies to be installed up to 30 ft. above grade and small-missile testing on assemblies to be installed at higher elevations.
2. Enhanced Protection: Conduct large-missile testing on assemblies regardless of installation elevation above grade.

C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.77 deg Btu/F x h x sq. ft. when tested in accordance with ASTM C1363 or ASTM E1423.

2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 STANDARD EXTERIOR HOLLOW METAL DOORS AND FRAMES

A. Exterior Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A. (This includes door 106B serving as Emergency Escape Opening for Storm Shelter)

1. Steel Sheet: Minimum A60 metallic coating.
2. Doors: 1-3/4 inches thick.

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a. Faces: Steel sheet; minimum 0.053-inch base-metal thickness.
b. Edge Construction: Model 2, Seamless .
c. Edge Bevel: Provide manufacturer's standard beveled or square edges.
d. End Closures: Steel sheet; minimum 0.042-inch base-metal thickness. Flush top channel sealed against water penetration and flush bottom channel with weep-hole openings to permit moisture to escape.
e. Cores: Manufacturer's standard.

3. Frames: Steel sheet; minimum 0.053-inch base-metal thickness.

a. Construction: Full-profile welded.

4. Exposed Finish: Prime painted.

2.5 STANDARD INTERIOR HOLLOW METAL DOORS AND FRAMES

A. Interior Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.

1. Steel Sheet: Uncoated.
2. Doors: 1-3/4 inches thick.

a. Faces: Steel sheet; minimum 0.053-inch base-metal thickness.
b. Edge Construction: Model 2, Seamless .
c. Edge Bevel: Provide manufacturer's standard beveled or square edges.
d. End Closures: Steel sheet; minimum 0.042-inch base-metal thickness. Flush top channel and flush bottom channel.
e. Cores: Manufacturer's standard .

3. Frames: Steel sheet; minimum 0.053-inch base-metal thickness.

a. Construction: Knocked down .
b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.

4. Exposed Finish: Prime painted .

B. Interior Maximum-Duty Doors and Frames: ANSI/SDI A250.8, Level 4; ANSI/SDI A250.4, Level A. Storm Shelter doors and frames. Doors 105 and 106.

1. Steel Sheet: Uncoated .
2. Doors: 1-3/4 inches thick.

a. Faces: Steel sheet; minimum 0.067-inch base-metal thickness.
b. Edge Construction: Model 2, Seamless.
c. Edge Bevel: Provide manufacturer's standard beveled or square edges.
d. End Closures: Flush top channel and bottom channel.
e. Cores: Manufacturer's standard .
f. Fire-Rated Cores: Manufacturer's standard core required for fire rating and temperature rise rating indicated. This is for door 105 only.

3. Frames: Steel sheet; minimum 0.067-inch base-metal thickness.

a. Construction: Full-profile welded.

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4. Exposed Finish: Prime painted.

2.6 BORROWED LITES

A. Borrowed Lite Frames:

1. Minimum Base-Metal Thickness: 0.053 inch .
2. Steel Sheet: Uncoated.
3. Construction: Knocked down.
4. Exposed Finish: Prime painted.

2.7 ACCESSORIES

A. Door Vision Lite Frames: Steel sheet matching door face material; minimum 0.032-inch base-metal thickness.

1. Profile: Flush type, with square stops.
2. Corner Construction: Butted and welded.
3. Fasteners: Countersunk.
4. Fixed-Stop Location: Secure (key) side of door.

B. Frame Anchors: ANSI/SDI 250.4; steel sheet; minimum base-metal thickness required by door and frame standard indicated.

1. Interior Locations: ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.
2. Exterior-Wall Anchors: ASTM A653/653M, A60 metallic coating.
3. Jamb Anchors: Of minimum size and type required by door and frame standard indicated, and suitable for performance level indicated.

    a. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor
4. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

2.8 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

C. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

D. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

E. Glazing: Comply with requirements in Section 088000 "Glazing."

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2.9 FABRICATION

A. Hollow Metal Frames:

1. Welded Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles, at each joint, fabricated from metal of same or greater thickness as frames.
2. Sidelite Frames: Provide closed tubular members with no visible face seams or joints fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

B. Hardware Preparation: Factory prepare hollow metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the door hardware required, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with ANSI/SDI A250.14 for preparing hollow metal doors and frames for hardware.

C. Door Vision Lite Frames:
1. Rabbets: Coordinate width between fixed and removable stops with glazing and installation types indicated.
2. Fastener Spacing: Not more than 9 inches o.c. and not more than 2 inches from each corner.

2.10 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Provide primer in accordance with 099114 Exterior Painting and 099124 Interior Painting for surfaces indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION OF STANDARD EXTERIOR HOLLOW METAL DOORS AND FRAMES

A. Install in accordance with ANSI/SDI A250.8 and ANSI/SDI A250.11.

B. Fire-Rated Hollow Metal Doors and Frames: Install in accordance with NFPA 80.

C. Install hollow metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

D. Mineral-Fiber Insulation: Solidly pack mineral-fiber insulation inside frames.

E. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow metal door and frame manufacturer's written instructions.

3.4 INSTALLATION OF STANDARD INTERIOR HOLLOW METAL DOORS AND FRAMES

A. Install in accordance with ANSI/SDI A250.8 and ANSI/SDI A250.11.

B. Fire-Rated Hollow Metal Doors and Frames: Install in accordance with NFPA 80.

C. Install hollow metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

D. Mineral-Fiber Insulation: Solidly pack mineral-fiber insulation inside frames.

E. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow metal door and frame manufacturer's written instructions.

3.5 INSTALLATION OF BORROWED LITE FRAMES

A. Install in accordance with ANSI/SDI A250.8 and ANSI/SDI A250.11.

B. Mineral-Fiber Insulation: Solidly pack mineral-fiber insulation inside frames.

C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow metal door and frame manufacturer's written instructions.

3.6 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform tests and inspections and to furnish reports to Architect.

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B. Fire-Rated Door Acceptance Testing: Test and inspect fire-rated doors in accordance with NFPA 80.

C. Egress-Door Acceptance Testing: Test and inspect egress doors in accordance with NFPA 101.

D. Storm Shelter Doors and Frames: Test and inspect Storm Shelter Doors as required by Chapter 8 of the 2020 Ohio Storm Shelter Code.

E. Repair or remove and replace installations where testing and inspections indicate noncompliance with specified requirements.

F. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

G. Inspection Report: Prepared and submitted in writing to Architect and Contractor within 24 hours after testing.

3.7 ADJUSTING

A. Remove and replace defective work, including frames that are warped, bowed, or otherwise defective.

B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

C. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint in accordance with manufacturer's written instructions.

END OF SECTION 081113

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SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core five-ply flush wood veneer-faced doors for transparent finish.
2. Light frames.

B. Related Requirements:
1. Section 088000 "Glazing" for glass view panels in flush wood doors.
2. Section 099300 "Staining and Transparent Finishing" for field finishing doors.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Solid-core five-ply flush wood veneer-faced doors for transparent finish.
2. Light frames and louvers.

B. Product Data Submittals: For each product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Factory-machining criteria.
5. Factory-finishing specifications.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, and swing.
2. Door elevations, dimension and locations of hardware, lite cutouts, and glazing thicknesses.
3. Dimensions and locations of blocking for hardware attachment.
4. Dimensions and locations of mortises and holes for hardware.
5. Clearances and undercuts.
6. Requirements for veneer matching.
7. Doors to be factory finished and application requirements.

D. Samples for Initial Selection: For factory-finished doors.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

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B. Sample Warranty: For special warranty.

C. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

D. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Special warranties.

B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

C. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

D. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

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C. Mark each door on bottom rail with opening number used on Shop Drawings.

D. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 FIELD CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.
2. Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during remainder of construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of veneer.
b. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.

2. Warranty also includes installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C or NFPA 252.

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2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 FLUSH WOOD DOORS AND FRAMES, GENERAL

A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

2.5 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Doors, Solid-Core Five-Ply Veneer-Faced :
   1. Performance Grade: ANSI/WDMA I.S. 1A Extra Heavy Duty.
   2. Architectural Woodwork Standards Quality Grade: Custom.
   3. Faces: Single-ply wood veneer not less than 1/50 inch (0.508 mm) thick.

      a. Species: Red oak.
      b. Cut: Rotary cut or Plain sliced (flat sliced)
      c. Match between Veneer Leaves: Book or Slip match.
      d. Assembly of Veneer Leaves on Door Faces: Running match.

   4. Core for Non-Fire-Rated Doors:

      a. ANSI A208.1, Grade LD-1 particleboard.

      b. Glued wood stave.
      c. WDMA I.S. 10 structural composite lumber.

         1) Screw Withdrawal, Door Face: 550 lbf (2440 N).
         2) Screw Withdrawal, Vertical Door Edge: 550 lbf (2440 N).

      d. Either glued wood stave or WDMA I.S. 10 structural composite lumber.

   5. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.

      a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.

2.6 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

   1. Wood Species: Same species as door faces.
   2. Profile: Manufacturer's standard shape.

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2.7 FABRICATION

A. Factory machine doors for hardware that is not surface applied.

1. Locate hardware to comply with DHI-WDHS-3.
2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.

B. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

2.8 FACTORY FINISHING (CONTRACTOR'S OPTION)

A. Comply with referenced quality standard for factory finishing.

1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
2. Finish faces, all four edges, edges of cutouts, and mortises.
3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

B. Factory finish doors.

C. Transparent Finish:

1. ANSI/WDMA I.S. 1A Grade: Custom.

a. TR-4 Conversion Varnish.
b. TR-6 Catalyzed Polyurethane.

2. Staining: As selected by Architect from manufacturer's full range.
3. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

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B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087111 "Door Hardware (Descriptive Specification)."

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3.2 mm in 2400 mm).

2. Install fire-rated doors and frames in accordance with NFPA 80.

D. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.

   a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.

2. Machine doors for hardware.
3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
4. Clearances:

   a. Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors.
   b. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
   c. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
   d. Comply with NFPA 80 for fire-rated doors.

5. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
6. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:
1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.

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2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

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SECTION 083613 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel sectional doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
2. For power-operated doors, include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

B. Shop Drawings: For each installation and for components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
4. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: For units with factory-applied finishes.

1. Include Samples of accessories involving color selection.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For manufacturer's warranty and finish warranty.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

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1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sectional doors to include in maintenance manuals.

B. Manufacturer's warranty.

C. Finish warranty.

D. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

E. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Failure of components or operators before reaching required number of operation cycles.
c. Faulty operation of hardware.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
e. Delamination of exterior or interior facing materials.

2. Warranty Period: Two years from date of Substantial Completion.

B. Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations: Obtain sectional doors from single source from single manufacturer.

1. Obtain operators and controls from sectional door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Provide sectional doors that comply with performance requirements specified without failure from defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components .

B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

1. Design Wind Load: As indicated on Drawings.
2. Testing: In accordance with ASTM E330/E330M .
3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.

a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of door width.
b. Deflection of horizontal track assembly shall not exceed 1/240 of door height.

4. Operability under Wind Load: Design sectional doors to remain operable under uniform pressure (velocity pressure) of 20 lbf/sq. ft. wind load, acting inward and outward.

C. Operation Cycles: Door components and operators capable of operating for not less than 10,000 operation cycles. One operation cycle is complete when door is opened from closed position to the open position and returned to closed position.

D. Air Infiltration: Maximum rate **of 0.4 cfm/sq. ft.** when tested in accordance with ASTM E283 or DASMA 105.

E. U-Value: 0.130 Btu/sq. ft. x h x deg F.

2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 SECTIONAL DOORS

A. Steel Sectional Doors: Provide sectional door formed with hinged sections and fabricated so that finished door assembly is rigid and aligned with tight hairline joints; is free of warp, twist, and deformation; and complies with requirements in DASMA 102.

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1. Basis-of-Design Product: Subject to compliance with requirements, provide Thermacore Model 591 insulated sectional steel door by Overhead Door Corporation or comparable product by one of the following:

    a. Amarr Company
    b. Arm-R-Lite Manufacturing Co., Inc.
    c. C.H.I. Overhead Doors, Inc.
    d. Clopay Building Products
    e. Fimbel Architectural Doors
    f. Haas Door; a Nofziger Company
    g. Hörmann LLC
    h. Martin Door Manufacturing
    i. Raynor Garage Doors
    j. Wayne Dalton; a division of Overhead Door Corporation
    k. Windsor Door
2. Steel Door Sections: ASTM A653/A653M, zinc-coated (galvanized), cold-rolled, commercial steel sheet with G60 zinc coating.
3. Door-Section Thickness: 1-5/8 inches .

    a. Section Faces:

        1) Thermal-Break Construction: Provide sections with continuous thermal-break construction separating the exterior and interior faces of door.
        2) Exterior Face: Fabricated from single sheets, not more than 24 inches high; with horizontal meeting edges rolled to continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove, weather- and pinch-resistant seals and reinforcing flange return.
        3) Steel Sheet Thickness: 0.015-inchnominal coated thickness.
        4) Surface: Manufacturer's standard, ribbed .

    b. Interior Face: Enclose insulation completely within steel exterior facing and interior facing material, with no exposed insulation. Provide the following interior-facing material:

        1) Matching exterior facing.
4. End Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inchnominal coated thickness and welded to door section.
5. Section Reinforcing: Horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.

    a. Bottom Section: Reinforce section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal (weatherseal) .
    b. Hardware Locations: Provide reinforcement for hardware attachment.

6. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard [CFC-free insulation of type indicated below:

    a. Board Insulation: Polystyrene or polyurethane , secured to exterior face sheet.
    b. Foamed-in-Place Insulation: Polyurethane, foamed in place to completely fill

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interior of section and pressure bonded to face sheets to prevent delamination under wind load.

c. Fire-Resistance Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, in accordance with ASTM E84.

B. Track: Manufacturer's standard, galvanized-steel, high-lift track system. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides.

1. Material: Galvanized steel, ASTM A653/A653M, minimum G60 zinc coating.
2. Size: As recommended in writing by manufacturer for door size, weight, track configuration and door clearances indicated on Drawings .
3. Track Reinforcement and Supports: Provide galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.

a. Vertical Track: Incline vertical track to ensure weathertight closure at jambs. Provide intermittent jamb brackets attached to track and wall.

b. Horizontal Track: Provide continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced attachments to overhead structural members.

C. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom topandjambs of door. Provide combination bottom weatherseal and sensor edge for bottom seal.

D. Windows: Manufacturer's standard window units of shape and size and in locations indicated on Drawings. Set glazing in vinyl, rubber, or neoprene glazing channel. Provide removable stops of same material as door-section frames. Provide the following glazing:

1. Clear Acrylic Plastic: 3 mm thick, transparent, smooth or polished, and formulated to be UV resistant. Provide double insulating units.

E. Hardware: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.

1. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch nominal coated thickness at each end stile and at each intermediate stile, in accordance with manufacturer's written recommendations for door size.

a. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible.

2. Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Match roller-tire diameter to track width.

a. Roller-Tire Material: Manufacturer's standard.

3. Push/Pull Handles: Equip each door with galvanized-steel lifting handles on each side of door, finished to match door.

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F. Locking Device:

1. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only.
2. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded deadbolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

    a. Lock Cylinders: Cylinders standard with manufacturer .
    b. Keying: Keyed to building keying system.
    c. Keys: Three for each cylinder.
3. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

G. Counterbalance Mechanism:

1. Torsion Spring: Adjustable-tension torsion springs complying with requirements of DASMA 102 for number of operation cycles indicated, mounted on torsion shaft.
2. Cable Drums and Shaft for Doors: Cast-aluminum cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised.

    a. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.
    b. Provide one additional midpoint bracket for shafts up to 16 ft. long and two additional brackets at one-third points to support shafts more than 16 ft. long unless closer spacing is recommended in writing by door manufacturer.

3. Cables: Galvanized-steel, multistrand, lifting cables with cable safety factor of at least 5 to 1.
4. Cable Safety Device: Include a spring-loaded steel or bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if lifting cable breaks.
5. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
6. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

H. Electric Door Operator: Electric door operator assembly of size and capacity recommended by door manufacturer for door and operation cycles specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA IA 10030; with NFPA 70, Class 2 control circuit, maximum 24 V ac or dc.
3. Safety: Listed in accordance with UL 325 by a qualified testing agency for commercial or industrial use ; moving parts of operator enclosed or guarded if exposed and mounted at 8 ft. or lower.
4. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day .
5. Operator Type: Manufacturer's standard for door requirements.

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6. Motor: Reversible-type with controller (disconnect switch) for interior, clean, and dry motor exposure. Use adjustable motor-mounting bases for belt-driven operators.

    a. Motor Size: As required to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor .
    b. Electrical Characteristics:

        1) Phase: Single phase .
        2) Volts: 115 V.

7. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
8. Obstruction Detection: Automatic external entrapment protection consisting of automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.

    a. Monitored Entrapment Protection: Electric sensor edge on bottom section designed to interface with door-operator control circuit to detect damage to or disconnection of sensor and complying with requirements in UL 325.
9. Control Station: Surface mounted, three-position (open, close, and stop) control.

    a. Operation: Push button interior and key exterior .
    b. Interior-Mounted Unit: Full-guarded, surface-mounted, [standard-duty, weatherproof-type, NEMA IA 10030, Type 4 enclosure.
    c. Exterior-Mounted Unit: Full-guarded, surface-mounted, standard-duty, weatherproof type, NEMA IA 10030, Type 4 enclosure.
    d. Features: Provide the following:

        1) Vehicle detection operation.

10. Emergency Manual Operation: Push-up type designed so required force for door operation does not exceed 25 lbf .
11. Emergency Operation Disconnect Device: Hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
12. Motor Removal: Design operator so motor can be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

I. Metal Finish: Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
    1. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.
        a. Color and GlossAs selected by Architect from manufacturer's full range.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF SECTIONAL DOORS

A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; in accordance with manufacturer's written instructions.

B. Tracks:

1. Fasten vertical track assembly to opening jambs and framing with fasteners spaced not more than 24 inches apart.
2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

C. Power-Operated Doors: Install[automatic garage doors openers in accordance with UL 325.

3.3 SYSTEM STARTUP

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks in accordance with manufacturer's written instructions.
2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.

D. Touchup Painting Galvanized Material: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A780/A780M.

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3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

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SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum-framed entrance and storefront systems.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Aluminum-framed entrance and storefront systems.

B. Product Data Submittals: For each product.

1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Operating characteristics, and furnished accessories.

C. Shop Drawings:

1. Plans, elevations, sections, full-size details, and attachments to other work.
2. Details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
3. Details of each type of vertical-to-horizontal intersection of aluminum-framed entrance and storefront systems, showing the following:

    a. Joinery, including concealed welds.
    b. Anchorage.
    c. Expansion provisions.
    d. Glazing.
    e. Flashing and drainage.

4. Connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
5.

D. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.

4. Glazing.
5. Flashing and drainage.

F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.3 INFORMATIONAL SUBMITTALS

A. Field Quality-Control Reports: For aluminum-framed entrance and storefront systems.

B. Sample Warranties: For aluminum-framed entrance and storefront systems.

C. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

D. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For aluminum-framed entrance and storefront systems.

B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
1. Entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.7 WARRANTY

A. Special Warranty: Manufacturer and Installer agree to repair or replace components of aluminum-framed entrance and storefront systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including but not limited to excessive deflection.
b. Faulty operation.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrance and storefront systems.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrance and storefront systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Aluminum-framed entrance and storefront systems to withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:

    a. Thermal stresses transferring to building structure.
    b. Glass breakage.
    c. Noise or vibration created by wind and thermal and structural movements.
    d. Loosening or weakening of fasteners, attachments, and other components.
    e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.

D. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

E. Water Penetration under Dynamic Pressure: Test in accordance with AAMA 501.1 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

F. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:

1. Thermal Transmittance (U-factor):

    a. Fixed Glazing and Framing Areas: U-factor for the system of not more than 0.57 Btu/sq. ft. x h x deg F (3.23 W/sq. m x K) as determined in accordance with NFRC 100.
    b. Entrance Doors: U-factor of not more than 0.63 Btu/sq. ft. x h x deg F (3.57 W/sq. m x K) as determined in accordance with NFRC 100.

2. Solar Heat-Gain Coefficient (SHGC):

a. Fixed Glazing and Framing Areas: SHGC for the system of not more than 0.38 as determined in accordance with NFRC 200.
b. Entrance Doors: SHGC of not more than 0.33 as determined in accordance with NFRC 200.

3. Condensation Resistance Factor (CRF):

a. Fixed Glazing and Framing Areas: CRF for the system of not less than 56 as determined in accordance with AAMA 1503.
b. Entrance Doors: CRF of not less than 56 as determined in accordance with AAMA 1503.

G. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.3 MANUFACTURERS

1. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Exterior Framing Construction: Thermally broken.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Front.
4. Finish: High-performance organic finish] [Superior-performance organic finish.
5. Fabrication Method: Field-fabricated stick system.
6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
7. Steel Reinforcement: As required by manufacturer.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch-(3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten

corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

2. Door Design: As indicated.
3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.

4. Finish: Match adjacent storefront framing finish.

2.5 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087111 "Door Hardware (Descriptive Specification)."

2.6 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

2.7 MATERIALS

A. Sheet and Plate: ASTM B209 (ASTM B209M).

B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221 (ASTM B221M).

C. Structural Profiles: ASTM B308/B308M.

D. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

2.8 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from **exterior** or interior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At interior and exterior doors, provide compression weather stripping at fixed stops.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
1. At exterior doors, provide weather sweeps applied to door bottoms.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.10 ALUMINUM FINISHES

A. High-Performance Organic Finish, Two-Coat PVDF: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.

1. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color and Gloss: [As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE AND STOREFRONT SYSTEMS

A. Comply with manufacturer's written instructions.

B. Do not install damaged components.

C. Fit joints to produce hairline joints free of burrs and distortion.

D. Rigidly secure nonmovement joints.

E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

F. Seal perimeter and other joints watertight unless otherwise indicated.

G. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.

H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

I. Install joint filler behind sealant as recommended by sealant manufacturer.

J. Install components plumb and true in alignment with established lines and grades.

K. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

L. Install entrance doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

M. Install glazing as specified in Section 088000 "Glazing."

3.3 ERECTION TOLERANCES

A. Install aluminum-framed entrance and storefront systems to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
2. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
3. Alignment:

    a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch (1.6 mm).
    b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
    c. Where surfaces are separated by reveal or protruding element of 1 inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).

4. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.

END OF SECTION 084113

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum windows. (Alternate)

2. Storm Shelter window. (Base Bid)

1.2 DEFINITIONS

A. Combination Assemblies: An assembly formed by a combination of two or more separate fenestration products whose frames are mulled together utilizing a combination mullion or reinforcing mullion.

B. Combination Mullions: A horizontal or vertical member formed by joining two or more individual fenestration units together without a mullion stiffener.

C. Reinforcing Mullions: A horizontal or vertical member with an added continuous mullion stiffener and joining two or more individual fenestration units along the sides of the mullion stiffener.

1.3 COORDINATION

A. Finish Matching: Coordinate all exposed exterior aluminum components and trim to ensure uniform and consistent color and appearance. Use products specified in this Section as a benchmark. Architect's decision will be final as to whether a proposed product matches.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes.

B. Shop Drawings:

1. Plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

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D. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

E. Delegated Design Submittals: For reinforcing mullions, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports:

B. Product Test Reports: For each aluminum window, for tests performed by qualified testing agency. \Sample warranties.

C. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

D. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Warranty Documentation:

1. Manufacturers' special warranties.

B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

B. Installer Qualifications: Authorized representative who is trained and approved by aluminum window manufacturer.

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1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver aluminum windows to Project site in original, unopened packages and store them in accordance with manufacturer's written instructions. Protect aluminum windows against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Handle aluminum windows in a manner that prevents damage before, during, and after installation.

C. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install aluminum windows outside of limits recommended in writing by manufacturer.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures, including excessive deflection, water leakage, condensation, and air infiltration.
c. Faulty operation of movable sash and hardware.
d. Deterioration of materials and finishes beyond normal weathering.
e. Failure of insulating glass.

2. Warranty Period:

a. Window: Two years from date of Substantial Completion.
b. Glazing Units: Five years from date of Substantial Completion.
c. Hardware: Three years from date of Substantial Completion.
d. Aluminum Finish: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain aluminum windows from single source from single manufacturer.

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2.2 PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: LC.
2. Minimum Performance Grade: 25.

C. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:

1. Thermal Transmittance (U-factor): As determined in accordance with NFRC 100:

   a. Fixed Windows: Not more than 0.34 Btu/sq. ft. x h x deg F (1.93 W/sq. m x K).
   b. Operable Windows: Not more than 0.36 Btu/sq. ft. x h x deg F (2.04 W/sq. m x K).

2. Solar Heat-Gain Coefficient (SHGC): As determined in accordance with NFRC 200:

   a. Fixed Windows: Not more than 0.30.
   b. Operable Windows: Not more than 0.30as determined in accordance with NFRC 200.

3. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance in accordance with AAMA 1503, showing a CRF of 45.

D. Thermal Movements: Provide aluminum windows, including anchorage, which allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C) ambient; 180 deg F (100 deg C) material surfaces.

E. Outdoor-Indoor Transmission Class (OITC): Rated for not less than 27/22 OITC when tested for laboratory sound transmission loss in accordance with ASTM E90 and determined by ASTM E1332.

F. AAMA 512-11 – Voluntary Specifications for Tornado Hazard Mitigation Fenestration Products.
1. Storm shelter window.

G. FEMA 361 - Design and Construction Guidelines For Community Safe Rooms
1. Storm shelter window.

H. ICC 500-2020 ICC/NSSA Standard for the Design and Construction of Storm Shelters
1. Storm shelter window.

I. Tornado Hazard Mitigating:
1. Test window in accordance with ICC 500-2020

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2. Window must be factory labeled and certified as ICC 500-2020 Compliant
3. Furnish windows capable of providing protection from winds as specified in ICC-500 Tornado Hazard Map
4. Furnish window that will resist 3-second 180 mph design wind speed and tornado missile speed of 100 mph (15-lb 2X4)
5. A “Pass” test as identified in ICC-500 Chapter 8. Missile did not perforate the glazing; The glazing remained attached to the glazing frame; Glass fragments or shards remained within the glazing unit.
6. Anchors, clips, stops and other accessories shall be provided to comply with AAMA 101.1.S.2 and AAMA 907. Provide units and anchorage mechanism with sufficient strength to withstand required design pressure and strength for specified load conditions.

2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 ALUMINUM WINDOWS

A. Manufacturers:
1. Capital Aluminum and Glass
2. Kawneer.
3. Efco.
4. Graham Architectural Products

B. Manufacturers: Storm Shelter Window:
1. Basis of Design: 3350 Series 3 ½” Heavy Commercial window by Winco or approved equal.

C. Provide manufacturer's standard aluminum window assemblies consisting of frames, sashes, glass, hardware, fasteners, and all components and accessories as required for a complete installation.

D. Operating Types: Provide the following operating types in locations indicated on Drawings:
1. Projected, awning.
2. Double hung.
3. Fixed.

E. Frames and Sashes: Aluminum extrusions of alloy, temper, and strength complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Thermally Broken Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

F. Insulating-Glass Units: ASTM E2190.

1. Glass: ASTM C1036, Type 1, Class 1, q3.

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a. Tint: Clear

2. Filling: Fill space between glass lites with air or argon.
3. Low-E Coating: Pyrolytic on second surface.

G. Glazing for Storm Shelter Window

1. Glass: Insulated Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
   a. Construction: Laminate glass with polyvinyl butyral interlayer, ionoplast interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.
2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
   a. Interlayer Color: Clear unless otherwise indicated.
   b. Tint: Clear.

H. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

I. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.

J. Window Hardware: projected.

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested in accordance with ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.

   a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.

2. Hinges: Non-friction type, not less than two per sash.
3. Lock: Lift-type throw, cam-action lock with keeper.
4. Limit Devices: Concealed friction adjustor, adjustable stay bar limit devices designed to restrict sash opening.

   a. Limit clear opening to 4 inches (100 mm) for ventilation; with custodial key release.

5. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches (1500 mm) above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches (1800 mm) above floor.

K. Hung Window Hardware:

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1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Tilt Latch: Releasing latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.

L. Weather Stripping: Provide manufacturer's standard full-perimeter weather stripping for each operable sash unless otherwise indicated.

M. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Avoid exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.5 ACCESSORIES

A. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.

B. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

C. Panning Trim: Profiles in sizes and configurations indicated on Drawings.

D. Nail Fins: Manufacturer's standard mounting flanges with holes pre-punched for mechanical fasteners.

2.6 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

1. Type and Location: Full, inside for projected, awning **F**ull, outside for double-hung sashes.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.

C. Aluminum Wire Fabric: 18-by-16 (1.1-by-1.3-mm) mesh of 0.011-inch- (0.28-mm-) diameter, coated aluminum wire.

1. Wire-Fabric Finish: Natural bright.

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2.7 FABRICATION

A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

B. Glaze aluminum windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

2.8 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA AMP 500 "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

A. Organic Coatings:

1. High-Performance Fluoropolymer Finish: Two coats complying with AAMA 2604, containing not less than [**50**] [**70**] percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

    a. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

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C. Examine wall flashings, vapor retarders, air and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain water passing joints and condensation to the exterior.

D. Separate aluminum from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

A. Storm Shelter Windows:
   1. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
      a. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Testing Services: Testing and inspection of installed windows as follows:
   1. Testing in accordance with ICC-500 2020.
   2. Test Reports: Prepared in accordance with AAMA 502.

C. Tests and Inspections:

   1. Windows will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

3.5 CLEANING AND PROTECTION

A. Clean exposed surfaces immediately after installing windows using manufacturer's written instructions. Avoid damaging finishes. Remove excess sealants, glazing materials, dirt, and other substances.

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B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately in accordance with manufacturer's written instructions.

END OF SECTION 085113

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SECTION 085200 - WOOD WINDOWS

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 fiberglass-clad wood windows.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for wood windows.

B. Shop Drawings: For wood windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples for Initial Selection: For units with factory-applied finishes.

1. Include Samples of hardware and accessories involving color selection.

D. Product Schedule: For wood windows. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of wood window, for tests performed by a qualified testing agency.

B. Sample Warranties: For manufacturer's warranties.

C. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

D. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act

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(BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An installer acceptable to wood window manufacturer for installation of units required for this Project.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace wood windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Failure to meet performance requirements.
    b. Structural failures including excessive deflection, water leakage, and air infiltration.
    c. Faulty operation of movable sash and hardware.
    d. Deterioration of materials and finishes beyond normal weathering.
    e. Failure of insulating glass.

    f. Window: 10 years from date of Substantial Completion.
    g. Glazing Units20 years from date of Substantial Completion.
    h. Fiberglass Cladding: 10 > years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wood windows from single source from single manufacturer.

B. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: [LC.
2. Minimum Performance Grade: 25.

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F (1.71 W/sq. m x K).

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.30.

E. Outside-Inside Transmission Class (OITC): Rated for not less than 27/22 OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.

2.3 WOOD WINDOWS

A. Fiberglass-Clad Wood Windows:

1. Basis of Design: A-Series by Andersen Corporation or a comparable product by one of the following manufacturers:
   a. Marvin Windows.
   b. Pella Windows.

B. Operating Types: Provide the following operating types in locations indicated on Drawings:
1. Awning: Project out.
2. Double hung.
3. Fixed.

C. Frames and Sashes: Fine-grained wood lumber complying with AAMA/WDMA/CSA 101/I.S.2/A440; kiln dried to a moisture content of not more than 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and

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surface checks larger than 1/32 inch (0.8 mm) deep by 2 inches (51 mm) wide; water-repellent preservative treated.

1. Exterior Finish: Fiberglass-clad wood.
   a. Exposed Unfinished Wood Surfaces: Manufacturer's standard paint-grade species.
   b. Color: As selected by Architect from manufacturer's full range.

2. Interior Finish: Manufacturer's standard color-coated finish .

   a. Exposed Unfinished Wood Surfaces: Manufacturer's standard species.
   b. Color: As selected by Architect from manufacturer's full range.

D. Insulating-Glass Units: ASTM E2190.

1. Glass: ASTM C1036, Type 1, Class 1, q3.

   a. Tint: Clear.

2. Lites: Two.
3. Low-E Coating: Manufacturer’s Standard.

E. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

F. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and FinishAs selected by Architect from manufacturer's full range.

G. Projected Window Hardware:

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.

   a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.

2. Hinges: Manufacturer's standard type for sash weight and size indicated.
3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to 29 inches (735 mm) tall and two arms on taller sashes.
4. Limit Devices: Concealed friction adjustor, adjustable stay bar limit devices designed to restrict sash opening.

   a. Limit clear opening to 4 inches (100 mm) for ventilation; with custodial key release.

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5. Operator Stud Cover: Matching operator handle finish. Provide in locations where operator handle is removed for controlled access.
6. Pole Operators: Tubular-shaped anodized aluminum; with rubber-capped lower end and standard push-pull hook at top to match hardware design; of sufficient length to operate window without reaching more than 60 inches (1500 mm) above floor; one pole operator and pole hanger per room that has operable windows more than 72 inches (1800 mm) above floor.

H. Hung Window Hardware:

1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
3. Tilt Hardware: Releasing tilt latch allows sash to pivot about horizontal axis to facilitate cleaning exterior surfaces from the interior.

I. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

J. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 ACCESSORIES

2.5 INSECT SCREENS

A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

1. Type and Location: Full, outside for double-hung sashes.

B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.

1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
2. Finish for Exterior Screens: Baked-on organic coating in color selected by Architect from manufacturer's full range.

C. Aluminum Wire Fabric: 18-by-16 (1.1-by-1.3-mm) mesh of 0.011-inch- (0.28-mm-) diameter, coated aluminum wire.

1. Wire-Fabric Finish: Natural bright.

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2.6 FABRICATION

A. Fabricate wood windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze wood windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

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C. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 085200

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SECTION 087111 - DOOR HARDWARE (DESCRIPTIVE SPECIFICATION)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hinges.
2. Continuous, gear-type hinges.
3. Bored locks.
4. Push-button combination locks.
5. Lock cylinders.
6. Key control cabinet.
7. Key lock boxes.
8. Operating trim.
9. Surface closers.
10. Wall-mounted stops.
11. Overhead stops and holders.
12. Door gasketing.
13. Thresholds.
14. Metal protective trim units.

B. Related Requirements:

1. Section 081113 "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.
2. Section 084113 "Aluminum-Framed Entrances and Storefronts" for additional entrance door hardware.
3. Section 123213 “Manufactured Wood Veneer Casework” for cabinet door hardware provided with casework.

1.2 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Keying Conference: Conduct conference at Project site.

1. Conference participants must include Installer's Architectural Hardware Consultant and Owner's security consultant.
2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system, including, but not limited to, the following:

a. Flow of traffic and degree of security required.
b. Preliminary key system schematic diagram.
c. Requirements for key control system.

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1.3 ACTION SUBMITTALS

A. Product Data:

1. Hinges.
2. Continuous, gear-type hinges.
3. Bored locks.
4. Push-button combination locks.
5. Lock cylinders.
6. Key control cabinet.
7. Key lock boxes.
8. Operating trim.
9. Surface closers.
10. Wall-mounted stops.
11. Overhead stops and holders.
12. Door gasketing.
13. Thresholds.
14. Metal protective trim units.
15. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Product Data Submittals: For each product.

C. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of product data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:

    a. Identification number, location, hand, fire rating, size, and material of each door and frame.
    b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
    c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
    d. Fastenings and other installation information.
    e. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
    f. Mounting locations for door hardware.
    g. List of related door devices specified in other Sections for each door and frame.

D. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

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1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

B. Field quality-control reports.

C. Sample Warranty: For special warranty.

D. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

E. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals.

B. Schedules: Final door hardware and keying schedule.

C. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

D. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
   1. Scheduling Responsibility: Preparation of door hardware and keying schedule.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as a Door and Hardware Specification Consultant (DHSC).

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1.7 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lockup for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

D. Deliver keys to Owner.

E. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
a. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of door hardware from single manufacturer.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

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2.3 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.

B. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC A117.1.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
2. Comply with the following maximum opening-force requirements:

    a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.

2.4 HINGES

A. Hinges: ANSI/BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

B. Antifriction-Bearing Hinges:

1. Mounting: Full mortise (butts).
2. Bearing Material: Ball bearing.
3. Grade 2 (standard weight).
4. Base and Pin Metal:

    a. Exterior Hinges: Stainless steel with stainless steel pin. NRP
    b. Interior Hinges: Brass with stainless steel pin body and brass protruding heads.

5. Pins: Nonrising loose unless otherwise indicated.

    a. Outswinging Exterior Doors: Nonremovable.

6.

2.5 CONTINUOUS HINGES

A. Continuous, Gear-Type Hinges: ANSI BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings. Minimum overall width of

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4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

1. Grade 1-150.
2. Mounting: Full surface, with removable continuous caps over fasteners.

2.6 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Backset: 2-3/4 inches (70 mm) unless otherwise indicated.

C. Lock Trim:

1. Description:
2. Levers: Wrought, Forged or Cast.
   a. Construction: Breakaway vandal resistant exterior doors only.

3. Escutcheons (Roses): Wrought, Forged or Cast.

D. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

E. Bored Locks: ANSI/BHMA A156.2, Grade 2, Series 4000.

2.7 AUXILIARY LOCKS

A. Push-Button Combination Locks: ANSI/BHMA A156.36, cylindrical, Grade 1; lock opens by entering a one- to five-digit code by pushing correct buttons in correct sequence; automatically relocks when door is closed; with strike that suits frame.

1. Auxiliary Lock Configuration: Deadbolt.
2. Override: By key cylinder.

2.8 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.

B. Standard Lock Cylinders: ANSI/BHMA A156.5, Grade 1 permanent cores; face finished to match lockset.

1. Core Type: Small format.
2. Number of Pins: Seven.
3. Lock Type: Mortise Rim all exterior doors and Bored-lock type.

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2.9 KEYING

A. Keying System: Factory registered, complying with guidelines in ANSI/BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.

1. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.

a. Provide three cylinder change keys and five each of master and grand master keys.

B. Keys: Nickel silver.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: "DO NOT DUPLICATE."

2.10 KEY CONTROL SYSTEM

A. Key Control Cabinet: ANSI/BHMA A156.28; metal cabinet with baked-enamel finish, containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.
1. Wall-Mounted Cabinet: Grade 1 cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

B. Key Lock Boxes: Designed for storage of two keys.

2.11 OPERATING TRIM

A. Operating Trim: ANSI/BHMA A156.6; aluminum unless otherwise indicated.

B. Offset Door Pulls: 1-inch (25-mm) constant-diameter pull.

1. Mounting: Back to back with threaded sleeves.
2. Offset: 2 inches (51 mm).
3. Minimum Clearance: 2-1/4 inches (57 mm) from face of door.
4. Overall Length: 9 inches (229 mm).

2.12 SURFACE CLOSERS

A. Surface Closers: ANSI/BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

B. Surface Closer with Cover: Grade 1; modern type with mechanism enclosed in cover.

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1. Mounting: Hinge side, Parallel arm and Bracket.
2. Type: Regular arm .
3. Backcheck: Factory preset and Adjustable, effective between 60 and 85 degrees of door opening.
4. Cover Material: Molded plastic.
5. Closing Power Adjustment: At least 50 percent more than minimum tested value.

2.13 MECHANICAL STOPS AND HOLDERS

A. Wall- Mounted Stops: ANSI/BHMA A156.16; polished cast-brass, -bronze, or -aluminum base metal.

B. Wall Bumpers: Grade 1; with rubber bumper; 2-1/2-inch (64-mm) diameter, minimum 3/4-inch (19-mm) projection from wall; with backplate for concealed fastener installation.

1. Bumper Configuration: Convex at upper dutch door and Concave elsewhere.

2.14 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops: ANSI/BHMA A156.8.

B. Overhead Surface-Mounted, Concealed Slide Stops: Type 2, Grade 1; release by push and pull of door unless control is set in inactive position; with stop, shock absorber, and adjustable holding pressure; for single-acting doors opening 110 degrees.

2.15 DOOR GASKETING

A. Door Gasketing: ANSI/BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

B. Maximum Air Leakage: When tested in accordance with ASTM E283/E283M with tested pressure differential of 0.3 inch wg (75 Pa), as follows:
1. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.

C. Adhesive-Backed Perimeter Gasketing: Vinyl bulb gasket material applied to frame rabbet with self-adhesive.

D. Door Sweeps: Neoprenegasket material held in place by flat housing or flange; surface mounted to face of door with screws.

1. Housing or Flange Material: Aluminum.

E. Automatic Door Bottoms: Sponge neoprene gasket material held in place by housing that automatically drops to form seal when door is closed; mounted to bottom edge of door with screws.

1. Housing Material: Aluminum.
2. Mounting: Surface applied to face of door.

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2.16 THRESHOLDS

A. Thresholds: ANSI/BHMA A156.21; fabricated to full width of opening indicated.

B. Saddle Thresholds:

1. Type: Fluted top, barrier free.
2. Base Metal: Aluminum.

2.17 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: ANSI/BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick aluminum; with manufacturer's standard machine or self-tapping screw fasteners.

B. Kick Plates: 8 inches (203 mm) high by door width with allowance for frame stops.

2.18 FABRICATION

A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and ANSI/BHMA A156.18.

B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended; however, aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

    a. Wood or Machine Screws: For the following:

        1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
        2) Strike plates to frames.
        3) Closers to doors and frames.

    b. Steel Through Bolts: For the following unless door blocking is provided:

        1) Surface hinges to doors.
        2) Closers to doors and frames.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.

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4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.19 FINISHES

A. Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.

B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's 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

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protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (760 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

E. Key Control System:

1. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
2. Key Lock Boxes: Install where indicated or approved by Architect to provide controlled access for fire and medical emergency personnel.

F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

G. Stops: Provide wall stops.

H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

3.4 FIELD QUALITY CONTROL

A. Independent Architectural Hardware Consultant: Engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.

1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

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B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant is to examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain door hardware.

3.9 DOOR HARDWARE SCHEDULE

1. See drawings

END OF SECTION 087111

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SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Glass products.
2. Insulating glass.
3. Glazing sealants.
4. Glazing tapes.
5. Miscellaneous glazing materials.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For glass.

B. Sample Warranties: For special warranties.

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C. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

D. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 QUALITY ASSURANCE

A. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved by primary glass manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

C. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

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1.10 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 5 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain glass from single source from single manufacturer.

B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

C. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:

1. Design Wind Pressures: As indicated on Drawings.

a. Wind Design Data: As indicated on Drawings.

2. Thermal Loads: Design glazing to resist thermal stress breakage induced by differential temperature conditions and limited air circulation within individual glass lites and insulated glazing units.

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C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6 mm thick of thickness indicated.
2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
3. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
4. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.
5. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm.

2.4 GLASS PRODUCTS

A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

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B. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Perimeter Spacer: Manufacturer's standard spacer material and construction.

3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

B. Neutral-Curing Silicone Glazing Sealant, Class 100/50: Complying with ASTM C920, Type S, Grade NS, Use NT.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

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1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks:
1. Type recommended in writing by sealant or glass manufacturer.

D. Spacers:
1. Type recommended in writing by sealant or glass manufacturer.

E. Edge Blocks:
1. Type recommended in writing by sealant or glass manufacturer.

F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

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2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch- (3-mm-) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

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I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

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D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

A. Clear Glass Type: Fully tempered float glass.

1. Minimum Thickness: 6 mm.
2. Safety glazing required.
3. Locations: interior doors and sidelights.

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3.9 INSULATING GLASS SCHEDULE

A. Low-E-Coated, Clear Insulating Glass Type:
   1. Overall Unit Thickness: 1 inch (25 mm).
   2. Minimum Thickness of Each Glass Lite: 6 mm.
   3. Outdoor Lite: Fully tempered float glass.
   4. Interspace Content: Air or Argon.
   5. Indoor Lite: Fully tempered float glass.
   6. Low-E Coating: Pyrolytic or sputtered on second or third surface.
   7. Safety glazing required.
   8. Locations: exterior doors and sidelights.

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SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.

B. Related Requirements:
1. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Gypsum wallboard.
2. Gypsum ceiling board.
3. Abuse-resistant gypsum board.
4. Interior trim.
5. Joint treatment materials.
6. Sound-attenuation blankets.
7. Acoustical sealant.

B. Shop Drawings: Show locations and installation of control joints, including plans, elevations, sections, details of components, and attachments to other work.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

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B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

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2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.5 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C1396/C1396M.
   1. Thickness: 5/8 inch (15.9 mm). Utilize1/2 inch (12.7 mm) for attic draftstopping (Contractor's Option).
   2. Long Edges: Tapered.

B. Gypsum Board, Type X: ASTM C1396/C1396M.
   1. Thickness: 5/8 inch (15.9 mm).
   2. Long Edges: Tapered.

C. Gypsum Ceiling Board: ASTM C1396/C1396M.
   1. Thickness: 1/2 inch (12.7 mm).
   2. Long Edges: Tapered.

D. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested in accordance with ASTM C1629/C1629M.
   1. Core: 5/8 inch (15.9 mm).
   2. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
   3. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
   4. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
   5. Long Edges: Tapered.
   6. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
   2. Shapes:

      a. Cornerbead.
      b. Expansion (control) joint.

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2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open jointsand damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

3. Fill Coat: For second coat, use [drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

D. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

F. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

G. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: hat shaped.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

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B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

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J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: Vertical surfaces unless otherwise indicated.
2. Type X: Where required for fire-resistance-rated assembly.
3. Ceiling Type: Ceiling surfaces]
    a. Utilize resilient channels for fiore rated ceiling assemblies.
4. Abuse-Resistant Type:On wall surfaces below 8’-0” above finish floor.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
    a. Fire-Resistance-Rated Assemblies: Wire tie resilient channels to supports.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing).

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws. See Shear Wall Schedule for fastening gypsum panels at shear wall.

3.4 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints in accordance with ASTM C840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.

3.5 FINISHING OF GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

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D. Gypsum Board Finish Levels: Finish panels to levels indicated below and in accordance with ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.

2. Level 5: At panel surfaces exposed to view.

    a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."

3. For Attic Draftstopping no finish is required.

3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

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SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glazed wall tile.
   2. Tile backing panels.
   3. Setting material.
   4. Grout materials.

B. Related Requirements:
   1. Section 079200 "Joint Sealants" for sealing of movement joints in tile surfaces.

1.2 DEFINITIONS

A. General: Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Face Size: Actual tile size, excluding spacer lugs.

C. Module Size: Actual tile size plus joint width indicated.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations, plans, and elevations, of each type of tile and tile pattern. Show widths, details, and locations of movement joints in tile substrates and finished tile surfaces.

C. Samples for Initial Selection: For tile, grout, and accessories involving color selection or shade variation.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

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1.5 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

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PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

2. Obtain setting and grouting materials, except for unmodified portland cement and aggregate, from single manufacturer.
3. Obtain underlayment from manufacturer of setting and grouting materials.
4. Obtain waterproof membrane, crack isolation, and other required membranes from manufacturer of setting and grouting materials.
5. Obtain joint sealants from manufacturer of setting and grouting materials.

B. Accessory Products: Obtain each of the following products specified in this Section from a single manufacturer:
1. Backer units.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard Grade requirements.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

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2.4 GLAZED WALL TILE

A. Glazed Wall Tile Type (CT1):

1. Module Size: 3 by 6 inches (76 by 152 mm).
2. Face Size Variation: Rectified.
3. Thickness: 5/16 inch (8 mm).
4. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
5. Grout Color: As selected by Architect from manufacturer's full range.
6. Mounting:
    a. Factory, back mounted.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
    a. Base for Thinset Mortar Installations: Straight, module size 6 by 6 inches (152 by 152 mm).
    b. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 3 by 6 inches (76 by 152 mm).
    c. External Corners for Thinset Mortar Installations: Surface bullnose; same size as adjoining flat tile.

B. Glazed Wall Tile Type (CT2):

1. Module Size: 4 1/4 by 4 1/4 inches (108 by 108 mm).
2. Face Size Variation: Rectified.
3. Thickness: 5/16 inch (8 mm).
4. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
5. Grout Color: As selected by Architect from manufacturer's full range.
6. Mounting:
    a. Factory, back mounted.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
    a. Base for Thinset Mortar Installations: Straight, module size 4-1/4 by 4-1/4 inches (108 by 108 mm).
    b. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 4-1/4 by 4-1/4 inches (108 by 108 mm).
    c. External Corners for Thinset Mortar Installations: Surface bullnose; same size as adjoining flat tile.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Gypsum Panel: ASTM C1658/C1658M, with fiberglass mat partially or completely embedded into the core.

1. Core: 5/8 inch (15.9 mm), abuse resistant.

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2. Long Edges: Tapered.
3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.

2.6 SETTING MATERIALS

A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.4.

2.7 GROUT MATERIALS

A. Standard Cement Grout: ANSI A118.6.

2.8 MISCELLANEOUS MATERIALS

A. Temporary Protective Coating: Formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products and easily removable after grouting is completed without damaging grout or tile.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

C. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

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B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.

B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

C. Substrate Flatness:

1. For tile shorter than 15 inches (381 mm), confirm that structure or substrate is limited to variation of 1/4 inch in 10 ft. (6.4 mm in 3 m) from the required plane, and no more than 1/16 inch in 12 inches (1.5 mm in 300 mm) when measured from tile surface high points.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM

A. Install tile backing panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

B. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

1. Add materials, water, and additives in accurate proportions.
2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

C. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
2. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
3. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

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4. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

    a. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets, so joints between sheets are not apparent in finished Work.
    b. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
    c. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

5. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

D. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

3.4 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile in accordance with tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.5 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

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3.6 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Wall Installations, Wood Studs:

1. TCNA W245: Thinset mortar on glass-mat, water-resistant gypsum backer board.

    a. Ceramic Tile Type: (CT1) and (CT2).
    b. Thinset Mortar: Modified dry-set mortar.
    c. Grout: Standard unsanded cement grout.
    d. Joint Width: 1/16 inch (1.6 mm).
    e. Movement Joints: at interior corners. 1/8" wide with joint sealant.

END OF SECTION 093013

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SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Acoustical panels.
2. Metal suspension system.
3. Metal edge moldings and trim.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Acoustical panels.
2. Metal suspension system.
3. Metal edge moldings and trim.

B. Samples for Initial Selection: For components with factory-applied finishes.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

B. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This

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documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 > percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

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2.3 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A in accordance with ASTM E1264.
2. Smoke-Developed Index: 450 or less.

2.4 ACOUSTICAL PANELS

A. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

B. Classification: Provide panels as follows:

1. Type and Form, Type III: Mineral base with painted finish; Form 2, water felted.
2. Pattern: Fine fissured.

C. Color: White.

D. Light Reflectance (LR): Not less than 0.85.

E. Ceiling Attenuation Class (CAC): Not less than 35.

F. Noise Reduction Coefficient (NRC): Not less than 0.70.

G. Edge/Joint Detail: Square.

H. Thickness:

1. 5/8 inch (15 mm).

I. Modular Size: 24 by 48 inches (610 by 1220 mm).

J. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.

2.5 METAL SUSPENSION SYSTEM

A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M and designated by type, structural classification, and finish indicated.

B. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 (Z90) coating designation; with prefinished 15/16-inch- (24-mm-) wide metal caps on flanges.

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1. Structural Classification: Intermediate-duty system.
2. End Condition of Cross Runners **butt-edge** type.
3. Face Design: Flat, flush.
4. Cap Material: Cold-rolled steel.
5. Cap Finish: Painted white.

2.6 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
   a. Corrosion Protection, Carbon Steel: Components zinc plated in accordance with ASTM B633, Class SC 1 (mild) service condition.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

   1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
   2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- (2.69-mm-) diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

F. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

2.7 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

   1. Edge moldings to fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.

2.8 ACOUSTICAL SEALANT

A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

A. Install acoustical panel ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

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6. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
7. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. Arrange directionally patterned acoustical panels as follows:

a. As indicated on reflected ceiling plans.

2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. Install impactclips in areas indicated; space in accordance with panel manufacturer's written instructions unless otherwise indicated.

a. Room 107 Gross Motor Room.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m) non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

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B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Thermoset-rubber base.
2. Rubber molding accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of product indicated.

C. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the

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domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than95 deg F (35 deg C).

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

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2.2 THERMOSET-RUBBER BASE

A. Product Standard: ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).

1. Style and Location:

a. Style A, Straight: Provide in areas with carpet.
b. Style B, Cove: Provide in areas with resilient floor coverings.

B. Thickness: 0.125 inch (3.2 mm).

C. Height: 4 inches (102 mm).

D. Lengths: Coils in manufacturer's standard length .

E. Outside Corners: Job formed or preformed.

F. Inside Corners: Job formed or preformed.

G. Colors: As selected from manufacturer's full range of colors.

2.3 RUBBER MOLDING ACCESSORY

A. Description: Rubber reducer strip for resilient floor covering.

B. Profile and Dimensions: As indicated.

C. Locations: Provide rubber molding accessories in areas indicated.

D. Colors and Patterns: As selected from manufacturer's full range of colors.

2.4 INSTALLATION MATERIALS

A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. 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.

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B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. Preformed Corners: Install preformed corners before installing straight pieces.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.

a. Miter or cope corners to minimize open joints.

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3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal 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.

END OF SECTION 096513

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SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid vinyl floor tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of resilient floor tile.

1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
2. Show details of special patterns.

C. Samples for Initial Selection: For each type of floor tile indicated.

D. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

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B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

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B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 SOLID VINYL FLOOR TILE

A. Manufacturers and Products:
1. Secoya 2.5 by Mohawk
2. Terrain II 3.0 Style 0892V by Shaw
3. Level Set Woodgrains 3.0 StyleC009 by Interface

B. Tile Standard: ASTM F1700.

1. Class: Class III, Printed Film Vinyl Tile.
2. Type: B, Embossed Surface.

C. Thickness:
1. 0.100 inch (2.5 mm) or 0.120 inch (3.0 mm).

D. Size:
1. 9 by 71 inches (229 by 1803 mm).

E. Colors and Patterns: As indicated by manufacturer's designations.

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2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. 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 floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F710.

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 floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 8 lb of water/1000 sq. ft. (3.63 kg of water/92.9 sq. m)in 24 hours.
    b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 90 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

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D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in pattern of colors and sizes indicated.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

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C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover floor tile until Substantial Completion.

END OF SECTION 096519

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SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Carpet tile.

B. Related Requirements:
1. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Shop Drawings: For carpet tile installation, showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of carpet tile.

1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

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B. Sample Warranties: For carpet tile.

C. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

D. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 10 full-size units.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

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1.7 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended in writing by carpet tile manufacturer.

1.8 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:

a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
b. Loss of tuft-bind strength.
c. Excess static discharge.
d. Delamination.
e. Dimensional instability.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 CARPET TILE CPTW

A. Manufacturer and Product
1. Defining Pace Tile by Mohawk
2. Welcome Tile Style 5T031 by Shaw
3. Step Repeat SR 899 by Interface

B. Color: As selected by Architect from manufacturer's full range.

C. Size: 24” square.

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D. Applied Treatments:

1. Soil-Resistance Treatment: Manufacturer's standard treatment.
2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:

a. Antimicrobial Activity: Not less than 2 mm halo of inhibition for gram-positive bacteria, not less than 1 mm halo of inhibition for gram-negative bacteria, and no fungal growth, in accordance with AATCC 174.

2.3 CARPET TILE CPT1

A. Manufacturer and Product
1. Explore D Tile BT609 by Mohawk
2. Embark Tile Style 5T040 by Shaw
3. Rock Springs by Interface

B. Color: As selected by Architect from manufacturer's full range.

C. Size: 24” square.

D. Applied Treatments:

1. Soil-Resistance Treatment: Manufacturer's standard treatment.
2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:

a. Antimicrobial Activity: Not less than 2 mm halo of inhibition for gram-positive bacteria, not less than 1 mm halo of inhibition for gram-negative bacteria, and no fungal growth, in accordance with AATCC 174.

2.4 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended in writing by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive types to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and that are recommended in writing by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

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B. Examine carpet tile for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft. (20 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m) in 24 hours.
b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum **75** percent relative humidity level measurement.
c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, in accordance with manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

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D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended in writing by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive and other surface blemishes using cleaner recommended in writing by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 13.7.

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

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SECTION 099114 - EXTERIOR PAINTING (MPI STANDARDS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Surface preparation and application of paint systems on the following exterior substrates:
   a. Fiber-cement board.
   b. Steel and iron.
   c. Galvanized metal.

B. Related Requirements:
1. Section 055000 "Metal Fabrications" for shop priming metal fabrications.

1.3 DEFINITIONS

A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include preparation requirements and application instructions.
2. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
3. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in the Exterior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

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1.5 INFORMATIONAL SUBMITTALS

A. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

B. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.9 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

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B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 PAINT PRODUCTS

A. MPI Standards: Provide products complying with MPI standards indicated and listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

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B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 INSTALLATION

A. Apply paints in accordance with manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in the Exterior Painting Schedule may be omitted on items that are factory primed if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

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3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
3. Allow empty paint cans to dry before disposal.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Fiber Cement Board Substrates:

1. Latex System MPI EXT 3.3L:
   a. Factory primed by Fiber Cement Board manufacturer.

   b. Intermediate Coat: Latex, exterior, matching topcoat.

   c. Semigloss Topcoat: Latex, exterior, semigloss (MPI Gloss Level 5), MPI #11.

B. Steel Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.1M:

   a. Acrylic Prime Coat: Primer, rust inhibitive, water based MPI #107.

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b. Shop Prime Coat: Shop primer specified in Section where substrate is specified.
c. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.

d. Gloss Topcoat: Light industrial coating, exterior, water based, gloss (MPI Gloss Level 6), MPI #164.

C. Galvanized-Metal Substrates:

1. Latex System MPI EXT 5.3A:

a. Cementitious Prime Coat: Primer, galvanized, cementitious, MPI #26.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Gloss Topcoat: Latex, exterior, gloss (MPI Gloss Level 6), MPI #119.

END OF SECTION 099114

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SECTION 099124 - INTERIOR PAINTING (MPI STANDARDS)

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 surface preparation and the application of paint systems on the following interior substrates:
   1. Steel.
   2. Wood.
   3. Gypsum board.

B. Related Requirements:
   1. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

B. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

C. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

   1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
   2. Indicate VOC content.

B. Samples for Initial Selection: For each type of topcoat product.

C. Product List: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

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1.5 INFORMATIONAL SUBMITTALS

A. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

B. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials**,** that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.9 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

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B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Wood: 15 percent.
2. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

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3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 INSTALLATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

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B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. Painting HVAC Work:

1. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry-Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Steel Substrates: Hollow metal doors and frames and other miscellaneous steel

1. Institutional Low-Odor/VOC Latex System, MPI INT 5.1S:

a. Prime Coat: Primer, rust inhibitive, water based MPI #107.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

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c. Topcoat: Latex, interior, institutional low odor/VOC, gloss (MPI Gloss Level 6), MPI #148.

B. Wood Substrates: Wood trim.

1. Institutional Low-Odor/VOC Latex System, MPI INT 6.3V:

a. Prime Coat: Primer, latex, for interior wood, MPI #39.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

c. Topcoat: Latex, interior, institutional low odor/VOC, semigloss (MPI Gloss Level 5), MPI #147.

C. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System, MPI INT 9.2M:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, flat (MPI Gloss Level 1), MPI #143.
1) Use bulkheads at ceiling.

d. Topcoat: Latex, interior, institutional low odor/VOC, semigloss (MPI Gloss Level 5), MPI #147.

END OF SECTION 099124

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SECTION 099300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood stains.
   2. Transparent finishes.
   3. This is an option to factory finishing the wood flush doors.

1.2 ACTION SUBMITTALS

A. Product Data:

   1. For each type of product.
   2. Include preparation requirements and application instructions.
   3. Indicate VOC content.

B. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

C. Product List: Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This

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documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Stains and Transparent Finishes: 5percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply finishes when relative humidity exceeds 85 percent, at temperatures of less than 5 deg F (3 deg C) above the dew point, or to damp or wet surfaces.

C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 SOURCE LIMITATIONS

A. Source Limitations: Obtain each coating product from single source from single manufacturer.

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2.3 MATERIALS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

B. Stain Colors: As selected by Architect from manufacturer's full range.

2.4 WOOD STAINS

A. Stain, Interior, Semitransparent, for Interior Wood: Solvent-based, oil or oil/alkyd, semitransparent, pigmented stain for new interior wood surfaces that are to be finished with a clear varnish.

2.5 TRANSPARENT FINISHES

A. Varnish, Interior, Polyurethane, Oil Modified, Satin: Solvent-based, one-component, oil-modified polyurethane clear satin varnish for new or previously varnished or stained interior wood surfaces.
1. Gloss and Sheen Level: Manufacturer's standard low-sheen finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with finish application only after unsatisfactory conditions have been corrected.

1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

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1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

B. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.

1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

C. Interior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Apply wood filler paste to open-grain woods to produce smooth, glasslike finish.
3. Sand surfaces exposed to view and dust off.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dry.

3.3 APPLICATION

A. Apply finishes according to manufacturer's written instructions.

1. Use applicators and techniques suited for finish and substrate indicated.
2. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE

A. Wood Substrates, Wood Trim, Doors (Contractor’s Option):

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1. Polyurethane Varnish over Stain System:

    a. Stain Coat: Stain, semitransparent, for interior wood.
    b. First Intermediate Coat: Polyurethane varnish matching topcoat.
    c. Second Intermediate Coat: Polyurethane varnish matching topcoat.
    d. Topcoat: Varnish, interior, polyurethane, oil modified, satin.

END OF SECTION 099300

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SECTION 101400 – SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following types of signs:
   1. Panel signs.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 1 Section “Temporary Facilities” for temporary identification signs.

1.3 ACTION SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.

C. Shop drawings showing fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details.

D. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.
   1. Samples for initial selection of color, pattern, and texture:
      a. Cast Acrylic Sheet and Plastic Laminate: Manufacturer's color charts consisting of actual sections of material including the full range of colors available for each material required.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 QUALITY ASSURANCE

A. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.

B. Single-Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.

C. Signage shall be provided to conform with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and State and local Regulations. These requirements supersede Technical Specifications in this Section.

1.7 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.8 PROJECT CONDITIONS

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 MATERIALS

A. Cast Acrylic Sheet: Provide cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet, in sizes and thickness indicated, with a minimum flexural strength of 16,000 psi when tested according to ASTM D 790, with a minimum allowable continuous service temperature of 176 deg F (80 deg C), and of the following general types:
   1. Thickness: 1/8 inch.
   2. Colors: Letters and background colors as selected by Architect from all "Pantone" colors.

B. Fasteners: Used concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface. Adhesive mounting is not acceptable.

C. Anchors and Inserts: Use nonferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts as required, to be set into concrete or masonry work.

D. Colored Coatings for Acrylic Plastic Sheet: Use colored coatings, including inks and paints for copy and background colors, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are non-fading for the application intended.

2.3 PANEL SIGNS

A. General:
   1. Graphic Process: Raised letters and Braille shall be formed as an integral part of the sign face using manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Surface applied letters and Braille are not allowed. All letters, numbers, and/or symbols shall contract with background either light characters on a dark background or dark characters on a light background. Characters and background shall have matte finish.
      a. Graphic Content and Style: Provide sign copy that complies with requirements indicated for size, style, spacing, content, mounting height and location, material, finishes, and color of signage.
   2. Letters and numbers shall have width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10. letters and numbers shall be raised 1/32 inch, uppercase, sans serif or simple sans serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be 5/8 inch high minimum and 2 inches high maximum. Equivalent written description must be placed directly below pictogram. Pictogram can be any size within a minimum field of 6 inches in height. Produce precisely formed characters with square cut edges free from burrs and cut marks.
   3. Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to comply with the following requirements:
      a. Edge Condition: Eased.
      b. Corner Condition: Rounded to a 3/8-inch radius, unless otherwise noted.
   4. Include a solid backer, 1/8-inch thick, of acrylic sheet for all signs occurring on glass sidelights. Color shall match sign background color.
   5. Material: Cast acrylic sheet.
   6. At appropriate locations, signs shall incorporate a clear area capable of displaying 2 lines of interchangeable text printed on plain paper and inserted into the sign. [Refer to Style E below.]
   7. Ease sign edge and radius corners 3/8 inch.
   8. Provide manufacturers standard size sign for each type of sign meeting all criteria listed.

9. Verify all signage locations with Owner and Architect prior to installation.
10. Interior Room Name and Number Signs:
    a. Layout of room name and number shall be as directed by the Architect.
    b. Number of signs required:
        1) Doors off halls, corridors, and passages.
        2) All spaces and doorways listed in Room Signage/Occupant Load Data Schedule.
    c. Provide signs with clear acrylic nameplate where indicated on Signage Styles.

B. Signage Styles:

Style A
Room Number Plates:
2 1/4" x 6 3/4"
Background color as selected by Architect with white copy.
Copy centered horizontally on plate.
1" tactile numerals.
San Serif or Simple San Serif / ALL CAPS.
Braille centered below numerals.
Letter baseline at 1 1/2" from top of plate.

Style B
Accessible Restroom Signs
6 3/4 "x 6 3/4" with tactile symbols centered on plate. Provide similar symbol for unisex restrooms.

Style C
Maximum Occupant Load:
4" high x 8" wide
Text: "Maximum Capacity: #"
Use Number in Occupant Load Column
Text Size: 1" High
Color: White text on background selected by architect from manufacturer's full range.

Style D:
Tactile Exit Sign
Tactile Exit Sign (Vertical): 8” high x 1.75” wide
Substrate: Aluminum and Hollow Metal Door Frame (2” wide jamb)
Text: EXIT
Raised Braille type face
Color: White text on background as selected by Architect from manufacturer’s full range.

Style DIS:
Storm Shelter Design Information Signage
4” high x 8” wide
Text:
“Design Occupancy Capacity: 29”
“Tornado”
“Design Wind Speed: 250 MPH”
“Governing Codes: 2020 Ohio Storm Shelter Code and 2020 ICC 500”
“Builder:” <Contractor’s Name>
Raised Braille type face
Color: White text on background as selected by Architect from manufacturer’s full range.

Style DS:
Storm Shelter Directional Signage
8” high x 8” wide
Text: Floor plan of building with path of travel indicated.
Raised Braille type face
Color: White text on background as selected by Architect from manufacturer’s full range.

Style PS:
Storm Shelter Perimeter Signage
4” high x 8” wide
Text: “Notice: Now leaving the Tornado Shelter”
Raised Braille type face
Color: White text on background as selected by Architect from manufacturer’s full range.

Style ESS:
Storm Shelter Entry signage
Size: 10” high x 7” wide
Text: “Tornado Shelter” with tornado symbol
Raised Braille type face
Color: White text on background as selected by Architect from manufacturer’s full range.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
   1. Use concealed fasteners and anchors unless indicated to be exposed.
   2. Sign Mounting Fasteners:

a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

B. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
4. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
5. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
1. Install signs level, plumb, and at the height indicated and complying with ADAAG, with sign surfaces free from distortion or other defects in appearance.

B. Panel Signs (Wall Mounted): Attach signs to wall surfaces using the methods indicated below:

1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.
2. Silicone-Adhesive Mounting: Use liquid silicone adhesive recommended by the sign manufacturer to attach sign units to irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign in place until the adhesive has fully cured.
3. Mounting Locations:
    a. Mount all signs on wall adjacent to frame on the lockset side of door, unless noted. Provide signage at consistent height throughout the building complying with ADA requirements.
    b. Verify location with Architect in field for conditions that vary from above.

3.2 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION 101400

SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-plastic toilet compartments.

B. Related Requirements:
1. Section 061000 "Rough Carpentry" for blocking.

1.2 COORDINATION

A. Coordinate requirements for blocking, reinforcing, and other supports concealed within wall to ensure that toilet compartments can be supported and installed as indicated.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Solid-plastic toilet compartments:

a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of centerlines of toilet fixtures.
3. Show locations of floor drains.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of toilet compartment.

1. Include Samples of hardware and accessories involving material and color selection.

D. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

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B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For toilet compartments.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

1.7 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain plastic toilet compartments from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.

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2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 SOLID-PLASTIC TOILET COMPARTMENTS

A. Toilet-Screen Style: Overhead braced.

B. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) material, not less than 1 inch (25 mm) thick, seamless, with eased edges, and with homogenous color throughout thickness of material.

1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
2. Heat-Sink Strip: Manufacturer's continuous, extruded-aluminum or stainless steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
3. Color: One color in each room as selected by Architect from manufacturer's full range.

C. Pilaster Shoes: Manufacturer's standard design; solid plastic or stainless steel.

1. Plastic Color: Matching pilaster.

D. Pilaster Sleeves (Caps): Manufacturer's standard design; solid plastic or stainless steel.

1. Plastic Color: Matching pilaster.

E. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets, stainless steel.

2.5 HARDWARE AND ACCESSORIES

A. Door Hardware and Accessories: Manufacturer's operating hardware and accessories. Mount with through bolts.

1. Hinges:

a. Manufacturer's integral hinge for solid-plastic doors, allowing emergency access by lifting door.

1) Material, Integral Hinge: Nylon gravity cam unit with stainless steel pins/screws.

2. Latch and Keeper: Manufacturer's surface-mounted latch unit, designed for emergency access, and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible.

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a. Material: Manufacturer's standard.

3. Coat Hook: Manufacturer's combination hook and rubber-tipped bumper.

a. Material: Manufacturer's standard.

4. Door Bumper: Manufacturer's rubber-tipped bumper at outswinging doors.

a. Material: Manufacturer's standard.

5. Door Pull: Manufacturer's unit at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible.

a. Material: Manufacturer's standard.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.6 MATERIALS

A. Aluminum Castings: ASTM B26/B26M.

B. Aluminum Extrusions: ASTM B221 (ASTM B221M).

C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.

D. Stainless Steel Castings: ASTM A743/A743M.

2.7 FABRICATION

A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Door Size and Swings: Provide 36-inch- (914-mm-) wide, outswinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for toilet enclosures designated as accessible.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels or Screens: 1/2 inch (13 mm).
b. Panels or Screens and Walls: 1 inch (25 mm).

2. Stirrup Brackets: Secure panels or screens to walls and to pilasters with no fewer than two brackets attached near top and bottom of panel or screen.

a. Locate wall brackets, so holes for wall anchors occur in tile joints.
b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to pilaster and to adjacent wall with no fewer than two fasteners.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors to return doors to fully closed position.

END OF SECTION 102113.19

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SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Corner guards.

B. Related Requirements:
   1. Section 087111 "Door Hardware (Descriptive Specification)" for metal protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

   1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.

B. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

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1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, 48-inch- (1200-mm-) long units.
2. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store wall protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
2. Keep plastic materials out of direct sunlight.
3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).

    a. Store corner-guard covers in a vertical position.
4. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

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a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

2.3 CORNER GUARDS

A. Surface-Mounted, Plastic-Cover Corner Guards: Manufacturer's standard assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.
1. Cover: Extruded rigid plastic, minimum 0.078-inch (2.0-mm) wall thickness; as follows:
a. Profile: Nominal 2-inch- (50-mm-) long leg and 1/4-inch (6-mm) corner radius.
b. Height: 4 feet (1.2 m).
c. Color and Texture: As selected by Architect from manufacturer's full range.
2. Retainer Clips: Manufacturer's standard impact-absorbing clips.
3. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

2.4 MATERIALS

A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.

B. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

C. Adhesive: As recommended by protection product manufacturer.

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2.5 FABRICATION

A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine walls to which wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

1. For wall protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall protection.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

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3.3 INSTALLATION

A. Installation Quality: Install wall protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

B. Mounting Heights: Install wall protection in locations and at mounting heights indicated on Drawings.

C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.

1. Provide anchoring devices and suitable locations to withstand imposed loads.
2. Adjust top caps as required to ensure tight seams.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

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SECTION 102800 - TOILET BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Custodial accessories.

1.2 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Public-use washroom accessories.
2. Custodial accessories.

B. Product Data Submittals: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

C. Samples: For each exposed product and for each finish specified, color charts.

D. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

E. Delegated Design Submittals: For grab bars.

1. Include structural design calculations indicating compliance with specified structural-performance requirements.

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1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranties.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.6 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials:
1. Paper towel dispensers

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2. Soap dispensers
3. Toilet paper dispensers.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf (1112 N) concentrated load applied in any direction and at any point.

2.3 MANUFACTURERS

1. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain **e**ach type of public-use washroom accessory from single source from single manufacturer.

B. Grab Bar:
1. Mounting: Flanges with concealed fasteners.
2. Material: Stainless steel, 0.05 inch (1.3 mm) thick.

a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin).

3. OD: 1-1/4 inches (32 mm).
4. Configuration and Length: As indicated on Drawings.

C. Sanitary-Napkin Disposal Unit :
1. Mounting: Surface mounted.
2. Door or Cover: Self-closing, disposal-opening cover.
3. Receptacle: Removable.
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

D. Mirror Unit :
1. Frame: Stainless steel angle, 0.05 inch (1.3 mm) thick.

a. Corners: Manufacturer's standard.

2. Size: As indicated on Drawings.

3. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

E. Hook (RH):
1. Description: Double-prong unit.
2. Mounting: Concealed.

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3. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.5 CUSTODIAL ACCESSORIES

A. Custodial Mop and Broom Holder:
1. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
2. Length: 36 inches (914 mm).
3. Hooks: Four.
4. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

a. Shelf: Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel.
b. Rod: Approximately 1/4-inch- (6-mm-) diameter stainless steel.

2.6 MATERIALS

A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch- (0.8-mm-) minimum nominal thickness unless otherwise indicated.

B. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.

C. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.7 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

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B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

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SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguisher.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing semirecessed, and relationships of box and trim to surrounding construction.

B. Samples for Initial Selection: For each type of exposed finish required.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

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C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

1.6 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.3 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.4 FIRE-PROTECTION CABINET (FEC)

A. Fire-Protection Cabinet Type: Suitable for fire extinguisher.

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Cold-rolled steel sheet.

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D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.

E. Cabinet Trim Material: Same material and finish as door.

F. Door Material: Steel sheet.

G. Door Style: Fully glazed, frameless, backless, acrylic panel.

H. Door Glazing: Acrylic sheet.

1. Acrylic Sheet Color:

a. Clear transparent acrylic sheet.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet door.
2) Application Process: Pressure-sensitive vinyl letters.
3) Lettering Color: Red.
4) Orientation: Vertical.

K. Materials:

1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.

a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
c. Color: White.
2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

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2.5 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Miter corners and grind smooth.
3. Provide factory-drilled mounting holes.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames and grind smooth.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

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3.3 INSTALLATION OF FIRE-PROTECTION CABINETS

A. General: Install fire-protection cabinets in locations and at mounting heights indicated

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification:

1. Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

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SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers.

B. Related Requirements:

1. Section 104413 "Fire Protection Cabinets."

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

B. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

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1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
   1. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
   2. Valves: Manufacturer's standard.
   3. Handles and Levers: Manufacturer's standard.
   4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 3-A:40-B:C, 5-lb (2.3-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

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SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated, single-roller shades.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples for Initial Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.

D. Product Schedule: For roller shades.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

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B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain roller shades from single source from single manufacturer.

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2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 MANUALLY OPERATED, SINGLE-ROLLER SHADES

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: Manufacturer's standard.

    a. Loop Length: Full length of roller shade.
    b. Limit Stops: Provide upper and lower ball stops.
    c. Chain-Retainer Type: RS1-Chain tensioner, jamb mounted typical. RS2-Chain tensioner, wall mounted at 60” above finish floor where indicated.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: Right side of interior face of shade.
2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
3. Shadeband-to-Roller Attachment: Manufacturer's standard method.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

E. Shadebands:

1. Shadeband Material: Light-blocking fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

    a. Type: Enclosed in sealed pocket of shadeband material.
    b. Color and Finish: As selected by Architect from manufacturer's full range.

F. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.

    a. Shape: L-shaped.
    b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches (102 mm) .

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2. Endcap Covers: To cover exposed endcaps.
3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.4 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.

1. Source: Roller shade manufacturer.
2. Type: PVC-coated fiberglass with bonded PVC film.
3. Orientation on Shadeband: Up the bolt.
4. Color: As selected by Architect from manufacturer's full range.

2.5 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. RS1: Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch (6 mm) per side or 1/2-inch (13-mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
2. RS2: Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
   a. Provide shades 2” minimum larger on each side of jamb.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.

B. Roller Shade Locations: At exterior windows.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 122413

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SECTION 123213 - MANUFACTURED WOOD-VENEER-FACED CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood-veneer-faced casework.
2. Hardware and accessories.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood blocking for anchoring casework.
2. Section 096513 "Resilient Base and Accessories" for resilient base applied to wood-veneer-faced casework.

1.2 DEFINITIONS

A. Definitions in the AWI/AWMAC/WI's "Architectural Woodwork Standards" apply to the Work of this Section.

1.3 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Wood-veneer-faced casework.
2. Hardware and accessories.

B. Shop Drawings: For wood-veneer-faced casework.

1. Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
2. Indicate types and sizes of casework.
3. Indicate manufacturer's catalog numbers for casework.
4. Show fabrication details, including types and locations of hardware.
5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and equipment.
6. Apply AWI's Quality Certification Program label to Shop Drawings.

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C. Keying Schedule: Include schematic keying diagram, and index each key set to unique designations that are coordinated with the Contract Documents.

D. Samples for Initial Selection: For casework and hardware finishes.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

B. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

C. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.6 CLOSEOUT SUBMITTALS

A. Quality Standard Compliance Certificates: AWI's Quality Certification Program certificates.

B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish complete touchup kit for each casework finish provided. Include fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged casework finish.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

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B. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during remainder of construction period. Maintain temperature and relative humidity during remainder of construction period in range recommended for Project location by the AWI/AWMAC/WI's "Architectural Woodwork Standards."

B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

C. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before enclosing them, and indicate measurements on Shop Drawings.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Delamination of components or other failures of glue bond.
b. Warping of components.
c. Failure of operating hardware.
d. Deterioration of finishes.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR CASEWORK

A. Quality Standard: Unless otherwise indicated, comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards" for grades of casework indicated for construction, finishes, installation, and other requirements.

1. Grade: Custom.
2. Provide labels and certificates from AWI certification program indicating that casework complies with requirements of grades specified.

a. This Project has been registered with AWI as AWI's Quality Certification Program Number .

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b. Contractor to register the Work under this Section with the AWI Quality Certification Program at www.awiqcp.org or by calling 855-345-0991.

B. Product Designations:

1. Drawings indicate sizes, configurations, and finish materials of manufactured wood-veneer-faced casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes and door and drawer configurations, of same finish materials, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."
2. Drawings indicate configurations of manufactured wood-veneer-faced casework by referencing designations of Casework Design Series numbering system in the Appendix of the AWI/AWMAC/WI's "Architectural Woodwork Standards."

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.3 WOOD-VENEER-FACED CASEWORK

A. Source Limitations: Obtain from single source from single manufacturer.

B. Design: Face-frame cabinet construction with the following door and drawer-front style:

C. Flush overlay.Wood Species: Red oak>.

1. Wood Stain Colors and Finishes: As selected by Architect from casework manufacturer's full range.

D. Face Veneer Cut: Plain sliced.

E. Veneer Matching:

1. None required; select and arrange veneers for compatible grain and color.

F. Grain Direction:

1. Doors: Vertical with continuous vertical matching.
2. Drawer Fronts: Horizontal.
3. Face Frame Members: Lengthwise.
4. End Panels: Vertical.
5. Bottoms and Tops of Units: Side to side.
6. Knee Space Panels: Vertical.
7. Aprons: Horizontal.

G. Exposed Materials:

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1. Plywood: Hardwood plywood with face veneer of species indicated, selected for compatible color and grain. Provide backs of same species as faces.
2. Solid Wood: Clear hardwood lumber of species indicated and selected for grain and color compatible with exposed plywood.
3. Edgebanding: Wood veneer of same species as face veneer.

H. Semiexposed Materials:

1. Wood: Provide solid wood or hardwood plywood for semiexposed surfaces unless otherwise indicated.

    a. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects, of same species as exposed wood.
    b. Plywood: Hardwood plywood of same species as exposed wood. Provide backs of same species as faces.

2. Thermally Fused Laminate (TFL) Panels: Provide thermally fused laminate panels for semiexposed surfaces, except provide solid wood or hardwood plywood for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.

    a. Colors and Patterns: As selected by Architect from manufacturer's full range.

3. Hardboard: Use only for cabinet backs where exterior side of back is not exposed.

I. Concealed Materials:

1. Solid Wood: With no defects affecting strength or utility.
2. Plywood: Hardwood plywood. Provide backs of same species as faces.
3. Particleboard.
4. MDF.
5. Hardboard.

2.4 HARDWARE AND ACCESSORIES

A. Hardware: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.

1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.

B. Butt Hinges: Chrome-plated, semiconcealed, five-knuckle hinges complying with ANSI/BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two hinges for doors less than 48 inches (1220 mm) high, and provide three hinges for doors more than 48 inches (1220 mm) high.

1. Degrees of Opening: 170 degrees.

C. Wire Pulls: Solid stainless steel or chrome-plated brass wire pulls, fastened from back with two screws.

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1. Provide two pulls for drawers more than 24 inches (600 mm) wide.

D. Door Catches: Zinc-plated, Powder-coated, nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide two catches on doors more than 48 inches (1220 mm) high.

E. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.

1. Doors: Provide one bumper at top and bottom of closing edge of each swinging door.
2. Drawers: Provide one bumper on back side of drawer front at each corner.

F. Drawer Slides: ANSI/BHMA A156.9.

1. Manufacturer's standard.

2. General-purpose drawers; provide 100 lb (45 kg) load capacity.
3. File drawers; provide 150 lb (45 kg) load capacity.

G. Drawer and Hinged-Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with ANSI/BHMA A156.11, Grade 1.

1. Provide a minimum of two keys per lock and six master keys.
2. Provide locks on every door and drawer.

a. Master key for up to 500 key changes.

H. Adjustable Shelf Supports:

1. Pin-type, two-pin-locking plastic shelf rests complying with ANSI/BHMA A156.9, Type B04013.

I. Wall Cabinet Pull Down Shelving System
1. 3 tier pull down stainless steel shelving system with hydraulic lift designed to fit inside wall cabinet and meet accessibility requirements.

2.5 MATERIALS

A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.

B. Hardwood Plywood: HPVA HP-1, particleboard core except where veneer core is indicated.

C. Softwood Plywood: DOC PS 1.

D. Particleboard: ANSI A208.1, Grade M-2.

E. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.

F. Hardboard: ANSI A135.4, Class 1 tempered.

G. Thermally Fused Laminate (TFL) Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper.

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1. Edgebanding for Thermally Fused Laminate (TFL) Panels: PVC or polyester edgebanding matching thermally fused laminate panels.

2.6 FABRICATION

A. Wood-Veneer-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:

1. Bottoms of Cabinets and Tops of Wall Cabinets: 3/4-inch- (19-mm-) thick, hardwood plywood.
2. Ends of Cabinets: 3/4-inch- (19-mm-) thick, hardwood plywood.
3. Shelves: 3/4-inch- (19-mm-) thick, veneer-core hardwood plywood or 1-inch- (25-mm-) thick, particleboard-core hardwood plywood.
4. Base Cabinet Top Frames: 3/4-by-2-inch (19-by-51-mm) solid wood with mortise and tenon or doweled connections, glued and pinned or screwed.
5. Base Cabinet Stretchers: 3/4-by-4-1/2-inch (19-by-114-mm) plywood, particleboard, or MDF strips or solid-wood boards at front and back of cabinet, glued and pinned or screwed. May be provided as an option to base cabinet top frames.
6. Base Cabinet Subtops: 3/4-inch- (19-mm-) thick panel product, glued and pinned or screwed. May be provided as an option to base cabinet top frames.
7. Backs of Cabinets: 3/4-inch- (19-mm-) thick, particleboard-core hardwood plywood where exposed, 1/4-inch- (6.4-mm-) thick hardboard, 1/4-inch- (6.4-mm-) thick, veneer-core hardwood plywood, or 1/2-inch- (13-mm-) thick hardwood plywood dadoed into sides, bottoms, and tops where not exposed.
8. Drawer Fronts: 3/4-inch- (19-mm-) thick, particleboard-core hardwood plywood or solid hardwood.
9. Drawer Sides and Backs: 1/2-inch- (13-mm-) thick, solid-wood or hardwood plywood, with glued dovetail or multiple-dowel joints.
10. Drawer Bottoms: 1/4-inch- (6.4-mm-) thick, veneer-core hardwood plywood, glued and dadoed into front, back, and sides of drawers. Use 1/2-inch- (13-mm-) thick material for drawers more than 24 inches (600 mm) wide.
11. Cabinet Doors:

    a. 48 Inches (1220 mm) or Less in Height: 3/4 inch (19 mm) thick, with solid hardwood stiles and rails, particleboard or MDF cores, and hardwood face veneers and crossbands.

B. Filler Strips: Provide as needed to close spaces between casework and walls, ceilings, and equipment. Fabricate from same material and with same finish as casework.

2.7 FINISH

A. Preparation: Sand lumber and plywood before assembling. Sand edges of doors and drawer fronts and molded shapes with profile-edge sander. Sand casework after assembling for uniform smoothness at least equivalent to that produced by 220-grit sanding and without machine marks, cross sanding, or other surface blemishes.

B. Staining: Remove fibers and dust and apply wash-coat sealer and stain to exposed and semiexposed surfaces as required to provide uniform color and to match approved Samples.

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C. Finishing Closed-Grain Woods: Apply manufacturer's standard two-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and a thermosetting catalyzed conversion varnish. Sand and wipe clean between applications of sealer and topcoat. Topcoat may be omitted on concealed surfaces.

D. Finishing Open-Grain Woods: Apply manufacturer's standard three-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and two coats of a thermosetting catalyzed conversion varnish. Sand and wipe clean between applications of sealer and topcoat and between topcoats. Topcoats may be omitted on concealed surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Grade: Install casework to comply with same quality standard grade as item to be installed.

B. Install casework level, plumb, and true in line; shim as required using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch (1.5 mm) of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16 inch (1.5 mm). Bolt adjacent cabinets together with joints flush, tight, and uniform.

D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch (1.5 mm) of a single plane. Fasten cabinets to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of 1/16 inch (1.5 mm).

E. Fasten casework to adjacent units and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards."

F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

G. Adjust operating hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

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3.3 CLEANING

A. Repair or remove and replace defective work as directed on completion of installation.

B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

END OF SECTION 123213

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SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad countertops.
2. Accessories.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Plastic-laminate-clad countertops.
2. Accessories.

B. Product Data Submittals: For each product.

C. Shop Drawings: For plastic-laminate-clad countertops.

1. Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.
2. Show locations and sizes of cutouts and holes for items installed in plastic-laminate-clad countertops.

D. Samples for Initial Selection: For plastic laminates.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For the following:

1. Composite wood products.
2. High-pressure decorative laminate.
3. Chemical-resistant, high-pressure decorative laminate.
4. Adhesives.

B. Quality Standard Compliance Certificates: AWI Quality Certification Program.

C. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

D. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act

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(BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.

B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

C. Keep surfaces of countertops covered with protective covering during handling and installation.

D. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 FIELD CONDITIONS

A. Environmental Limitations without Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

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C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 PLASTIC-LAMINATE-CLAD COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.

1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that countertops comply with requirements of grades specified.
2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.

B. Grade: Custom.

C. High-Pressure Decorative Laminate: ISO 4586-3, Grade HGS.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As selected by Architect from manufacturer's full range.

E. Edge Treatment: 3.0-mm PVC edging.

F. Core Material: Particleboard made with exterior glueor MDF made with exterior glue.

G. Core Thickness: 1-1/8 inch (29 mm).

1. Build up countertop thickness to 1-1/2 inches (38 mm) at front, back, and ends with additional layers of core material laminated to top.

H. Backer Sheet: Provide plastic-laminate backer sheet, ISO 4586-3, grade to match exposed surface, on underside of countertop substrate.

I. Paper Backing: Provide paper backing on underside of countertop substrate.

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2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
   1. MDF: Medium-density fiberboard, ANSI A208.2, Grade 130.
   2. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
   3. Softwood Plywood: DOC PS 1.

2.4 MISCELLANEOUS MATERIALS

A. Adhesive for Bonding Plastic Laminate: Type I, waterproof type as selected by fabricator to comply with requirements.

   1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
   1. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended, and check measurements of assemblies against field measurements before disassembling for shipment.

B. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing.

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3.2 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

1. Secure field joints in countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a 1/8-inch-in-96-inches (3-mm-in-2400-mm) variation from a straight, level plane.
2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c. and to walls with adhesive.
3. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semiexposed surfaces.

C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches (1220 mm) o.c. Remove protection at Substantial Completion.

END OF SECTION 123623.13

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SECTION 123661.16 - SOLID SURFACING COUNTERTOPS (ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.

B. Related Requirements:

1. Section 224150 " Plumbing Fixtures" for sinks and plumbing fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

B. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

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B. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

C. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.6 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting performance requirements including those of the Build America, Buy America Act (BABAA) and the Manufacturer can provide the required BABAA certification shown above.

2.2 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ISFA 2-01.
   1. Type: Provide Standard type unless Special Purpose type is indicated.

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2. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.3 FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Custom.

B. Configuration:

1. Front: 1-1/2-inch (38-mm) laminated bullnose.
2. Backsplash: Straight, slightly eased at corner.
3. End Splash: Matching backsplash.

C. Countertops:

1. 3/4-inch- (19-mm-) thick, solid surface material with front edge built up with same material.

D. Backsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material.

E. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.

F. Joints:

1. Fabricate countertops without joints.

G. Cutouts and Holes:

1. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
2. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.4 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m), 1/4 inch (6 mm) maximum. Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

D. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

E. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

F. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

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INDEX

DIVISION 22 - PLUMBING

LIFE FIRST AMBULANCE DISTRICT
EMERGENCY MEDICAL SERVICES (EMS) STATION

4585 State Route 98
Sulphur Springs, Ohio 44881

TRIAD Architects
172 E. State St., Suite 600
Columbus, Ohio 43215

O'Reilly Engineering Group, LLC
5404 Via Alvito Drive
Westerville, Ohio 43082
OEG Project No. 2026P02

Section	Section Title

DIVISION 22 PLUMBING

220505	Common Work Results for Plumbing
220517	Sleeves and Sleeve Seals for Plumbing Piping
220518	Escutcheons For Plumbing Piping
225019	Meters and Gages for Plumbing Piping
220523	General-Duty Valves for Plumbing Piping
220529	Hangers and Supports for Plumbing Piping and Equipment
220553	Identification for Plumbing Piping and Equipment
220719	Plumbing Piping Insulation
221116	Domestic Water Piping (PEX Piping)
221117	Domestic Wate Piping (Copper Piping)
221119	Domestic Water Piping Specialties
221316	Sanitary Waste and Vent Piping
221319	Sanitary Waste Piping Specialties
221600	Facility Propane – Gas Piping
223400	Fuel-Fired, Domestic-Water Heaters
224150	Plumbing Fixtures

AUGUST, 2026

SECTION 220505 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of this Section apply to all sections of Division 22.

B. All provisions of the Bidding Requirements, General Conditions, and Division 1 General Requirements apply to work specified in this Division.

C. The Mechanical and Electrical drawings and specifications assign work (labor and/or materials) to be provided by the General, Plumbing, HVAC or Electrical Contractor or their sub-contractors. Understanding that the contractors for mechanical and electrical work are sub-contractors to the (General) Contractor, such assignments are not intended to restrict the Contractor in assignment of work among the Sub-Contractor to accommodate trade agreements and practices or the normal conduct of the construction work.

1.2 SUMMARY

A. The scope of the Plumbing work includes furnishing, installing, testing and warranty of all Plumbing work and complete Plumbing systems shown on the Plumbing drawings and specified herein.

1.3 ALTERNATES

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

B. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

C. Schedule of Alternates

1. Alternate No. 3: Provide all plumbing work as required for the additional garage bay as indicated on the drawings, Sheet P-100, Alternate Garage Bay Plan.

2. Alternate No. 4: Provide propane gas piping connection to the generator. The base bid work shall include gas piping to the generator with capped outlet.

1.4 PERMITS AND REGULATIONS

A. Include payment of all permit and inspection fees applicable to the work in this Division. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.

B. Work must conform to applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.

1.5 QUALITY ASSURANCE

A. Mechanical, electrical and associated systems shall be safe, reliable, efficient, durable, easily and safely operable and maintainable, easily and safely accessible, and in compliance with applicable codes as specified. The systems shall be comprised of high quality institutional-class and industrial-class products of manufacturers that are experienced specialists in the required product lines. All construction firms and personnel shall be experienced and qualified specialists in industrial and commercial Plumbing.

B. Products Criteria:

1. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years (or longer as specified elsewhere). The design, model and size of each item shall have been in satisfactory and efficient operation on at least three installations for approximately three years. However, digital electronics devices, software and systems such as controls, instruments, computer work station, shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years. See other specification sections for any exceptions and/or additional requirements.

2. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.

3. Conform to codes and standards as required by the specifications. Conform to local codes, if required by local authorities such as the propane gas supplier, if

the local codes are more stringent then those specified. Refer any conflicts to the Engineer.

4. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

5. Assembled Units: Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.

6. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

7. Asbestos products or equipment or materials containing asbestos shall not be used.

8. All equipment/material shall be new and listed for the application, unless otherwise authorized in writing by the Owner before installation.

C. Equipment Service Organizations:

1. Plumbing: Products and systems shall be supported by service organizations that maintain a complete inventory of repair parts and are located within 50 miles to the site.

D. Plumbing Systems Welding: Before any welding is performed, contractor shall submit a certificate certifying that welders comply with the following requirements:

1. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".

2. Comply with provisions of ASME B31 series "Code for Pressure Piping".

3. Certify that each welder has passed American Welding Society (AWS) qualification tests for the welding processes involved, and that certification is current.

E. Execution (Installation, Construction) Quality:

1. Apply and install all items in accordance with manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Engineer for resolution. Provide written hard copies or computer files of manufacturer’s installation instructions to the Engineer at least two weeks prior to commencing installation of any item. Installation of the item will not be allowed to proceed until the

recommendations are received. Failure to furnish these recommendations is a cause for rejection of the material.

2. Provide complete layout drawings required by Paragraph, SUBMITTALS. Do not commence construction work on any system until the layout drawings have been approved.

1.6 SUBMITTALS

A. Certificate of Compliance with Build America/Buy America Grant Requirements.

B. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

C. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

D. Submit in accordance with Section 013300, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, and with requirements in the individual specification sections.

E. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.

F. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.

G. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.

H. Submittals and shop drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient installation.

I. Six (6) sets of submittals and descriptive information shall be assembled by each Contractor of equipment and materials furnished in their contract, and submitted to the Architect and/or Engineer for review as stated in the General Conditions and Supplementary Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal

information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and factory test data and documents showing conformance to relevant standards. Shop drawings for equipment, fixtures, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review.

J. In lieu of “paper submittals” the contractor can submit “electronic submittals” of all items requiring shop drawings.

Electronic submittals shall identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

K. The review of submittals by the Architect or Engineer shall not relieve the Contractor from responsibility for errors in the submittals. Deviations from specifications and drawing requirements shall be called to the Engineer's attention in a separate clearly stated notification at the time of submittal for the Engineer's review.

L. Submittals of the following Plumbing equipment and materials shall be submitted:

1. Pipe; fittings and joining method for the various systems.

2. Pipe hangers and saddles.

3. Valves.

4. Flexible connectors.

5. Gauges.

6. Pipe insulation.

7. Plumbing fixtures and trim.

8. Water heaters.

9. Expansion tanks.

10. Wall hydrants.

11. In-line circulating pump.

1.7 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.8 DRAWINGS AND SPECIFICATIONS

A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are- necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Architect for approval before proceeding with the work.

B. Make all necessary field measurements to insure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay.

C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Architect for interpretation or correction, so that misunderstandings at a later date may be avoided. The contract drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Having pipe and fittings fabricated and delivered in advance of making actual measurements shall not be sufficient cause to avoid making offsets and minor changes as may be necessary to install piping and equipment.

D. The Architect shall reserve the right to make minor-adjustment in locations of system runs and components where considered desirable in the interest of concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.

E. Equipment or piping shall not be installed in the dedicated electrical space above or in the working space required around electrical switchgear, motor control centers or panelboards as identified by National Electric Code (NEC) 110.16 Spaces About Electrical Equipment 600 Volts Nominal or Less. For equipment rated over 600 Volts Nominal - 110.32 Work Space Above Equipment - 110-33 Entrance and Access to Work Space - 110.34 Work Space and Guarding.

F. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of ductwork, piping, etc., where conflict arises.

G. Provide offsets in system runs, additional fittings, necessary drains and minor valves, traps, and devices required to complete the installation, or for the proper operation of the system. Each Contractor shall exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.

H. Should overlap of work among the trades become evident, this shall be called to the attention of the Architect. In such event, none of the trades or their suppliers shall assume that he is relieved of the work which is specified under his branch until instructions in writing are received from the Architect.

1.9 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

B. Protection of Equipment:

1. Equipment and material placed on the job site shall remain in the custody of the Contractor until phased acceptance, whether or not the Owner has reimbursed the Contractor for the equipment and material. The Contractor is solely responsible for the protection of such equipment and material against any damage.

2. Place damaged equipment in first class, new operating condition; or, replace same as determined and directed by the Engineer. Such repair or replacement shall be at no additional cost to the Owner.

3. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

4. Existing equipment and piping being worked on by the Contractor shall be under the custody and responsibility of the Contractor and shall be protected as required for new work.

C. Cleanliness of Piping and Equipment Systems:

1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.

2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.

3. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

1.10 INSPECTION

A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Architect, Engineer and Owner.

B. Final inspection certificates shall-be obtained by the Contractor and given to the Owner.

1.11 RECORD DRAWINGS

A. Each Contractor shall maintain a separate set of prints of the contract documents and shall show all changes or variations, in a manner to be clearly discernible, which are made during construction. Upon completion of the work, these drawings shall be turned over to the Architect.

B. Coordinate submission of as-builts in accord with Owner's documentation requirements.

1.12 OPERATING AND MAINTENANCE MANUALS

A. Two copies each of operating and maintenance manuals shall be assembled for Plumbing work by the respective Contractor.

B. All shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. Domestic water disinfection certificate of completion shall also be included. In addition, the Contractor shall prepare a chart listing all items of equipment which are furnished under his contract and indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required.

C. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included. these shall be submitted to the Architect or Engineer for review. Upon approval, manuals shall be turned over to the Owner.

D. Digital copies in PDF and native format are required for all manuals and drawings.

1.13 FINAL INSPECTION AND PUNCH LIST

A. As the time of work completion approaches, the Contractor shall survey and inspect his work and develop his own punch list to confirm that it is complete and finished. He shall then notify the Architect and request that a final inspection be made. It shall not be considered the Architect's or Engineer's Obligation to perform a final inspection until the Contractor has inspected the work and so states at the time of the request for the final inspection.

B. Requests to the Architect, Engineer or Owner for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.

C. The Architect, Engineer and Owner will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken by the Contractor to the satisfaction of Architect and Engineer within 30 days of receipt of the Architect/Engineer's punch list.

1.14 WARRANTY

A. This Contractor shall warrant all workmanship, equipment and material entering into this contract for a period of two years from date of final acceptance or date of beneficial use, as agreed to between Contractor and Architect. An materials or equipment proving to be defective during this warranty period shall be m de good by this Contractor without expense to the Owner.

B. This provision is intended specifically to cover deficiencies in contract completion or performance which are discovered after systems are placed in operation. Also included shall be supplementary assistance in balancing, adjusting or providing operating instructions as the need develops, and replacing overload heater elements in starters where necessary to keep systems in operation. Heater element sizes shall not exceed the motor manufacturer's recommendations.

C. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

D. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

1.15 CONSTRUCTION WATER

A. Refer to Division 1 - General Requirements, for information regarding construction water.

PART 2 - PRODUCTS

2.1 FACTORY-ASSEMBLED PRODUCTS

A. Provide maximum standardization of components to reduce spare part requirements.

B. Manufacturers of equipment assemblies that include components made by others shall assume complete responsibility for final assembled unit.

1. All components of an assembled unit need not be products of same manufacturer.

2. Constituent parts that are alike shall be products of a single manufacturer.

3. Components shall be compatible with each other and with the total assembly for intended service.

4. Contractor shall guarantee performance of assemblies of components, and shall repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly.

C. Components of equipment shall bear manufacturer's name and trademark, model number, serial number and performance data on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment.

D. Major items of equipment, which serve the same function, must be the same make and model. Exceptions will be permitted if performance requirements cannot be met.

2.2 REFERENCE STANDARDS

A. Where standards (NFPA, NEC, ASTM, UL, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the authority having jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used.

2.3 EQUIPMENT SELECTION

A. The selection of materials and equipment to be furnished under this contract shall be governed by the following:

1. Where trade names, brands, or manufacturers of equipment or materials are listed in the specification, the exact equipment listed shall be furnished. Where more than one name is used, the Contractor shall have the option of selecting between anyone of the several specified. All products shall be first quality line of manufacturer's listed.

2. Where the words "or approved equal" appear after a manufacturer's name, specific approval must be obtained from the Architect and Owner during the bidding period in sufficient time to be included in an addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.

3. Where the words "equal to" appear, followed by a manufacturer's name and sometimes a model or series designation, such designation is intended to establish quality level and standard features. Equal equipment by other manufacturers will be acceptable, subject to the Engineer's and Owner's approval.

B. Substitute equipment of equal quality and capacity will be considered when the listing of such is included as a separate item of the bid. State the deduction or addition in cost to that of the specified product.

C. Before bidding equipment, and again in the preparation of shop drawings, the Contractor and his supplier shall verify that adequate space is available for entry and installation of the item of equipment, including associated piping and accessories. Also verify that adequate space is available for servicing of the equipment.

D. If extensive changes in pipe or equipment layout or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in the contract.

2.4 EQUIPMENT AND MATERIALS IDENTIFICATION

A. Use symbols, nomenclature and equipment numbers specified, shown on the drawings and shown in the maintenance manuals. Identification for piping is specified in Section 220553, Identification for Plumbing Piping and Equipment.

B. Valve Tags and Lists:

1. Valve tags: Engraved black filled numbers and letters not less than 13 mm (1/2-inch) high for number designation, and not less than 6.4 mm(1/4-inch) for service designation on 19 gage 38 mm (1-1/2 inches) round brass disc, attached with brass "S" hook or brass chain.

PART 3 - EXECUTION

3.1 PIPE AND EQUIPMENT SUPPORTS

A. Where hanger spacing does not correspond with joist or rib spacing, use structural steel channels secured directly to joist and rib structure that will correspond to the required hanger spacing, and then suspend the equipment and piping from the

channels. Drill or burn holes in structural steel only with the prior approval of the Engineer.

B. Use of chain, wire or strap hangers; wood for blocking, stays and bracing; or, hangers suspended from piping above will not be permitted. Replace or thoroughly clean rusty products and paint with zinc primer.

C. Use hanger rods that are straight and vertical. Turnbuckles for vertical adjustments may be omitted where limited space prevents use. Provide a minimum of 15 mm (1/2-inch) clearance between pipe or piping covering and adjacent work.

D. Plumbing Horizontal Pipe Support Spacing: Refer to Section 220529 Hangers and Supports for Plumbing Piping and Equipment. Provide additional supports at valves, strainers, in-line pumps and other heavy components. Provide a support within one foot of each elbow.

E. Plumbing Vertical Pipe Supports:

1. Up to 150 mm (6-inch pipe), 9 m (30 feet) long, bolt riser clamps to the pipe below couplings, or welded to the pipe and rests supports securely on the building structure.

2. Vertical pipe larger than the foregoing, support on base elbows or tees, or substantial pipe legs extending to the building structure.

F. Overhead Supports:

1. The basic structural system of the building is designed to sustain the loads imposed by equipment and piping to be supported overhead.

2. Provide steel structural members, in addition to those shown, of adequate capability to support the imposed loads, located in accordance with the final approved layout of equipment and piping.

3. Tubing and capillary systems shall be supported in channel troughs.

3.2 CLEANING AND PAINTING

A. Prior to final inspection and acceptance of the facilities for beneficial use by the Owner, the facilities, equipment and systems shall be thoroughly cleaned and painted. Refer to Division 09 - Finishes.

B. In addition, the following special conditions apply:

1. Cleaning shall be thorough. Use solvents, cleaning materials and methods recommended by the manufacturers for the specific tasks. Remove all rust prior

to painting and from surfaces to remain unpainted. Repair scratches, scuffs, and abrasions prior to applying prime and finish coats.

2. Material And Equipment Not To Be Painted Includes:

   a. Control valves and thermostatic elements.

   b. Copper, brass, aluminum, stainless steel and bronze surfaces.

   c. Valve stems and rotating shafts.

   d. Pressure gauges and thermometers.

   e. Name plates.

3. Control and instrument panels shall be cleaned, damaged surfaces repaired, and shall be touched-up with matching paint obtained from panel manufacturer.

4. Final result shall be smooth, even-colored, even-textured factory finish on all items. Completely repaint the entire piece of equipment if necessary to achieve this.

3.3 PIPE TESTING

A. All piping provided in this work shall be pressure tested, as specified below.

B. Pipe testing for Plumbing piping shall be:

1. Water piping - hydrostatic at 125 psig or 1.50 times maximum operating pressure throughout the system, whichever is higher for 6 hours at the low point of the system.

2. Condensate drainage piping, same as for plumbing drainage piping.

3. Other piping - refer to appropriate Sections.

C. Testing shall be performed prior to application of insulation. Ensure that air is vented from piping when piping is hydrostatically tested.

D. Tests shall be witnessed by field representatives of the Architect or Engineer or shall be monitored by a recorder. Furnish a written record of each piping system test indicating date, system, pressure, duration and results of tests. Copies of test reports shall be included in the O&M manuals.

E. Leaks discovered during testing shall not be patched. Threaded connections shall be either tightened or replaced. Small leaks in welded pipe may be chipped and rewelded.

F. Where a new pipe connects to an existing pipe, provide the following to facilitate testing, cleaning, draining and eventual shutoff service:

1. A shutoff valve in the new pipe near the point of connection.

2. A 0.75" valved stub with capped 0.75" hose connector beyond the valve for testing of the new pipe extension. Close valve, remove handle after testing is complete. Wire handle to valve body.

3.4 PIPE CLEANING

A. Before placing each water piping system in operation, the piping system shall be thoroughly flushed out with clean water.

B. Refer to appropriate Sections for cleaning of other piping for normal operation.

3.5 OPERATING DEMONSTRATION AND INSTRUCTIONS

A. The Contractor shall set the various systems into operation and demonstrate to the Owner and Architect that the systems function properly and that the requirements of the Contract are fulfilled.

B. The Contractor shall provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and 'systems. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings.

C. O&M manuals shall be submitted, reviewed and approved prior to scheduling of demonstrations.

3.6 WORKMANSHIP

A. Materials and equipment shall be installed and supported in a first-class and workmanship manner by mechanics skilled in their particular trades. Workmanship shall be first-class in all respects, and the Architect shall have the right to stop the work if highest quality workmanship is not maintained.

B. Plumbing work shall be performed by licensed Plumbing Contractors in accordance with requirements of the jurisdiction.

3.7 PROTECTION

A. Each Contractor shall be entirely responsible for all material and equipment furnished in connection with his work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Architect.

B. The Owner's property and the property of other contractors shall be scrupulously respected at all times. Provide drop cloths and visqueen or similar barriers where dust and debris is generated, to protect adjacent areas.

3.8 CUTTING AND PATCHING

A. Refer to Division 1 - General Requirements for information regarding cutting and patching.

B. Plan the work well ahead of the general construction. Where pipes are to pass thru new walls, partitions, floors, roof or ceilings, place sleeves in these elements or arrange with the General Contractor to provide openings where sleeves are not practical. Where sleeves or openings have not been installed, cut holes and patch as required for the installation of this work, or pay other trades for doing this work when so directed by the Architect. Any damage caused to the building shall be repaired or rectified.

C. Where pipes are to pass thru, above or behind existing walls, partitions, floors, roof or ceiling, cutting, patching and refinishing of same shall be 'included in this contract. Core drilling and saw cutting shall be utilized.

D. All sleeves and openings not used or partially used shall be closed to prevent passage of smoke and fire.

E. All materials, methods and procedures used in patching and refinishing shall be in accordance with applicable provisions of specifications governing the various trades. The final appearance and integrity of the patched and refinished areas must meet the approval of the Architect. Wall, floor and ceiling refinishing must extend to logical termination lines (entire ceiling of the room repainted, for instance), if an acceptable appearance cannot be attained by finishing a partial area.

F. Provide steel angle or channel lintels to span openings which are cut in existing jointed masonry walls where the opening span exceeds 16 inches. Provide framing around roof openings for required support of the roof deck.

3.9 PAINTING

A. In addition to any painting specified for various individual items of equipment, the following painting shall be included in Division 22.

1. Ferrous metal which is not factory or shop painted or galvanized and which remains exposed to view in the building including finished areas, mechanical rooms, storage rooms, and other unfinished areas shall be given a prime coat of paint and two finish coats of paint.

2. Ferrous metal installed outside the building which is not factory or shop painted or galvanized shall be given a prime coat of paint.

3. Equipment and materials which have been factory or shop coated (prime or finished painted or galvanized), on which the finish has been damaged or has deteriorated, shall be cleaned and refinished equal to its original condition. The entire surface shall be repainted if a uniform appearance cannot be accomplished by touch-up.

4. Apply C.R.C. cold galvanize or Galvicon, or approved equal, for touch-out of previously galvanized surfaces.

B. Paint, surface preparation and application shall conform to applicable portions of the Painting section of Division 9 of the Specifications. All rust must be removed before application of paint.

C. Finish painting is included in the General Contract except where otherwise required under remodeling work. Refer to the Cutting and Patching paragraph in this Section for finishing requirements.

END OF SECTION 220505

SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Sleeves.
2. Stack-sleeve fittings.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

F. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

G. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

2.2 STACK-SLEEVE FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Smith, Jay R. Mfg. Co.
2. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

B. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.3 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. Metraflex Company (The).
4. Pipeline Seal and Insulator, Inc.
5. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, Stainless steel of length required to secure pressure plates to sealing elements.

2.4 SLEEVE-SEAL FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Presealed Systems.

B. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

2.5 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
2. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.

2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 079200 "Joint Sealants."

E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.2 STACK-SLEEVE-FITTING INSTALLATION

A. Install stack-sleeve fittings in new slabs as slabs are constructed.

1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
5. Using grout, seal the space around outside of stack-sleeve fittings.

B. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.3 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:

    a. Piping Smaller Than NPS 6: Sleeve-seal fittings.
    b. Piping NPS 6 and larger: Galvanized-steel wall sleeves.

2. Exterior Concrete Walls below Grade:

    a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves with sleeve-seal system.

        1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

    b. Piping NPS 6 and Larger: Galvanized-steel wall sleeves with sleeve-seal system.

        1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs-on-Grade:

    a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves with sleeve-seal system.

        1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

    b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system.

1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

4. Concrete Slabs above Grade:

   a. Piping Smaller Than NPS 6: PVC-pipe sleeves.
   b. Piping NPS 6 and Larger: PVC-pipe sleeves.

5. Interior Partitions:

   a. Piping Smaller Than NPS 6: PVC-pipe sleeves.
   b. Piping NPS 6 and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION 220517

SECTION 220518 - ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Escutcheons.
2. Floor plates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

D. Split-Casting Brass Type: With polished, chrome-plated finish and with concealed hinge and setscrew.

E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed hinge, and spring-clip fasteners.

2.2 FLOOR PLATES

A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
c. Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type.
h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass or split-casting brass type with rough-brass finish.
i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type.
j. Bare Piping in Equipment Rooms: One-piece, cast-brass type with rough-brass finish.
k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.

3.2 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 220518

SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Bimetallic-actuated thermometers.
2. Thermowells.
3. Dial-type pressure gages.
4. Gage attachments.
5. Test plugs.
6. Test-plug kits.
7. Sight flow indicators.

B. Related Sections:

1. Section 221116 "Domestic Water Piping" for water meters inside the building.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of meter and gage, from manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 BIMETALLIC-ACTUATED THERMOMETERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ashcroft Inc.
2. Trerice, H. O. Co.
3. Watts Regulator Co.; a div. of Watts Water Technologies, Inc.
4. Weiss Instruments, Inc.

B. Standard: ASME B40.200.

C. Case: Liquid-filled and sealed type(s); stainless steel with 5-inch nominal diameter.

D. Dial: Nonreflective aluminum with permanently etched scale markings and scales in deg F and deg C.

E. Connector Type(s): Union joint, adjustable angle, with unified-inch screw threads.

F. Connector Size: 1/2 inch, with ASME B1.1 screw threads.

G. Stem: 0.25 or 0.375 inch in diameter; stainless steel.

H. Window: Plain glass or plastic.

I. Ring: Stainless steel.

J. Element: Bimetal coil.

K. Pointer: Dark-colored metal.

L. Accuracy: Plus or minus 1 percent of scale range.

2.2 THERMOWELLS

A. Thermowells:

1. Standard: ASME B40.200.
2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.
3. Material for Use with Copper Tubing: CNR or CUNI.
4. Material for Use with Steel Piping: CRES.
5. Type: Stepped shank unless straight or tapered shank is indicated.

6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, ASME B1.20.1 pipe threads.
7. Internal Threads: 1/2, 3/4, and 1 inch, with ASME B1.1 screw threads.
8. Bore: Diameter required to match thermometer bulb or stem.
9. Insertion Length: Length required to match thermometer bulb or stem.
10. Lagging Extension: Include on thermowells for insulated piping and tubing.
11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.3 PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Ashcroft Inc.
    b. Marsh Bellofram.
    c. Trerice, H. O. Co.
    d. Watts Regulator Co.; a div. of Watts Water Technologies, Inc.
    e. Weiss Instruments, Inc.

2. Standard: ASME B40.100.
3. Case: Liquid-filled, Sealed type(s); cast aluminum or drawn steel 4-1/2-inch nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
8. Pointer: Dark-colored metal.
9. Window: Glass or plastic.
10. Ring: Stainless steel.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

2.4 GAGE ATTACHMENTS

A. Snubbers: ASME B40.100, brass; with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and piston-type surge-dampening device. Include extension for use on insulated piping.

B. Valves: Brass ball, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads.

2.5 TEST PLUGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Trerice, H. O. Co.
2. Watts Regulator Co.; a div. of Watts Water Technologies, Inc.
3. Weiss Instruments, Inc.

B. Description: Test-station fitting made for insertion into piping tee fitting.

C. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.

D. Thread Size: NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe thread.

E. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.

F. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install thermowells with socket extending one-third of pipe diameter and in vertical position in piping tees.

B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.

C. Install thermowells with extension on insulated piping.

D. Fill thermowells with heat-transfer medium.

E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.

F. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.

G. Install valve and snubber in piping for each pressure gage for fluids.

H. Install test plugs in piping tees.

I. Install thermometers in the following locations:

1. Inlet and outlet of each water heater.

J. Install pressure gages in the following locations:

1. Building water service entrance into building.
2. Inlet and outlet of each pressure-reducing valve.

3.2 CONNECTIONS

A. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.

3.3 ADJUSTING

A. Adjust faces of meters and gages to proper angle for best visibility.

3.4 THERMOMETER SCHEDULE

A. Thermometers at inlet and outlet of each domestic water heater shall be one of the following:

1. Liquid-filled, bimetallic-actuated type.
2. Direct-mounted, metal-case, vapor-actuated type.

B. Thermometer stems shall be of length to match thermowell insertion length.

3.5 THERMOMETER SCALE-RANGE SCHEDULE

A. Scale Range for Domestic Cold-Water Piping: 0 to 150 deg F.

B. Scale Range for Domestic Hot-Water Piping: 0 to 250 deg F.

3.6 PRESSURE-GAGE SCHEDULE

A. Pressure gages at discharge of each water service into building shall be one of the following:

1. Liquid-filled, direct-mounted, metal case.
2. Test plug with chlorosulfonated polyethylene synthetic or EPDM self-sealing rubber inserts.

B. Pressure gages at inlet and outlet of each water pressure-reducing valve shall be one of the following:

1. Liquid-filled, direct-mounted, metal case.
2. Test plug with chlorosulfonated polyethylene synthetic or EPDM self-sealing rubber inserts.

3.7 PRESSURE-GAGE SCALE-RANGE SCHEDULE

A. Scale Range for Water Service Piping: 0 to 160 psi.

B. Scale Range for Domestic Water Piping: 0 to 160 psi.

END OF SECTION 220519

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Bronze ball valves.
2. Bronze lift check valves.
3. Bronze swing check valves.
4. Bronze globe valves.

B. Related Sections:

1. Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
2. Section 221116 "Domestic Water Piping" for valves applicable only to this piping.
3. Section 221319 "Sanitary Waste Piping Specialties" for valves applicable only to this piping.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene copolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Nonrising stem.

E. RS: Rising stem.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of valve indicated.

1.5 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
2. ASME B31.9 for building services piping valves.

C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set ball and plug valves open to minimize exposure of functional surfaces.
4. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:

1. Handwheel: For valves other than quarter-turn types.
2. Handlever: For quarter-turn valves NPS 6 and smaller.

E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.

F. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Grooved: With grooves according to AWWA C606.
3. Solder Joint: With sockets according to ASME B16.18.
4. Threaded: With threads according to ASME B1.20.1.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hammond Valve.
b. Milwaukee Valve Company.
c. NIBCO INC.
d. Red-White Valve Corporation.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 150 psig.
c. CWP Rating: 600 psig.
d. Body Design: Two piece.
e. Body Material: Bronze.
f. Ends: Threaded.
g. Seats: PTFE or TFE.
h. Stem: Bronze.
i. Ball: Chrome-plated brass.
j. Port: Full.

B. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Hammond Valve.
    b. Milwaukee Valve Company.
    c. NIBCO INC.
    d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

    a. Standard: MSS SP-110.
    b. SWP Rating: 150 psig.
    c. CWP Rating: 600 psig.
    d. Body Design: Two piece.
    e. Body Material: Bronze.
    f. Ends: Threaded.
    g. Seats: PTFE or TFE.
    h. Stem: Stainless steel.
    i. Ball: Stainless steel, vented.
    j. Port: Full.

2.3 BRONZE LIFT CHECK VALVES

A. Class 125, Lift Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Crane Co.; Crane Valve Group; Crane Valves.
    b. Crane Co.; Crane Valve Group; Jenkins Valves.
    c. Crane Co.; Crane Valve Group; Stockham Division.

2. Description:

    a. Standard: MSS SP-80, Type 1.
    b. CWP Rating: 200 psig.
    c. Body Design: Vertical flow.
    d. Body Material: ASTM B 61 or ASTM B 62, bronze.
    e. Ends: Threaded.
    f. Disc: Bronze.

B. Class 125, Lift Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hammond Valve.
b. Milwaukee Valve Company.
c. NIBCO INC.
d. Red-White Valve Corporation.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Standard: MSS SP-80, Type 2.
b. CWP Rating: 200 psig.
c. Body Design: Vertical flow.
d. Body Material: ASTM B 61 or ASTM B 62, bronze.
e. Ends: Threaded.
f. Disc: NBR, PTFE, or TFE.

2.4 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hammond Valve.
b. Milwaukee Valve Company.
c. NIBCO INC.
d. Powell Valves.
e. Red-White Valve Corporation.
f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Standard: MSS SP-80, Type 3.
b. CWP Rating: 200 psig.
c. Body Design: Horizontal flow.
d. Body Material: ASTM B 62, bronze.
e. Ends: Threaded.
f. Disc: Bronze.

B. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hammond Valve.
b. Milwaukee Valve Company.

c. NIBCO INC.
d. Red-White Valve Corporation.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Standard: MSS SP-80, Type 4.
b. CWP Rating: 200 psig.
c. Body Design: Horizontal flow.
d. Body Material: ASTM B 62, bronze.
e. Ends: Threaded.
f. Disc: PTFE or TFE.

2.5 BRONZE GLOBE VALVES

A. Class 125, Bronze Globe Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Hammond Valve.
b. Milwaukee Valve Company.
c. NIBCO INC.
d. Red-White Valve Corporation.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Standard: MSS SP-80, Type 1.
b. CWP Rating: 200 psig.
c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
d. Ends: Threaded or solder joint.
e. Stem and Disc: Bronze.
f. Packing: Asbestos free.
g. Handwheel: Malleable iron, bronze, or aluminum.

B. Class 125, Bronze Globe Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. NIBCO INC.
b. Red-White Valve Corporation.

2. Description:

a. Standard: MSS SP-80, Type 2.
b. CWP Rating: 200 psig.
c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
d. Ends: Threaded or solder joint.
e. Stem: Bronze.
f. Disc: PTFE or TFE.
g. Packing: Asbestos free.
h. Handwheel: Malleable iron, bronze, or aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install check valves for proper direction of flow and as follows:

1. Swing Check Valves: In horizontal position with hinge pin level.
2. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball valves.
2. Throttling Service: Globe or ball valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
3. Bronze Swing Check Valves: Class 125, bronze or nonmetallic disc.
4. Bronze Globe Valves: Class 125, bronze or nonmetallic disc.

END OF SECTION 220523

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure. Do not suspend hangers from roof decks. Suspend from roof trusses, joists and joist girders only at panel points and at top chords unless otherwise indicated.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories. Hanger spacing shall be in accordance with all applicable codes.

D. Install lateral bracing with pipe hangers and supports to prevent swaying.

E. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

F. Insulated Piping:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.

3.2 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.3 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099123 "Interior Painting."

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 220529

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipe labels.
2. Stencils.
3. Valve tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.2 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers.

1. Tag Material: Brass, 0.032-inch (0.8-mm), Stainless steel, 0.025-inch (0.64-mm), Aluminum, 0.032-inch (0.8-mm) or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Section 099123 "Interior Painting."

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings.

C. Pipe Label Color Schedule:

1. Domestic Water Piping:

a. Background Color: Black.
b. Letter Color: White.

3.3 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

a. Cold Water: 1-1/2 inches, round.
b. Hot Water: 1-1/2 inches, round.

2. Valve-Tag Color:

a. Cold Water: Natural.
b. Hot Water: Natural.

3. Letter Color:

a. Cold Water: Black.
b. Hot Water: Black.

END OF SECTION 220553

SECTION 220719 - PLUMBING PIPING INSULATION

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 insulating the following plumbing piping services:

1. Domestic cold-water piping.
2. Domestic hot-water and hot water return piping.
3. Protective Shielding Guards.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

B. Provide product warranties for all products in this section.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.5 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.6 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Indoor Piping Insulation Schedule," articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

D. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aerocel.
b. Armacell LLC; AP Armaflex.
c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

E. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Fibrex Insulations Inc.; Coreplus 1200.
b. Johns Manville; Micro-Lok.
c. Knauf Insulation; 1000-Degree Pipe Insulation.
d. Manson Insulation Inc.; Alley-K.
e. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ.

Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Aeroflex USA, Inc.; Aeroseal.
   b. Armacell LLC; Armaflex 520 Adhesive.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
   d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements for the State of Ohio.

2.3 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Engineered Brass Company.
   b. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
   c. McGuire Manufacturing.
   d. Plumberex.
   e. Truebro; a brand of IPS Corporation.
   f. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

O. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

C. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.

2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. NPS 1 and Smaller: Insulation shall be one of the following:

   a. Flexible Elastomeric: 1/2 inch thick.

   b. Mineral Fiber, Preformed Pipe Insulation: 1/2" inch thick.

2. NPS 1-1/4 and Larger: Insulation shall be one of the following:

   a. Flexible Elastomeric: 1 inch thick.

   b. Mineral Fiber, Preformed Pipe Insulation: 1" inch thick.

B. Domestic Hot Water:

1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:

a. Flexible Elastomeric: 3/4 inch thick.

b. Mineral Fiber, Preformed Pipe Insulation: 1" inch thick.

2. NPS 1-1/2 and Larger: Insulation shall be one of the following:

a. Flexible Elastomeric: 1 inch thick.

b. Mineral Fiber, Preformed Pipe Insulation: 1" inch thick.

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING (PEX PIPING)

PART 1 - GENERAL

1.1 SUMMARY

A. Domestic potable hot and cold-water plumbing system, where shown on the Drawings and Schedules, shall be crosslinked polyethylene pipe, and shall include the following:
   1. Crosslinked polyethylene (PEXa) piping.
   2. Distribution manifold(s) with balancing and flow control valves where required.
   3. Cold-expansion and compression sleeve fittings.
   4. Pipe fasteners as approved by the manufacturer of the PEXa piping.
   5. Supervision and field engineering required for the complete and proper function of the system.

1.2 REFERENCES

A. Publications listed here are part of this specification to the extent they are referenced. Where no specific edition of the standard or publication is identified, the current edition shall apply.

B. ASTM - American Society for Testing and Materials
   1. ASTM D2765 – Standard Test Method for Determination of Gel Content and Swell Ratio of Crosslinked Ethylene Plastics
   2. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
   3. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials
   4. ASTM F876 – Standard Specification for Crosslinked Polyethylene (PEX) Tubing
   5. ASTM F877 – Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems
   6. ASTM F2023 – Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water
   7. ASTM F2080 – Standard Specification for Cold-Expansion Fittings with Metal Compression- Sleeves for Crosslinked Polyethylene (PEX) Pipe

C. AWWA – American Water Works Association
   1. AWWA C904-06 - Crosslinked Polyethylene (PEX) Pressure Pipe, 1/2 In.(12 mm) Through 3 In. (76 mm), for Water Service

D. CSA Canadian Standards Associations
   1. CSA B137.5 – Crosslinked Polyethylene (PEX) Tubing Systems for Pressure Applications

E. IAPMO – International Association of Plumbing and Mechanical Officials

F. ICC – International Code Council

G. ISO – International Organization for Standardization
   1. ISO 9001 – Quality Management Systems – Requirements

H. NSF International
   1. NSF/ANSI 14 – Plastic Piping System Components and Related Materials
   2. NSF/ANSI 61 – Drinking Water System Components – Health Effects

I. Plastic Pipe Institute
   1. PPI TR-3 / 2007 – Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe

J. Underwriters' Laboratories
   1. ANSI/UL 263 – Standard Fire Tests of Building Construction and Materials

K. Underwriters' Laboratories of Canada
   1. CAN/ULC S101 – PEX Pipe through Fire Rated Assemblies
   2. CAN/ULC S102.2 – Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials

1.3 DEFINITIONS

A. Crosslinked polyethylene, commonly abbreviated PEX, is made from high density polyethylene (HDPE). Crosslinking is accomplished during manufacturing. Crosslinking enhances the physical & mechanical properties of the polymer. The high-temperature properties are improved. Chemical resistance is enhanced by resisting dissolution. Low temperature properties are also improved; its impact and tensile strength, scratch resistance, and resistance to brittle fracture are enhanced. The required degree of crosslinking, according to ASTM Standard F876-07, is between 70-89%. This specification requires PEX to be designated as PEXa and be manufactured by the high-pressure peroxide method.

1.4 SYSTEM DESCRIPTION

A. Design Requirements
   1. Standard grade hydrostatic pressure ratings from Plastics Pipe Institute in accordance with TR-3. The following three standard-grade hydrostatic ratings are required:
      a. 200°F (93°C) at 80 psi (551 kPa)

b. 180°F (82°C) at 100 psi (689 kPa)
c. 73.4°F (23°C) at 160 psi (1102 kPa)

2. Certification of flame spread/smoke development rating of 25/50 in accordance with ASTM E 84 and ULC S101 for the following PEX pipe sizes. It may be necessary to encase with 1/2-inch fiberglass insulation at tube spacing of not less than 4 inches apart, as required by the specific manufacturer. Certain sizes may not conform to this standard; appropriate insulation shall be installed to meet the standard.
   a. 3/8 inch (9.53 mm)
   b. 1/2 inch (12.7 mm)
   c. 3/4 inch (19.05 mm)
   d. 1 inch (25.4 mm)
   e. 1 1/4 inch (31.75 mm)
   f. 1 1/2 inch (38.1 mm)
   g. 2 inch (50.8 mm)

B. Performance Requirements: To provide a domestic potable hot and cold-water plumbing system, which is manufactured, fabricated and installed to comply with regulatory agencies and to maintain performance criteria stated by the PEX pipe manufacturer without defects, damage or failure.

C. Compliant to the following standards:
1. NSF/ANSI Standard 14
2. NSF/ANSI Standard 61
3. ASTM F877
4. ASTM E119
5. ANSI/UL 263 through certification listings with Underwriters Laboratories, Inc. (UL).
   a. UL Design No. L557 — 1 hour wood frame floor/ceiling assemblies
   b. UL Design No. K913 — 2-hour concrete floor/ceiling assemblies
   c. UL Design No. U372 — 1 hour wood stud/gypsum wallboard wall assemblies
   d. UL Design No. V444 — 1 hour steel stud/gypsum wallboard wall assemblies

1.5 SUBMITTALS

A. Comply with Section 01 33 00, Submittal Procedures. Approval and/or acceptance of all submittals are required prior to fabrication.

B. Product Data: Submit manufacturer's Technical Manual, submittal forms, catalog cuts, brochures, specifications, and installation instructions. Submit data in sufficient detail to indicate compliance with the contract documents.
1. Submit manufacturer's instructions for installation.

2. Submit data for equipment, fittings, fasteners and associated items necessary for the installation of the piping and manifolds.

C. Submit computer-generated system design indicating pipe sizing, flow rates and temperatures.

D. Shop Drawings: Provide plans drawn to scale for all installation areas.
1. Indicate dimensions, descriptions of materials, general construction, component connections, and installation procedures.
2. Indicate design, schematic layout of system, including equipment and critical dimensions as well as details for protecting exposed PEX piping.

E. Certification:
1. Submit independent certification results for the piping systems from an accredited independent testing laboratory.
2. The design shall be approved by a professional appropriately licensed in the jurisdiction where the installation will take place, as being complete and accurate.
3. Fittings shall be third-party as approved by the manufacturer's PEX piping system with applicable plumbing and mechanical code certifications.
4. Fittings encased behind walls or ceilings shall be certified to ASTM F2080.

F. Samples: Submit samples of metal and exposed finishes if requested by Architect.

G. Maintenance Instructions: Submit instructions for any maintenance required or recommended by manufacturer.

1.6 QUALITY ASSURANCE

A. Comply with Section 01 43 00, Quality Assurance.

B. Manufacturer: Must be a company specializing in the Work of this Section with a minimum of 5 years documented experience.

C. All components shall be supplied by one manufacturer.

D. Pipe shall be manufactured in a facility whose quality management system is ISO 9001 certified.

E. Crosslinked polyethylene (PEXa) pipe shall conform and be certified to ASTM F876, F877 and CSA B137.5. Fittings shall conform and be certified to ASTM F877 or F2080, and CSA B137.5.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with Section 01 60 00, Product Requirements.

B. Deliver and store piping and equipment in shipping containers with labeling in place.
   1. Pipe shall be kept in original shipping boxes until required for installation.

C. Store piping and equipment in a safe place, dry, enclosed, under cover, in a well-ventilated area.
   1. Do not expose pipe to ultraviolet light beyond exposure limits recommended by manufacturer.
   2. Protect piping and manifolds from entry of contaminating materials. Install suitable plugs in open pipe ends until installation.
   3. Where possible, connect pipes to assembled manifolds to eliminate the possibility of contaminants and cross-connections.
   4. Piping shall not be dragged across the ground or other surfaces and shall be stored on a flat surface with no sharp edges.

D. Protect materials from damage by other trades.

E. Pipe shall be protected from oil, grease, paint, direct sunlight and other elements as recommended by manufacturers.

1.8 WARRANTY

A. Provide manufacturer's standard written warranty.
   1. The warranty shall include as a minimum, provisions to repair defects from faulty materials or workmanship developed during the guarantee period, or provide for replacement with new materials, at no expense to Owner.
   2. The pipe manufacturer shall warrant the crosslinked polyethylene piping to be free from defects in material and workmanship for a period of twenty-five (25) years starting at completion of successful pressurized water tests immediately following system installation.
   3. Cold-expansion compression-sleeve pipe repair couplings shall be warranted to be free from defects in material and workmanship for a period of twenty-five (25) years starting at completion of successful pressurized water tests immediately following system installation.
   4. All manifolds and distribution headers shall be warranted to be free from defects in material and workmanship for a period of two (2) years starting at completion of successful pressurized water tests immediately following system installation.

B. Provide installer’s guarantee as appropriate.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Subject to compliance with requirements, provide products by one of the following:

1. Rehau
2. Nibco Inc.
3. Apollo
4. Uponor
5. Viega
6. Zurn

2.2 COMPONENTS

A. Piping
1. All pipe shall be high-density crosslinked polyethylene manufactured using the high-pressure peroxide method of crosslinking (PEXa). Pipe shall conform to ASTM F876, ASTM F877 CSA B137.5, NSF/ANSI 14 and NSF/ANSI 61.
2. Pipe shall be rated for continuous operation of 100 psi gauge pressure at 180°F temperature (690 kPa @ 82°C), and 80 psi gauge pressure at 200°F temperature (550 kPa @ 93°C).
3. Pipe shall be certified by PPI to standard TR-3, with applicable plumbing and mechanical code certifications.
4. Pipe to be manufactured using a high-pressure peroxide method with a minimum degree of crosslinking of 70-89% when tested in accordance with ASTM D2765, Method B.
5. Pipe to be tested for resistance to hot chlorinated water in accordance with ASTM F2023. Pipe to have a minimum extrapolated time-to-failure of 50 years, calculated in accordance with section 13.3 of F2023 and listed as "3006" per the ASTM F876 standard.
6. When required, PEX pipe to have a co-extruded colored UV Shield made from UV-Resistant polyethylene providing UV resistance.
7. Pipe to be manufactured in an ISO 9001 certified production facility.
8. Bend Radius:
   a. The minimum bend radius for cold bending of the pipe shall be not less than five (5) times the outside diameter.
   b. Bends with a radius less than this shall require the use of a bending template as supplied by the pipe manufacturer, and/or hot air.
9. Pipe to have a Flame Spread Index of less than 25, and a Smoke Developed Index of less than 50 when tested in accordance with ASTM E84 (in U.S.) or CAN/ULC S102.2 (in Canada). In any case where the pipe does not conform to these

standards, appropriate piping insulation shall be installed in order to meet the standard.

B. Fittings
   1. All Fittings used with crosslinked polyethylene (PEX) water distribution pipe intended for plumbing applications shall be of the cold-expansion compression-sleeve design.
   2. All Fittings shall be third-party certified to applicable standards ASTM F877, ASTM F2080, NSF/ANSI 14, NSF/ANSI 61 and CSA B137.5 and approved by the manufacturer's PEX piping system, with applicable plumbing and mechanical code certifications.
   3. Compression-sleeve fittings shall be manufactured of brass and shall be supplied by the piping manufacturer as part of a proven cataloged system.
   4. Where fittings are encased in concrete or buried underground, fittings shall be wrapped as per manufacturer's recommendation to protect the material.

C. Manifolds
   1. Material: Distribution manifolds shall be manufactured of copper and be supplied by the piping manufacturer as a proven cataloged part of the manufacturer's system.
   2. Copper manifolds
      a. Copper manifolds shall be manufactured from Type L copper.
      b. Copper and/or brass outlets shall be high-temperature brazed (lead-free) into headers.
      c. Outlets in copper headers shall be made using the T-drill process according to ASTM F2014.

2.3 MARKINGS

A. Pipe shall carry the following markings every three (3) feet (0.9 meters): Manufacturer's name or trademark, nominal size, PEXa 3006 (material designation) SDR9 (standard dimension ratio), ASTM F876/ F877 / F2080, CSA B137.5, NSF-pw, UPC Shield, 160 psi @ 73.4°F / 100 psi @ 180°F / 80 psi @ 200°F, POTABLE TUBING, manufacturing date and footage mark.

2.4 PACKAGING

A. Coiled pipe shall be shipped in protective cardboard boxes marked with product name and size.

B. Straight lengths shall be packed in plastic bags.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

A. As a minimum, installation shall be performed by qualified laborers trained by the manufacturer in the procedures of PEX systems and they shall be appropriately licensed for the jurisdiction where the installation will take place.

3.2 EXAMINATION

A. Examine areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of work. Do not proceed until unsatisfactory conditions are corrected.

B. Beginning of installation means acceptance of existing conditions.

3.3 PREPARATION

A. Coordinate with related trades and manufacturer’s recommendations with regard to installation in conjunction with:

B. Prepare a suitable cavity for the manifold, with a secure mounting plate that will secure the manifold at least 30 inches (75 cm) above floor level. Manifold must be installed in an area that will allow easy access for piping as well as future access for maintenance.

3.4 INSTALLATION

A. Install in accordance with manufacturer's published installation manual and/or published guidelines and final shop drawings.

B. Manifolds shall be mounted as level as possible.

C. Route piping in an orderly manner, according to layout and spacing shown in final shop drawings. All installation notes shown on the drawings shall be followed.

D. At connections and fittings, use a plastic pipe cutter to ensure square (90°) and clean cuts, and join pipes immediately or cap ends of pipe to seal from contaminants.

E. Pipe shall be dispensed using a suitable uncoiling device. Remove twists prior to securing pipe. Pipe shall lie flat on an even plane.

F. Piping that passes through expansion joints or walls shall be covered in protective polyethylene convoluted sleeving (flexible conduit) extending 15 inches (38 cm) on each side of the joint. Sleeving shall be secured on pipe to prevent movement during installation.

G. Where piping enters or exits a wall a protective conduit shall be placed around the pipe, with the conduit extending a minimum of 6 inches (15 cm) into the floor and exiting by a minimum of 6 inches (15 cm). For penetrations at manifolds, use rigid PVC bend guides secured in place to prevent movement.

H. Horizontal piping runs shall be installed with metal saddles, straps and hangers to comply with all applicable codes.

3.5 FIELD QUALITY CONTROL

A. Filling, Testing & Balancing: Tests of domestic plumbing systems shall comply with authorities having jurisdiction, and, where required, shall be witnessed by the building official.

B. Pressure gauges used in testing and balancing shall show pressure increments of 1 psig and shall be located at or near the lowest points in the distribution system.

C. Air Test
   1. Charge the completed, yet unconcealed pipes with air at a minimum of 40 psig.
   2. Do not exceed 150 psig.
   3. Use soap solution to check for leakage at manifold connections.

D. Water Test
   1. Purge air from pipes.
   2. Charge the completed, yet unconcealed pipes with water.
   3. Take necessary precautions to prevent water from freezing.
   4. Check the system for leakage, especially at all pipe joints.

E. Perform a preliminary pressure test pressurizing the system to the greater of 1.5 times the maximum operating pressure or 100 psig for 30 minutes.
   1. As the piping expands, restore pressure, first at 10 minutes into the test and again at 20 minutes.
   2. At the end of the 30-minute preliminary test, pressure shall not fall by more than 8 psig from the maximum, and there shall be no leakage.

F. After successfully performing the preliminary pressure test, perform the main pressure test immediately.
   1. The test pressure shall be restored and continued as the main test for 2 hours.
   2. The main test pressure shall not fall more than 3 psig after 2 hours.
   3. No leakage shall be detected.

G. Complete inspection and furnish test reports supplied by the manufacturer of the system.

3.6 CLEANING

A. Clean exposed surfaces upon completion of installation using clean, damp cloth. No cleaning agents are allowed.

B. Comply with manufacturer's recommendations.

3.7 PROTECTION

A. Protect installation throughout construction process until date of final completion.

B. Replace components that cannot be repaired.

END OF SECTION 221116

SECTION 221117 - DOMESTIC WATER PIPING (COPPER PIPING)

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.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Potable-water piping and components shall comply with NSF 14 and NSF 61.

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

B. Soft Copper Tube: ASTM B 88, Type K water tube, annealed temper.

C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.

D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

E. Copper Unions:

1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends.

2.3 PIPING JOINING MATERIALS

A. Solder Filler Metals: ASTM B 32, lead-free alloys.

B. Flux: ASTM B 813, water flushable.

C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

2.5 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Capitol Manufacturing Company; member of the Phoenix Forge Group.
b. Matco-Norca.
c. McDonald, A. Y. Mfg. Co.
d. Watts; a division of Watts Water Technologies, Inc.
e. Wilkins; a Zurn company.

2. Standard: ASSE 1079.
3. Pressure Rating: 125 psig minimum at 180 deg F.
4. End Connections: Solder-joint copper alloy and threaded ferrous.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe

and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install domestic water piping level without pitch and plumb.

D. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

G. Install piping to permit valve servicing.

H. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

I. Install piping free of sags and bends.

J. Install fittings for changes in direction and branch connections.

K. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

L. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

M. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

3.3 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

B. Support vertical piping and tubing at base and at each floor.

C. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 (DN 20) and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.

D. Install supports for vertical copper tubing every 10 feet.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

3.6 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.8 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

    a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
    b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.9 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

    c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    d. Repeat procedures if biological examination shows contamination.
    e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.10 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller, shall be the following:

1. Soft copper tube, ASTM B 88, Type K wrought-copper, solder-joint fittings; and brazed joints.

E. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type L cast or wrought copper, solder-joint fittings; and brazed joints.

3.11 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball valves for piping NPS 2 and smaller.
2. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
3. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 221117

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Water-hammer arresters.
2. Air vents.
3. Trap-seal primer valves.
4. Backflow preventers.
5. Balancing valves.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For domestic water piping specialties.

1. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Potable-water piping and components shall comply with NSF 61 and NSF 14.

2.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers

1. Basis-of-Design Product: Subject to compliance with requirements, provide Wilkins Co. Series 975XL, ASSE 101.3 or comparable product by one of the following:

a. Ames Fire & Waterworks; a division of Watts Water Technologies, Inc.
b. Conbraco Industries, Inc.
c. FEBCO; a division of Watts Water Technologies, Inc.
d. Flomatic Corporation.
e. Watts Co.

2. Standard: ASSE 1013.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: 12 psig maximum, through middle third of flow range.
5. Size: 3" NPS.

2.4 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AMTROL, Inc.
b. Josam Company.
c. MIFAB, Inc.
d. Sioux Chief Manufacturing Company, Inc.
e. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
f. Watts Drainage Products.

g. Zurn Industries, LLC; Plumbing Products Group; Specification Drainage Products.

2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows.
4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.5 AIR VENTS

A. Bolted-Construction Automatic Air Vents:

1. Body: Bronze.
2. Pressure Rating and Temperature: 125-psig minimum pressure rating at 140 deg F.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8, NPS 1/2 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

B. Welded-Construction Automatic Air Vents:

1. Body: Stainless steel.
2. Pressure Rating: 150-psig minimum pressure rating.
3. Float: Replaceable, corrosion-resistant metal.
4. Mechanism and Seat: Stainless steel.
5. Size: NPS 3/8 minimum inlet.
6. Inlet and Vent Outlet End Connections: Threaded.

2.6 TRAP-SEAL PRIMER DEVICE

A. Supply-Type, Trap-Seal Primer Device:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. MIFAB, Inc.
b. Precision Plumbing Products, Inc.
c. Sioux Chief Manufacturing Company, Inc.
d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
e. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.

2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig minimum.

4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

2.7 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Armstrong International, Inc.
    b. Flo Fab Inc.
    c. ITT Corporation; Bell & Gossett Div.
    d. NIBCO Inc.
    e. TAC.
    f. TACO Incorporated.
    g. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.

2. Type: Ball valve with two readout ports and memory-setting indicator.
3. Body: Brass or bronze.
4. Size: Same as connected piping, but not larger than NPS 2.
5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install temperature-actuated, water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.

1. Install cabinet-type units recessed in or surface mounted on wall as specified.

B. Install water-hammer arresters in water piping according to PDI-WH 201.

C. Install air vents at high points of water piping. Install drain piping and discharge onto floor drain.

D. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

E. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.

1. Locate backflow preventers in same room as connected equipment or system.
2. Install drain for backflow preventers with atmospheric-vent drain connection with airgap fitting, fixed airgap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
3. Do not install bypass piping around backflow preventers.

F. Install balancing valves in locations where they can easily be adjusted.

3.2 CONNECTIONS

A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Fire-retardant-treated-wood blocking is specified in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

3.3 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:

1. Primary, thermostatic, water mixing valves.
2. Supply-type, trap-seal primer valves.

3.4 FIELD QUALITY CONTROL

A. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

B. Prepare test and inspection reports.

3.5 ADJUSTING

A. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION 221119

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.

B. Related Sections:

1. Section 221313 "Facility Sanitary Sewers" for sanitary sewerage piping and structures outside the building.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect and Owner no fewer than seven (7) days in advance of proposed interruption of sanitary waste service.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service and Extra Heavy class(es).

B. Gaskets: ASTM C 564, rubber.

C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.3 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. Sovent Stack Fittings: ASME B16.45 or ASSE 1043, hubless, cast-iron aerator and deaerator drainage fittings.

C. CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ANACO-Husky.
b. Dallas Specialty & Mfg. Co.
c. Fernco Inc.
d. Matco-Norca, Inc.
e. MIFAB, Inc.
f. Mission Rubber Company; a division of MCP Industries, Inc.
g. Tyler Pipe.

2. Standards: ASTM C 1277 and CISPI 310.
3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.4 COPPER TUBE AND FITTINGS

A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

C. Hard Copper Tube: ASTM B 88, Type L and Type M, water tube, drawn temper.

D. Copper Pressure Fittings:

1. Copper Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

E. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

2.5 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. Cellular-Core PVC Pipe: ASTM F 891, Schedule 40.

C. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

D. Adhesive Primer: ASTM F 656.

E. Solvent Cement: ASTM D 2564.

2.6 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Unshielded, Nonpressure Transition Couplings:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Dallas Specialty & Mfg. Co.
2) Fernco Inc.
3) Mission Rubber Company; a division of MCP Industries, Inc.

b. Standard: ASTM C 1173.

c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

d. Sleeve Materials:

1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
2) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Install piping to allow application of insulation.

I. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of

different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

J. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

K. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105/A 21.5.

L. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

M. Install above ground PVC piping according to ASTM D2665.

N. Install underground PVC piping according to ASTM D2321.

O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum calked joints.

C. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

E. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

3.3 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in OD's.
2. In Drainage Piping: Unshielded, nonpressure transition couplings.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Vertical Piping: MSS Type 8 or Type 42, clamps.
3. Install individual, straight, horizontal piping runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.

B. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

C. Support vertical piping and tubing at base and at each floor.

D. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.

2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 72 inches with 3/8-inch rod.
2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
3. NPS 2-1/2: 108 inches with 1/2-inch rod.
4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.

F. Install supports for vertical copper tubing every 10 feet.

G. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
2. NPS 3: 48 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
5. NPS 10 and NPS 12: 48 inches with 7/8-inch rod.

H. Install supports for vertical PVC piping every 48 inches.

I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

3.6 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.7 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.8 PIPING SCHEDULE

A. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings heavy-duty hubless-piping couplings; and coupled joints.
3. Copper DWV tube, copper drainage fittings, and soldered joints.
4. Solid wall PVC pipe, PVC socket fittings, and solvent cemented joints.

B. Aboveground, vent piping NPS 4 and smaller shall be any of the following:

1. Galvanized-steel pipe, drainage fittings, and threaded joints.
2. Copper DWV tube, copper drainage fittings, and soldered joints.
3. Solid wall PVC pipe, PVC socket fittings, and solvent cemented joints.

C. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:

1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; cast-iron hubless-piping couplings; and coupled joints.
3. Solid wall PVC pipe, PVC socket fittings, and solvent cemented joints.

END OF SECTION 221316

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cleanouts.
2. Floor drains.
3. Through-penetration firestop assemblies.
4. Miscellaneous sanitary drainage piping specialties.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. FOG: Fats, oils, and greases.

C. FRP: Fiberglass-reinforced plastic.

D. HDPE: High-density polyethylene plastic.

E. PE: Polyethylene plastic.

F. PP: Polypropylene plastic.

G. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:

1. Cleanouts.
2. Floor drains.

B. Shop Drawings: Show fabrication and installation details for frost-resistant vent terminals.

1. Wiring Diagrams: Power, signal, and control wiring.

1.5 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Exposed Metal Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Josam Company; Josam Div.
b. MIFAB, Inc.
c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
d. Tyler Pipe; Wade Div.
e. Watts Drainage Products Inc.
f. Zurn Plumbing Products Group; Specification Drainage Operation.
g. Josam Company; Blucher-Josam Div.

2. Standard: ASME A112.36.2M for cast iron, ASME A112.3.1 for stainless steel for cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Closure: Stainless-steel plug with seal.

B. Metal Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Josam Company; Josam Div.
b. Sioux Chief Manufacturing Company, Inc.
c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
d. Tyler Pipe; Wade Div.
e. Watts Drainage Products Inc.
f. Zurn Plumbing Products Group; Specification Drainage Operation.
g. Josam Company; Josam Div.
h. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

C. Cast-Iron Wall Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Josam Company; Josam Div.
b. MIFAB, Inc.
c. Smith, Jay R. Mfg. Co.; d of Smith Industries, Inc.
d. Tyler Pipe; Wade Div.
e. Watts Drainage Products Inc.
f. Zurn Plumbing Products Group; Specification Drainage Operation.

2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Josam Company; Josam Div.
b. MIFAB, Inc.
c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
d. Tyler Pipe; Wade Div.
e. Zurn Plumbing Products Group; Specification Drainage Operation.

2.3 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. ProSet Systems Inc.

2. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
3. Size: Same as connected soil, waste, or vent stack.
4. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
5. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
6. Special Coating: Corrosion resistant on interior of fittings.

2.4 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Open Drains:

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping.

B. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 side inlet.

2.5 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4.0-lb/sq. ft. thickness.
2. Vent Pipe Flashing: 3.0-lb/sq. ft. thickness.
3. Burning: 6-lb/sq. ft. thickness.

B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:

1. General Applications: 12 oz./sq. ft.
2. Vent Pipe Flashing: 8 oz./sq. ft.

C. Fasteners: Metal compatible with material and substrate being fastened.

D. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

E. Solder: ASTM B 32, lead-free alloy.

F. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

D. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.

1. Position floor drains for easy access and maintenance.
2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

E. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

F. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.

G. Assemble open drain fittings and install with top of hub 1 inch above floor.

H. Install deep-seal traps on floor drains and other waste outlets, if indicated.

I. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.

1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
2. Size: Same as floor drain inlet.

J. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.

3.2 FLASHING INSTALLATION

A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:

1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft. thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft. thickness or thinner.
2. Copper Sheets: Solder joints of copper sheets.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 076200 "Sheet Metal Flashing and Trim."

F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.3 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 221319

SECTION 221600 - FACILITY PROPANE-GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Pipes, tubes, and fittings.
2. Piping specialties.
3. Piping and tubing joining materials.
4. Valves.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

1.4 PERFORMANCE REQUIREMENTS

A. Minimum Operating-Pressure Ratings:

1. Piping and Valves: 100 psig minimum unless otherwise indicated.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Piping specialties.
2. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.

3. Dielectric fittings.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans and details, drawn to scale, on which propane-gas piping is shown and coordinated with other installations, using input from installers of the items involved.

B. Site Survey: Plans, drawn to scale, on which propane-gas piping is shown and coordinated with other services and utilities.

C. Qualification Data: For qualified professional engineer.

D. Welding certificates.

E. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.

B. Interruption of Existing Propane-gas Service: Do not interrupt propane-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of propane-gas supply according to requirements indicated:

1. Notify Architect and Owner no fewer than two (2) days in advance of proposed interruption of propane-gas service.
2. Do not proceed with interruption of propane-gas service without Architect's and Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

    a. Material Group: 1.1.
    b. End Connections: Threaded or butt welding to match pipe.
    c. Lapped Face: Not permitted underground.
    d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
    e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.

5. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.

    a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.

6. Mechanical Couplings:

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Dresser Piping Specialties; Division of Dresser, Inc.
        2) Smith-Blair, Inc.

    b. Stainless-steel or Steel flanges and tube with epoxy finish.
    c. Buna-nitrile seals.
    d. Stainless-steel or Steel bolts, washers, and nuts.
    e. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
    f. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.

B. PE Pipe: ASTM D 2513, SDR 11.

1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
3. Anodeless Service-Line Risers: Factory fabricated and leak tested.

    a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
    b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering. Vent casing aboveground.
    c. Aboveground Portion: PE transition fitting.
    d. Outlet shall be threaded or flanged or suitable for welded connection.
    e. Tracer wire connection.
    f. Ultraviolet shield.
    g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

4. Transition Service-Line Risers: Factory fabricated and leak tested.

    a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet connected to steel pipe complying with ASTM A 53/A 53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
    b. Outlet shall be threaded or flanged or suitable for welded connection.
    c. Bridging sleeve over mechanical coupling.
    d. Factory-connected anode.
    e. Tracer wire connection.
    f. Ultraviolet shield.
    g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

5. Plastic Mechanical Couplings,NPS 1-1/2 and Smaller: Capable of joining PE pipe to PE pipe.

    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Lyall, R. W. & Company, Inc.
        2) Mueller Co.; Gas Products Div.
        3) Perfection Corporation; a subsidiary of American Meter Company.

    b. PE body with molded-in, stainless-steel support ring.
    c. Buna-nitrile seals.
    d. Acetal collets.

e. Electro-zinc-plated steel stiffener.

6. Plastic Mechanical Couplings, NPS 2 and Larger: Capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.

   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Lyall, R. W. & Company, Inc.
      2) Mueller Co.; Gas Products Div.
      3) Perfection Corporation; a subsidiary of American Meter Company.

   b. Fiber-reinforced plastic body.
   c. PE body tube.
   d. Buna-nitrile seals.
   e. Acetal collets.
   f. Stainless-steel bolts, nuts, and washers.

7. Steel Mechanical Couplings: Capable of joining plain-end PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.

   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Dresser Piping Specialties; Division of Dresser, Inc.
      2) Smith-Blair, Inc.

   b. Stainless-steel or Steel flanges and tube with epoxy finish.
   c. Buna-nitrile seals.
   d. Stainless-steel or Steel bolts, washers, and nuts.
   e. Factory-installed anode for steel-body couplings installed underground.

2.2 PIPING SPECIALTIES

A. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
4. Corrugated stainless-steel tubing with polymer coating.
5. Operating-Pressure Rating: 0.5 psig.
6. End Fittings: Zinc-coated steel.
7. Threaded Ends: Comply with ASME B1.20.1.
8. Maximum Length: 72 inches.

B. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 40-mesh startup strainer and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for propane-gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.4 MANUAL GAS SHUTOFF VALVES

A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.

1. CWP Rating: 125 psig.
2. Threaded Ends: Comply with ASME B1.20.1.
3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

C. General Requirements for Metallic Valves, NPS 2-1/2 and Larger: Comply with ASME B16.38.

1. CWP Rating: 125 psig.

2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
4. Service Mark: Initials "WOG" shall be permanently marked on valve body.

D. One-Piece, Bronze Ball Valve with Bronze Trim: MSS SP-110.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. BrassCraft Manufacturing Company; a Masco company.
    b. Conbraco Industries, Inc.; Apollo Div.
    c. Lyall, R. W. & Company, Inc.
    d. McDonald, A. Y. Mfg. Co.
    e. Perfection Corporation; a subsidiary of American Meter Company.

2. Body: Bronze, complying with ASTM B 584.
3. Ball: Chrome-plated brass.
4. Stem: Bronze; blowout proof.
5. Seats: Reinforced TFE; blowout proof.
6. Packing: Separate packnut with adjustable stem packing threaded ends.
7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
8. CWP Rating: 600 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for propane-gas service with "WOG" indicated on valve body.

E. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. BrassCraft Manufacturing Company; a Masco company.
    b. Conbraco Industries, Inc.; Apollo Div.
    c. Lyall, R. W. & Company, Inc.
    d. McDonald, A. Y. Mfg. Co.
    e. Perfection Corporation; a subsidiary of American Meter Company.

2. Body: Bronze, complying with ASTM B 584.
3. Ball: Chrome-plated bronze.
4. Stem: Bronze; blowout proof.
5. Seats: Reinforced TFE; blowout proof.

6. Packing: Threaded-body packnut design with adjustable-stem packing.
7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
8. CWP Rating: 600 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for propane-gas service with "WOG" indicated on valve body.

F. Bronze Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Lee Brass Company.
    b. McDonald, A. Y. Mfg. Co.

2. Body: Bronze, complying with ASTM B 584.
3. Plug: Bronze.
4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
5. Operator: Square head or lug type with tamperproof feature where indicated.
6. Pressure Class: 125 psig.
7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
8. Service: Suitable for propane-gas service with "WOG" indicated on valve body.

G. Cast-Iron, Lubricated Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Flowserve.
    b. Homestead Valve; a division of Olson Technologies, Inc.
    c. McDonald, A. Y. Mfg. Co.
    d. Milliken Valve Company.
    e. Mueller Co.; Gas Products Div.
    f. R&M Energy Systems, A Unit of Robbins & Myers, Inc.

2. Body: Cast iron, complying with ASTM A 126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with propane-gas.

6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for propane-gas service with "WOG" indicated on valve body.

2.5 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Capitol Manufacturing Company.
    b. Central Plastics Company.
    c. Hart Industries International, Inc.
    d. Jomar International Ltd.
    e. Matco-Norca, Inc.
    f. McDonald, A. Y. Mfg. Co.
    g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
    h. Wilkins; a Zurn company.

2. Description:

    a. Standard: ASSE 1079.
    b. Pressure Rating: 125 psig minimum at 180 deg F.
    c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Capitol Manufacturing Company.
    b. Central Plastics Company.
    c. Matco-Norca, Inc.
    d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
    e. Wilkins; a Zurn company.

2. Description:

a. Standard: ASSE 1079.
b. Factory-fabricated, bolted, companion-flange assembly.
c. Pressure Rating: 125 psig minimum at 180 deg F.
d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

2.6 LABELING AND IDENTIFYING

A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for propane-gas piping system to verify actual locations of piping connections before equipment installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Close equipment shutoff valves before turning off propane-gas to premises or piping section.

B. Inspect propane-gas piping according to NFPA 54 and the International Fuel Gas Code to determine that propane-gas utilization devices are turned off in piping section affected.

C. Comply with NFPA 54 and the International Fuel Gas Code requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of propane-gas piping.

B. Install underground, propane-gas piping buried at least 36 inches below finished grade. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

1. If propane-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.

C. Install underground, PE, propane-gas piping according to ASTM D 2774.

D. Steel Piping with Protective Coating:

1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
3. Replace pipe having damaged PE coating with new pipe.

E. Install fittings for changes in direction and branch connections.

3.4 INDOOR PIPING INSTALLATION

A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of propane-gas piping.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.

D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Locate valves for easy access.

H. Install propane-gas piping at uniform grade of 2 percent down toward drip and sediment traps.

I. Install piping free of sags and bends.

J. Install fittings for changes in direction and branch connections.

K. Verify final equipment locations for roughing-in.

L. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.

M. Concealed Location Installations: Except as specified below, install concealed propane-gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.

1. Above Accessible Ceilings: Propane-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
2. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.

    a. Exception: Tubing passing through partitions or walls does not require striker barriers.

3. Prohibited Locations:

    a. Do not install propane-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys, or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
    b. Do not install propane-gas piping in solid walls or partitions.

N. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

O. Connect branch piping from top or side of horizontal piping.

P. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.

Q. Do not use propane-gas piping as grounding electrode.

R. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.

S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.5 HANGER AND SUPPORT INSTALLATION

A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."

B. Comply with requirements for pipe hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

C. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
5. NPS 4 and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.

3.6 CONNECTIONS

A. Connect to utility's gas main according to utility's procedures and requirements.

B. Install propane-gas piping electrically continuous and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

C. Install piping adjacent to appliances to allow service and maintenance of appliances.

D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.

E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.7 LABELING AND IDENTIFYING

A. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for piping and valve identification.

B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.8 PAINTING

A. Comply with requirements in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for painting interior and exterior propane-gas piping.

B. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.

1. Alkyd System: MPI EXT 5.1D.

a. Prime Coat: Alkyd anticorrosive metal primer.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Exterior alkyd enamel (flat).
d. Color: Gray.

C. Paint exposed, interior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components, with factory-applied paint or protective coating.

1. Latex Over Alkyd Primer System: MPI INT 5.1Q.

a. Prime Coat: Alkyd anticorrosive metal primer.
b. Intermediate Coat: Interior latex matching topcoat.
c. Topcoat: Interior latex (flat).
d. Color: Gray.

D. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Test, inspect, and purge propane-gas according to NFPA 54 and the International Fuel Gas Code and authorities having jurisdiction.

C. Propane-gas piping will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.10 OUTDOOR PIPING SCHEDULE

A. Underground propane-gas piping shall be one of the following:

1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.
2. Steel pipe with wrought-steel fittings and welded joints, or mechanical couplings. Coat pipe and fittings with protective coating for steel piping.

B. Aboveground propane-gas pipingshall be one of the following:

1. Steel pipe with malleable-iron fittings and threaded joints.
2. Steel pipe with wrought-steel fittings and welded joints.

C. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

3.11 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG

A. Aboveground, branch piping NPS 2 and smaller shall be one of the following:

1. Steel pipe with malleable-iron fittings and threaded joints.

B. Aboveground, distribution piping NPS 2-1/2 and larger shall be one of the following:

1. Steel pipe with wrought-steel fittings and welded joints.

C. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

D. Containment Conduit Vent Piping: Steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

END OF SECTION 221600

SECTION 223400 - FUEL-FIRED, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Commercial, gas-fired, high-efficiency, tankless, domestic-water heater.
2. Domestic-water heater accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of domestic-water heater indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings:

1. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of commercial, gas-fired, domestic-water heater, from manufacturer.

B. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.

C. Source quality-control reports.

D. Field quality-control reports.

E. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuel-fired, domestic-water heaters to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE/IESNA Compliance: Fabricate and label fuel-fired, domestic-water heaters to comply with ASHRAE/IESNA 90.1.

C. ASME Compliance:

1. Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
2. Where ASME-code construction is indicated, fabricate and label commercial, finned-tube, domestic-water heaters to comply with ASME Boiler and Pressure Vessel Code: Section IV.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

1.7 COORDINATION

A. Coordinate sizes and locations of bases with actual equipment provided.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-fired, domestic-water heaters that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including storage tank and supports.
b. Faulty operation of controls.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion.

a. Commercial, Gas-Fired, Storage, Domestic-Water Heaters:

1) Storage Tank: Five years.
2) Controls and Other Components: Two year(s).

PART 2 - PRODUCTS

2.1 COMMERCIAL, GAS-Fired, STORAGE, domestic-WATER HEATERS

A. Commercial, Gas-Fired, High-Efficiency, Storage, Domestic-Water Heaters:
1. Basis-of-Design Product: Subject to compliance with requirements, provide A.O. Smith model GCRT-50L or comparable product by one of the following:

a. Lochinvar Corp.
b. Rheem Manufacturing Company.
c. Bradford White Mfg. Co.

2. Standard: ANSI Z21.10.3/CSA 4.3.
3. Description: Manufacturer's proprietary design to provide at least 95 percent combustion efficiency at optimum operating conditions.
4. Storage-Tank Construction: ASME-code steel with 150-psig minimum working-pressure rating.

a. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing.

1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.

b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
c. Lining: Glass complying with NSF 61 barrier materials for potable-water tank linings, including extending lining into and through tank fittings and outlets.

5. Factory-Installed Storage-Tank Appurtenances:

a. Anode Rod: Replaceable magnesium.
b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
c. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
d. Insulation: Comply with ASHRAE/IESNA 90.1. Surround entire storage tank except connections and controls.
e. Jacket: Steel with enameled finish.
f. Burner or Heat Exchanger: Comply with UL 795 or approved testing agency requirements for gas-fired, high-efficiency, domestic-water heaters and natural-gas fuel.
g. Temperature Control: Adjustable thermostat.
h. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.

i. Combination Temperature-and-Pressure Relief Valves: ANSI Z21.22/CSA 4.4-M. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.

B. Capacity and Characteristics:

1. Refer to equipment data on drawings.
2. Electrical Characteristics:

a. Volts: 120.
b. Phase: Single.
c. Hertz: 60.
d. Full-Load Amperes: 3.2.

2.2 domestic-WATER HEATER ACCESSORIES

A. Domestic-Water Compression Tanks:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Amtrol Inc. or comparable product by one of the following:

a. Taco, Inc.
b. Bell and Gossett.
c. A.O. Smith Co.

2. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
3. Construction:

a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
c. Air-Charging Valve: Factory installed.

4. Capacity and Characteristics:

a. Refer to equipment data on drawings.

B. Gas Shutoff Valves: ANSI Z21.15/CSA 9.1-M, manually operated. Furnish for installation in piping.

C. Gas Pressure Regulators: ANSI Z21.18/CSA 6.3, appliance type. Include 1/2-psig pressure rating as required to match gas supply.

D. Combination Temperature-and-Pressure Relief Valves: Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.

1. Gas-Fired, Domestic-Water Heaters: ANSI Z21.22/CSA 4.4-M.

E. Concentric vent kit for combustion air and vent. One (1) for wall mounting.

F. Condensate neutralization kit for each heater.

G. Recirculating Pump: Refer to drawings for capacities. Pumps shall be as manufactured by Bell & Gossett, Taco, Armstrong or Grundfos.

2.3 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect assembled domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test commercial domestic-water heaters and storage tanks to minimum of one and one-half times pressure rating before shipment.

C. Domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 domestic-WATER HEATER INSTALLATION

A. Install domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."

B. Install gas-fired, domestic-water heaters according to NFPA 54.

1. Install gas shutoff valves on gas supply piping to gas-fired, domestic-water heaters without shutoff valves.
2. Install gas pressure regulators on gas supplies to gas-fired, domestic-water heaters without gas pressure regulators if gas pressure regulators are required to reduce gas pressure at burner.
3. Install automatic gas valves on gas supplies to gas-fired, domestic-water heaters if required for operation of safety control.
4. Comply with requirements for gas shutoff valves, gas pressure regulators, and automatic gas valves specified in Section 221600 "Facility Natural-Gas Piping."

C. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

D. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties."

E. Install thermometer on outlet piping of domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."

F. Fill domestic-water heaters with water.

G. Charge domestic-water compression tanks with air.

3.2 CONNECTIONS

A. Comply with requirements for domestic-water piping specified in Section 221116 "Domestic Water Piping."

B. Comply with requirements for fuel-oil piping specified in Section 231113 "Facility Fuel-Oil Piping."

C. Comply with requirements for gas piping specified in Section 221600 "Facility Natural-Gas Piping."

D. Drawings indicate general arrangement of piping, fittings, and specialties.

E. Where installing piping adjacent to fuel-fired, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

C. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial, gas-fired, storage, domestic-water heaters.

END OF SECTION 223400

SECTION 224150 – PLUMBING FIXTURES

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. Plumbing fixtures installed in place complete with supports, supply and waste trim shall be provided as shown on the drawings and as specified.

B. Refer to Division 7 for submittal, qualification, storage, handling warranty and installation requirements for joint sealants. Shop drawings shall be submitted to the Architect for review and approval.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for lavatories.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted plumbing fixtures.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For plumbing fixtures and faucets to include in emergency, operation, and operation and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.
3. Flushometer-Tank Repair Kits: Equal to 5 percent of amount of each type installed, but no fewer than two of each type.

PART 2 - PRODUCTS

2.1 FIXTURES AND TRIM

A. Refer to schedule on the drawings for fixture specifications, including supply and waste trim and carriers where required. The schedule lists catalog numbers of various manufacturers. These catalog numbers are for the purpose of comparison to establish the construction material, quality and features of the fixtures and their components. Fixtures of equal quality by manufacturers listed in each category will be acceptable.

B. Fixture supply trim shall be of non-ferrous construction and supplies to each fixture shall be individually valved. Valves, supplies and escutcheons shall be furnished with the fixture supply trim.

C. Where exposed to view, all waste trim and supply trim shall be brass chrome plated furnished with wall escutcheons.

D. Screwed nipples serving fixtures from copper tube supply system shall be solid brass to avoid electrolytic corrosion. Exposed nipples shall be chrome plated.

E. Fixtures shall be white unless otherwise noted.

F. Water cooler color selection from optional colors by Architect.

2.2 JOINT SEALANTS

A. Joint sealants shall be by Pecora, Sonneborn, Tremco, or equal by Division 7 listed manufacturers.

B. At regular china fixtures- one part, mildew resistant silicone, ASTM C-920, Type S, Grade NS, Class 25 with fungicide, white, equal to Pecora 898.

C. In secure areas - two-part epoxy security sealant, ASTM C-881, Type 1, high solids, pick resistant, Shore 0 hardness of 70, color as selected by Architect, equal to Pecora Dynapoxy EP-1200.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing-fixture installation.

B. Examine walls, floors, cabinets, and counters for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Space fixtures and rough-in carefully. Fixtures shall be carefully assembled and connected to the required plumbing outlets so the equipment will be ready for use when work is completed. Height shall be within 0.50" of specified nominal.

B. Secure supply and waste piping in chases and walls to preclude loose and ill-fitting pipes thru wall.

C. After installation of the fixtures is completed, all connecting pipes shall be flushed out through the fixtures to eliminate scale, and all valves shall be properly adjusted and fixtures left complete and ready for use. All fixtures shall be cleaned immediately prior to acceptance by the Owner.

D. Seal joints around each fixture at wall, floor and any adjacent construction.

E. Install plumbing fixtures level and plumb according to roughing-in drawings.

F. Install floor-mounted water closets on closet flange attachments to drainage piping.

G. Install counter-mounting fixtures in and attached to casework.

H. Install pedestal lavatories on pedestals and secured to wood blocking in wall.

I. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Comply with valve requirements specified in Section 220523 "General-Duty Valves for Plumbing Piping."

J. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.

K. Install toilet seats on water closets.

L. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

M. Install shower flow-control fittings with specified maximum flow rates in shower arms.

N. Install traps on fixture outlets.

1. Exception: Omit trap on fixtures with integral traps.
2. Exception: Omit trap on indirect wastes unless otherwise indicated.

O. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories and sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

P. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings.

Q. Seal joints between plumbing fixtures, counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories and sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.4 ADJUSTING

A. Operate and adjust plumbing fixtures and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of plumbing fixtures inspect and repair damaged finishes.

B. Clean plumbing fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed plumbing fixtures and fittings.

D. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224150

INDEX

DIVISION 23 - HVAC

LIFE FIRST AMBULANCE DISTRICT
EMERGENCY MEDICAL SERVICES (EMS) STATION
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Westerville, Ohio 43082
OEG Project No. 2026P02

Section	Section Title
DIVISION 23	HEATING VENTILATING AND AIR CONDITIONING
230505	Common Work Results for HVAC
230513	Common Motor Requirements for HVAC Equipment
230529	Hangers and Supports for HVAC Piping and Equipment
230553	Identification for HVAC Piping and Equipment
230593	Testing, Adjusting, and Balancing for HVAC
230713	Duct Insulation
230900	Instrumentation and Control for HVAC
230995	Gas Monitoring System
232300	Refrigerant Piping
233113	Metal Ducts
233300	Air Duct Accessories
233416	HVAC Fans
233713	Diffusers, Registers and Grilles
235400	Fuel-Fired Furnaces (Propane)
235533	Fuel-Fired Unit Heaters (Propane)
236200	Packaged Compressor and Condenser Units
238239.19	Electric Wall Heater

AUGUST, 2026

SECTION 230505 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of this Section apply to all sections of Division 23.

B. All provisions of the Bidding Requirements, General Conditions, and Division 1 General Requirements apply to work specified in this Division.

C. The Mechanical and Electrical drawings and specifications assign work (labor and/or materials) to be provided by the General, Plumbing, HVAC or Electrical Contractor or their sub-contractors. Understanding that the contractors for mechanical and electrical work are sub-contractors to the (General) Contractor, such assignments are not intended to restrict the Contractor in assignment of work among the Sub-Contractor to accommodate trade agreements and practices or the normal conduct of the construction work.

1.2 SUMMARY

A. The scope of the HVAC work includes furnishing, installing, testing and warranty of all HVAC work and complete HVAC systems shown on the HVAC drawings and specified herein.

1.3 ALTERNATES

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

B. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

C. Schedule of Alternates

1. Alternate No. 3: Provide all HVAC work as required for the additional garage bay as indicated on the drawings, Sheet H-100, Alternate Garage Bay Plan.

1.4 PERMITS AND REGULATIONS

A. Include payment of all permit and inspection fees applicable to the work in this Division. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.

B. Work must conform to applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.

1.5 QUALITY ASSURANCE

A. Mechanical, electrical and associated systems shall be safe, reliable, efficient, durable, easily and safely operable and maintainable, easily and safely accessible, and in compliance with applicable codes as specified. The systems shall be comprised of high quality institutional-class and industrial-class products of manufacturers that are experienced specialists in the required product lines. All construction firms and personnel shall be experienced and qualified specialists in industrial and institutional HVAC.

B. Flow Rate Tolerance for HVAC Equipment: Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC.

C. Equipment Vibration Tolerance:

1. PRODUCTS Refer to Section 230548, VIBRATION CONTROLS FOR HVAC PIPING and EQUIPMENT. Equipment shall be factory-balanced to this tolerance and re-balanced on site, as necessary.

2. After HVAC air balance work is completed and permanent drive sheaves are in place, perform field mechanical balancing and adjustments required to meet the specified vibration tolerance.

D. Products Criteria:

1. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years (or longer as specified elsewhere). The design, model and size of each item shall have been in satisfactory and efficient operation on at least three installations for approximately three years. However, digital electronics devices, software and systems such as controls, instruments, computer work station, shall be the current generation of technology and basic design that has a proven

satisfactory service record of at least three years. See other specification sections for any exceptions and/or additional requirements.

2. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.

3. Conform to codes and standards as required by the specifications. Conform to local codes, if required by local authorities such as the natural gas supplier, if the local codes are more stringent then those specified. Refer any conflicts to the Engineer.

4. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

5. Assembled Units: Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.

6. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

7. Asbestos products or equipment or materials containing asbestos shall not be used.

8. All equipment/material shall be new and listed for the application, unless otherwise authorized in writing by the Owner before installation.

E. Equipment Service Organizations:

1. HVAC: Products and systems shall be supported by service organizations that maintain a complete inventory of repair parts and are located within 50 miles to the site.

F. HVAC Mechanical Systems Welding: Before any welding is performed, contractor shall submit a certificate certifying that welders comply with the following requirements:

1. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".

2. Comply with provisions of ASME B31 series "Code for Pressure Piping".

3. Certify that each welder has passed American Welding Society (AWS) qualification tests for the welding processes involved, and that certification is current.

G. Execution (Installation, Construction) Quality:

1. Apply and install all items in accordance with manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Engineer for resolution. Provide written hard copies or computer files of manufacturer's installation instructions to the Engineer at least two weeks prior to commencing installation of any item. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations is a cause for rejection of the material.

1.6 SUBMITTALS

A. Certificate of Compliance with Build America/Buy America Grant Requirements.

B. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

C. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

D. Submit in accordance with Section 013300, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, and with requirements in the individual specification sections.

E. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.

F. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.

G. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.

H. Submittals and shop drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient installation.

I. Six (6) sets of submittals and descriptive information shall be assembled by each Contractor of equipment and materials furnished in their contract, and submitted to the Architect and/or Engineer for review as stated in the General Conditions and Supplementary Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and factory test data and documents showing conformance to relevant standards. Shop drawings for equipment, fixtures, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review.

J. In lieu of “paper submittals” the Contractor can submit “electronic submittals” of all items requiring shop drawings.

Electronic submittals shall identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single specification section and transmittal form with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

K. The review of submittals by the Architect or Engineer shall not relieve the Contractor from responsibility for errors in the submittals. Deviations from specifications and drawing requirements shall be called to the Engineer's attention in a separate clearly stated notification at the time of submittal for the Engineer's review.

L. Submittals of the following HVAC equipment and materials shall be submitted:

1. Flexible connectors.

2. Gauges.

3. Vibration isolators.

4. Ductwork insulation.

5. Electric wall heaters.

6. Exhaust fans and ventilation air fan

7. Fuel-fired furnaces.

8. Package compressor and condenser units.

9. Fuel-fired unit heaters.

10. Air outlets and inlets.

11. Temperature controls system.

1.7 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.8 DRAWINGS AND SPECIFICATIONS

A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are- necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Architect for approval before proceeding with the work.

B. Make all necessary field measurements to insure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay.

C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Architect for interpretation or correction, so that misunderstandings at a later date may be avoided. The contract drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Having ductwork, pipe and fittings fabricated and delivered in advance of making actual measurements shall not be sufficient cause to avoid making offsets and minor changes as may be necessary to install ductwork, piping and equipment.

D. The Architect shall reserve the right to make minor-adjustment in locations of system runs and components where considered desirable in the interest of concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.

E. Equipment, ductwork or piping shall not be installed in the dedicated electrical space above or in the working space required around electrical switchgear, motor control centers or panelboards as identified by National Electric Code (NEC) 110.16 Spaces About Electrical Equipment 600 Volts Nominal or Less. For equipment rated over 600 Volts Nominal - 110.32 Work Space Above Equipment - 110-33 Entrance and Access to Work Space - 110.34 Work Space and Guarding.

F. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of ductwork, piping, etc., where conflict arises.

G. Provide offsets in system runs, additional fittings, necessary drains and minor valves, traps, dampers and devices required to complete the installation, or for the proper operation of the system. Each Contractor shall exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.

H. Should overlap of work among the trades become evident, this shall be called to the attention of the Architect. In such event, none of the trades or their suppliers shall assume that he is relieved of the work which is specified under his branch until instructions in writing are received from the Architect.

1.9 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

B. Protection of Equipment:

1. Equipment and material placed on the job site shall remain in the custody of the Contractor until phased acceptance, whether or not the Owner has reimbursed the Contractor for the equipment and material. The Contractor is solely responsible for the protection of such equipment and material against any damage.

2. Place damaged equipment in first class, new operating condition; or, replace same as determined and directed by the Engineer. Such repair or replacement shall be at no additional cost to the Owner.

3. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

4. Existing equipment and piping being worked on by the Contractor shall be under the custody and responsibility of the Contractor and shall be protected as required for new work.

C. Cleanliness of Piping and Equipment Systems:

1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.

2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.

3. Clean interior of all tanks prior to delivery for beneficial use by the Owner.

4. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

1.10 INSPECTION

A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Architect, Engineer and Owner.

B. Final inspection certificates shall-be obtained by the Contractor and given to the Owner.

1.11 RECORD DRAWINGS

A. Each Contractor shall maintain a separate set of prints of the contract documents and shall show all changes or variations, in a manner to be clearly discernible, which are made during construction. Upon completion of the work, these drawings shall be turned over to the Architect.

B. Coordinate submission of as-builts in accord with Owner's documentation requirements.

1.12 OPERATING AND MAINTENANCE MANUALS

A. Two copies each of operating and maintenance manuals shall be assembled for HVAC work by the respective Contractor.

B. All shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. Air and water balance reports and domestic water disinfection certificate of completion shall also be included. In addition, the Contractor shall prepare a chart listing all items of equipment which are furnished under his contract and indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required.

C. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included. these shall be submitted to the Architect or Engineer for review. Upon approval, manuals shall be turned over to the Owner.

D. Digital copies in PDF and native format are required for all manuals and drawings.

1.13 FINAL INSPECTION AND PUNCH LIST

A. As the time of work completion approaches, the Contractor shall survey and inspect his work and develop his own punch list to confirm that it is complete and finished. He shall then notify the Architect and request that a final inspection be made. It shall not be considered the Architect's or Engineer's Obligation to perform a final inspection until the Contractor has inspected the work and so states at the time of the request for the final inspection.

B. Requests to the Architect, Engineer or Owner for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.

C. The Architect, Engineer and Owner will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken by the Contractor to the satisfaction of Architect and Engineer within 30 days of receipt of the Architect/Engineer's punch list.

1.14 WARRANTY

A. This Contractor shall warrant all workmanship, equipment and material entering into this contract for a period of two years from date of final acceptance or date of beneficial use, as agreed to between Contractor and Architect. An materials or equipment proving to be defective during this warranty period shall be m de good by this Contractor without expense to the Owner.

B. This provision is intended specifically to cover deficiencies in contract completion or performance which are discovered after systems are placed in operation. Also included

shall be supplementary assistance in balancing, adjusting or providing operating instructions as the need develops, and replacing overload heater elements in starters where necessary to keep systems in operation. Heater element sizes shall not exceed the motor manufacturer's recommendations.

C. This provision shall not be construed to include maintenance items such as replacing filters, re-tightening or repacking glands, greasing, oiling, belt tightening and cleaning strainers after these have been done for final close-out.

D. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

1.15 CONSTRUCTION WATER

A. Refer to Division 1 - General Requirements, for information regarding construction water.

1.16 TEMPORARY HEAT

A. Refer to Division 1 - General Requirements for information regarding temporary heating.

B. Fuel and electric costs attendant to temporary heating are not included in Division 23.

C. The use of the permanent HVAC system for temporary heating and ventilation during the latter stages of construction shall be allowed. Expedite completion of system as practicable to this end. Maintain the system during this period, Provide and maintain temporary air filters to protect coils and ducts. Replace temporary filters with the specified filters (clean) when the systems are placed on permanent duty. Air filters specified for the systems and units, including specified spare filters, are <u>not</u> to be used for temporary service.

D. Cover all return duct openings with temporary filter media when recirculating air. Stop fans during heavy dust generating operations. Before turning the system over to the Owner, the Contractor shall clean duct interiors and interior surfaces and components with the air handling equipment if dirt, dust and debris have accumulated on these surfaces.

E. Warranty periods on equipment, materials and system shall commence upon Owner acceptance of the building or systems. Temporary heat use shall not jeopardize or alter the warranty requirements.

PART 2 - PRODUCTS

2.1 FACTORY-ASSEMBLED PRODUCTS

A. Provide maximum standardization of components to reduce spare part requirements.

B. Manufacturers of equipment assemblies that include components made by others shall assume complete responsibility for final assembled unit.

1. All components of an assembled unit need not be products of same manufacturer.

2. Constituent parts that are alike shall be products of a single manufacturer.

3. Components shall be compatible with each other and with the total assembly for intended service.

4. Contractor shall guarantee performance of assemblies of components, and shall repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly.

C. Components of equipment shall bear manufacturer's name and trademark, model number, serial number and performance data on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment.

D. Major items of equipment, which serve the same function, must be the same make and model. Exceptions will be permitted if performance requirements cannot be met.

2.2 REFERENCE STANDARDS

A. Where standards (NFPA, NEC, ASTM, UL, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the authority having jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used.

2.3 EQUIPMENT SELECTION

A. The selection of materials and equipment to be furnished under this contract shall be governed by the following:

1. Where trade names, brands, or manufacturers of equipment or materials are listed in the specification, the exact equipment listed shall be furnished. Where more than one name is used, the Contractor shall have the option of selecting between anyone of the several specified. All products shall be first quality line of manufacturer's listed.

2. Where the words "or approved equal" appear after a manufacturer's name, specific approval must be obtained from the Architect and Owner during the bidding period in sufficient time to be included in an addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.

3. Where the words "equal to" appear, followed by a manufacturer's name and sometimes a model or series designation, such designation is intended to establish quality level and standard features. Equal equipment by other manufacturers will be acceptable, subject to the Engineer's and Owner's approval.

B. Substitute equipment of equal quality and capacity will be considered when the listing of such is included as a separate item of the bid. State the deduction or addition in cost to that of the specified product.

C. Before bidding equipment, and again in the preparation of shop drawings, the Contractor and his supplier shall verify that adequate space is available for entry and installation of the item of equipment, including associated piping and accessories. Also verify that adequate space is available for servicing of the equipment.

D. If extensive changes in pipe, duct or equipment layout or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in the contract.

2.4 BELT DRIVES

A. Type: ANSI/RMA standard V-belts with proper motor pulley and driven sheave. Belts shall be constructed of reinforced cord and rubber.

B. Dimensions, rating and selection standards: ANSI/RMA IP-20 and IP-21.

C. Minimum Horsepower Rating: Motor horsepower plus recommended ANSI/RMA service factor (not less than 20 percent) in addition to the ANSI/RMA allowances for pitch diameter, center distance, and arc of contact.

D. Maximum Speed: 25 m/s (5000 feet per minute).

E. Adjustment Provisions: For alignment and ANSI/RMA standard allowances for installation and take-up.

F. Drives may utilize a single V-Belt (any cross section) when it is the manufacturer's standard.

G. Multiple Belts: Matched to ANSI/RMA specified limits by measurement on a belt measuring fixture. Seal matched sets together to prevent mixing or partial loss of sets. Replacement, when necessary, shall be an entire set of new matched belts.

H. Sheaves and Pulleys:

1. Material: Pressed steel, or close grained cast iron.

2. Bore: Fixed or bushing type for securing to shaft with keys.

3. Balanced: Statically and dynamically.

4. Groove spacing for driving and driven pulleys shall be the same.

I. Drive Types, Based on ARI 435:

1. Provide adjustable-pitch //or fixed-pitch// drive as follows:

a. Fan speeds up to 1800 RPM: 7.5 kW (10 horsepower) and smaller.

b. Fan speeds over 1800 RPM: 2.2 kW (3 horsepower) and smaller.

2. Provide fixed-pitch drives for drives larger than those listed above.

3. The final fan speeds required to just meet the system CFM and pressure requirements, without throttling, shall be determined by adjustment of a temporary adjustable-pitch motor sheave or by fan law calculation if a fixed-pitch drive is used initially.

2.5 DRIVE GUARDS

A. For machinery and equipment, provide guards as shown in AMCA 410 for belts, chains, couplings, pulleys, sheaves, shafts, gears and other moving parts regardless of height above the floor to prevent damage to equipment and injury to personnel. Drive guards may be excluded where motors and drives are inside factory fabricated air handling unit casings.

B. Pump shafts and couplings shall be fully guarded by a sheet steel guard, covering coupling and shaft but not bearings. Material shall be minimum 16-gage sheet steel; ends shall be braked and drilled and attached to pump base with minimum of four 6 mm (1/4-inch) bolts. Reinforce guard as necessary to prevent side play forcing guard onto couplings.

C. V-belt and sheave assemblies shall be totally enclosed, firmly mounted, non-resonant. Guard shall be an assembly of minimum 22-gage sheet steel and expanded or

perforated metal to permit observation of belts. 25 mm (one-inch) diameter hole shall be provided at each shaft centerline to permit speed measurement.

D. Materials: Sheet steel, cast iron, expanded metal or wire mesh rigidly secured so as to be removable without disassembling pipe, duct, or electrical connections to equipment.

E. Access for Speed Measurement: 25 mm (One inch) diameter hole at each shaft center.

2.6 ELECTRIC MOTORS

A. All material and equipment furnished and installation methods shall conform to the requirements of Section 230513, COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT; Section 262913, ENCLOSED CONTROLLERS; and, Section 260519, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW). Provide all electrical wiring, conduit, and devices necessary for the proper connection, protection and operation of the systems. Provide special energy efficient premium efficiency type motors as scheduled.

2.7 EQUIPMENT AND MATERIALS IDENTIFICATION

A. Use symbols, nomenclature and equipment numbers specified, shown on the drawings and shown in the maintenance manuals. Identification for piping is specified in Section 230553, Identification for HVAC Piping and Equipment.

B. Use symbols, nomenclature and equipment numbers specified, shown on the drawings and shown in the maintenance manuals. In addition, provide bar code identification nameplate for all equipment which will allow the equipment identification code to be scanned into the system for maintenance and inventory tracking.

C. Interior (Indoor) Equipment: Engraved nameplates, with letters not less than 48 mm (3/16-inch) high of brass with black-filled letters, or rigid black plastic with white letters permanently fastened to the equipment. Identify unit components such as coils, filters, fans, etc.

PART 3 - EXECUTION

3.1 ARRANGEMENT AND INSTALLATION OF EQUIPMENT AND PIPING

A. Coordinate location of piping, sleeves, inserts, hangers, ductwork and equipment. Locate piping, sleeves, inserts, hangers, ductwork and equipment clear of windows, doors, openings, light outlets, and other services and utilities. Prepare equipment layout drawings to coordinate proper location and personnel access of all facilities. Submit the drawings for review. Follow manufacturer's published recommendations for installation methods not otherwise specified.

B. Operating Personnel Access and Observation Provisions: Select and arrange all equipment and systems to provide clear view and easy access, without use of portable ladders, for maintenance and operation of all devices including, but not limited to: all equipment items, valves, filters, strainers, transmitters, sensors, control devices. All gages and indicators shall be clearly visible by personnel standing on the floor or on permanent platforms. Do not reduce or change maintenance and operating space and access provisions that are shown on the drawings.

C. Equipment and Piping Support: Coordinate structural systems necessary for pipe and equipment support with pipe and equipment locations to permit proper installation.

D. Location of pipe sleeves, trenches and chases shall be accurately coordinated with equipment and piping locations.

E. Cutting Holes:

1. Cut holes through concrete and masonry by rotary core drill. Pneumatic hammer, impact electric, and hand or manual hammer type drill will not be allowed, except as permitted by Engineer where working area space is limited.

2. Locate holes to avoid interference with structural members such as beams or grade beams. Holes shall be laid out in advance and drilling done only after approval by the Engineer. If the Contractor considers it necessary to drill through structural members, this matter shall be referred to Engineer for approval.

3. Do not penetrate membrane waterproofing.

F. Protection and Cleaning:

1. Equipment and materials shall be carefully handled, properly stored, and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the Engineer. Damaged or defective items in the opinion of the Engineer, shall be replaced.

2. Protect all finished parts of equipment, such as shafts and bearings where accessible, from rust prior to operation by means of protective grease coating and wrapping. Close pipe openings with caps or plugs during installation. Tightly cover and protect fixtures and equipment against dirt, water chemical, or mechanical injury. At completion of all work thoroughly clean fixtures, exposed materials and equipment.

G. Switchgear/Electrical Equipment Drip Protection: Every effort shall be made to eliminate the installation of pipe above electrical and telephone switchgear. If this is not possible, encase pipe in a second pipe with a minimum of joints. Installation of piping, ductwork, leak protection apparatus or other installations foreign to the

electrical installation shall be located in the space equal to the width and depth of the equipment and extending from the floor to a height of 1.8 m (6 ft.) above the equipment or to structural ceiling, whichever is lower (NFPA 70).

H. Inaccessible Equipment:

1. Where the Engineer determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action performed as directed at no additional cost to the Owner.

2. The term "conveniently accessible" is defined as capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.

3.2 PIPE AND EQUIPMENT SUPPORTS

A. Where hanger spacing does not correspond with joist or rib spacing, use structural steel channels secured directly to joist and rib structure that will correspond to the required hanger spacing, and then suspend the equipment and piping from the channels. Drill or burn holes in structural steel only with the prior approval of the Engineer.

B. Use of chain, wire or strap hangers; wood for blocking, stays and bracing; or, hangers suspended from piping above will not be permitted. Replace or thoroughly clean rusty products and paint with zinc primer.

C. Use hanger rods that are straight and vertical. Turnbuckles for vertical adjustments may be omitted where limited space prevents use. Provide a minimum of 15 mm (1/2-inch) clearance between pipe or piping covering and adjacent work.

3.3 CLEANING AND PAINTING

A. Prior to final inspection and acceptance of the facilities for beneficial use by the Owner, the facilities, equipment and systems shall be thoroughly cleaned and painted. Refer to Division 09 - Finishes.

B. In addition, the following special conditions apply:

1. Cleaning shall be thorough. Use solvents, cleaning materials and methods recommended by the manufacturers for the specific tasks. Remove all rust prior to painting and from surfaces to remain unpainted. Repair scratches, scuffs, and abrasions prior to applying prime and finish coats.

2. Material And Equipment Not To Be Painted Includes:

a. Motors, controllers, control switches, and safety switches.

b. Control and interlock devices.

c. Lubrication devices and grease fittings.

d. Copper, brass, aluminum, stainless steel and bronze surfaces.

e. Pressure gauges and thermometers.

f. Glass.

g. Name plates.

3. Control and instrument panels shall be cleaned, damaged surfaces repaired, and shall be touched-up with matching paint obtained from panel manufacturer.

4. Temporary Facilities: Apply paint to surfaces that do not have existing finish coats.

5. Final result shall be smooth, even-colored, even-textured factory finish on all items. Completely repaint the entire piece of equipment if necessary to achieve this.

3.4 MOTOR AND DRIVE ALIGNMENT

A. Belt Drive: Set driving and driven shafts parallel and align so that the corresponding grooves are in the same plane.

B. Direct-connect Drive: Securely mount motor in accurate alignment so that shafts are free from both angular and parallel misalignment when both motor and driven machine are operating at normal temperatures.

3.5 OPERATING AND PERFORMANCE TESTS

A. Prior to the final inspection, perform required tests as specified in Section 010000, GENERAL REQUIREMENTS and submit the test reports and records to the Engineer.

B. Should evidence of malfunction in any tested system, or piece of equipment or component part thereof, occur during or as a result of tests, make proper corrections, repairs or replacements, and repeat tests at no additional cost to the Owner.

C. When completion of certain work or system occurs at a time when final control settings and adjustments cannot be properly made to make performance tests, then make performance tests for heating systems and for cooling systems respectively during first actual seasonal use of respective systems following completion of work.

3.6 OPERATION AND ADJUSTMENT OF EQUIPMENT

A. As each air distribution system is put into operation, all items of equipment included therein shall be adjusted to proper working order. This shall. include balancing air and water systems, adjusting fan speeds, belts, pulleys, tightening packing glands, and adjusting all operating equipment.

B. Caution: Verify that all bearings are lubricated, all motors are operating in the right direction, and correct overload heater elements' are provided on all motors. Do not depend wholly on the electrician's judgment in these matters. Follow specific instructions in regard to lubrication. Do' not oil or grease presealed ball bearings unless upon manufacturer's specific instructions.

C. Test relief valves, air vents and regulating valves to insure proper operation.

3.7 OPERATING DEMONSTRATION AND INSTRUCTIONS

A. The Contractor shall set the various systems into operation and demonstrate to the Owner and Architect that the systems function properly and that the requirements of the Contract are fulfilled.

B. The Contractor shall provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and 'systems. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings.

C. O&M manuals shall be submitted, reviewed and approved prior to scheduling of demonstrations.

3.8 WORKMANSHIP

A. Materials and equipment shall be installed and supported in a first-class and workmanship manner by mechanics skilled in their particular trades. Workmanship shall be first-class in al/ respects, and the Architect shall have the right to stop the work if highest quality workmanship is not maintained.

B. HVAC work shall be performed by licensed HVAC Contractors in accordance with requirements of the jurisdiction.

3.9 PROTECTION

A. Each Contractor shall be entirely responsible for all material and equipment furnished in connection with his work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Architect.

B. The Owner's property and the property of other contractors shall be scrupulously respected at all times. Provide drop cloths and visqueen or similar barriers where dust and debris is generated, to protect adjacent areas.

3.10 CUTTING AND PATCHING

A. Refer to Division 1 - General Requirements for information regarding cutting and patching.

B. Plan the work well ahead of the general construction. Where pipes and ducts are to pass thru new walls, partitions, floors, roof or ceilings, place sleeves in these elements or arrange with the General Contractor to provide openings where sleeves are not practical. Where sleeves or openings have not been installed, cut holes and patch as required for the installation of this work, or pay other trades for doing this work when so directed by the Architect. Any damage caused to the building shall be repaired or rectified.

C. Where pipes and ducts are to pass thru, above or behind existing walls, partitions, floors, roof or ceiling, cutting, patching and refinishing of same shall be 'included in this contract. Core drilling and saw cutting shall be utilized.

D. All sleeves and openings not used or partially used shall be closed to prevent passage of smoke and fire.

E. All materials, methods and procedures used in patching and refinishing shall be in accordance with applicable provisions of specifications governing the various trades. The final appearance and integrity of the patched and refinished areas must meet the approval of the Architect. Wall, floor and ceiling refinishing must extend to logical termination lines (entire ceiling of the room repainted, for instance), if an acceptable appearance cannot be attained by finishing a partial area.

F. Provide steel angle or channel lintels to span openings which are cut in existing jointed masonry walls where the opening span exceeds 16 inches. Provide framing around roof openings for required support of the roof deck.

END OF SECTION 230505

SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

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 general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with NEMA MG 1 unless otherwise indicated.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet (1000 m) above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with

indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Energy efficient, as defined in NEMA MG 1.

C. Service Factor: 1.15.

D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

E. Multispeed Motors: Separate winding for each speed.

F. Rotor: Random-wound, squirrel cage.

G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

H. Temperature Rise: Match insulation rating.

I. Insulation: Class F.

J. Code Letter Designation:

1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.

K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230513

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Fastener systems.

B. Related Sections:

1. Section 233113 "Metal Ducts" for duct hangers and supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.6 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carpenter & Paterson, Inc.
2. ERICO International Corporation.
3. National Pipe Hanger Corporation.
4. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
5. Piping Technology & Products, Inc.

B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.

C. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

D. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.3 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless-steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

C. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

D. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

E. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

F. Install hangers and supports to allow controlled thermal movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion loops, expansion bends, and similar units.

G. Install lateral bracing with pipe hangers and supports to prevent swaying.

H. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

J. Pipe Stand Installation: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.

3.2 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.3 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.5 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.

F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

G. Use thermal-hanger shield inserts for insulated piping and tubing.

H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg ., pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
3. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.

I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.

J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.

2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
4. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.

END OF SECTION 230529

SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Duct labels.
3. Stencils.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2.2 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: White.

C. Background Color: Black.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 DUCT LABEL INSTALLATION

A. Install self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:

1. ASME A13.1 Colors and Designs: For hazardous material exhaust.

B. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

END OF SECTION 230553

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Furnace Units F-1 and F-2.

b. Exhaust fan systems EF-1 thru EF-6.

c. Supply air fan system SA-1.

d. Ventilation air fan VF-1.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

1.4 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC or NEBB.

1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC or NEBB.
2. TAB Technician: Employee of the TAB contractor and who is certified by AABC or NEBB as a TAB technician.

B. TAB Conference: Meet with Architect on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the

participation of the TAB field supervisor and technicians. Provide seven (7) days' advance notice of scheduled meeting time and location.

1. Agenda Items:

    a. The Contract Documents examination report.
    b. The TAB plan.
    c. Coordination and cooperation of trades and subcontractors.
    d. Coordination of documentation and communication flow.

C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms approved by Architect.

E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

F. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

G. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.5 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.6 COORDINATION

A. Notice: Provide seven (7) days' advance notice for each test. Include scheduled test dates and times.

B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

I. Examine operating safety interlocks and controls on HVAC equipment.

J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Balance, smoke, and fire dampers are open.
5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
6. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.

1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check condensate drains for proper connections and functioning.

J. Check for proper sealing of air-handling-unit components.

K. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

    a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet or through the flexible connection.
    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
    d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up a rooftop unit, and other air-handling and -treating equipment.

    a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.

    a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.
3. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.6 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

3.7 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Heating-Water Flow Rate: Plus or minus 10 percent.

3.8 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.9 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Pump curves.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.

2. Duct, outlet, and inlet sizes.
3. Terminal units.
4. Balancing stations.
5. Position of balancing devices.

E. Gas-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Fuel type in input data.
g. Output capacity in Btu/h.
h. Ignition type.
i. Burner-control types.
j. Motor horsepower and rpm.
k. Motor volts, phase, and hertz.
l. Motor full-load amperage and service factor.
m. Sheave make, size in inches, and bore.
n. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm.
b. Entering-air temperature in deg F.
c. Leaving-air temperature in deg F.
d. Air temperature differential in deg F.
e. Entering-air static pressure in inches wg.
f. Leaving-air static pressure in inches wg.
g. Air static-pressure differential in inches wg.
h. Low-fire fuel input in Btu/h.
i. High-fire fuel input in Btu/h.
j. Manifold pressure in psig.
k. High-temperature-limit setting in deg F.
l. Operating set point in Btu/h.
m. Motor voltage at each connection.
n. Motor amperage for each phase.
o. Heating value of fuel in Btu/h.

F. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

G. Round and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft.
g. Indicated air flow rate in cfm.
h. Indicated velocity in fpm.
i. Actual air flow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

3.10 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
c. Verify that balancing devices are marked with final balance position.
d. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Architect.
3. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.11 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 230713 - DUCT INSULATION

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 insulating the following duct services:

1. Indoor supply air, return air and outside air, and plenums.
2. Exhaust air and plenums where noted on drawings.

B. Related Sections:

1. Section 233113 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, dampers, specialties, and flanges for each type of insulation.
3. Detail application of field-applied jackets.
4. Detail application at linkages of control devices.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable

to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors and Outdoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.5 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.6 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type II with factory-applied vinyl jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. CertainTeed Corp.; SoftTouch Duct Wrap.
    b. Johns Manville; Microlite.
    c. Knauf Insulation; Friendly Feel Duct Wrap.
    d. Manson Insulation Inc.; Alley Wrap.
    e. Owens Corning; SOFTR All-Service Duct Wrap.

D. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. CertainTeed Corp.; Commercial Board.
    b. Johns Manville; 800 Series Spin-Glas.
    c. Knauf Insulation; Insulation Board.
    d. Manson Insulation Inc.; AK Board.
    e. Owens Corning; Fiberglas 700 Series.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.Eagle Bridges - Marathon Industries; 225.
    b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.Mon-Eco Industries, Inc.; 22-25.

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

B. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
    b. Eagle Bridges - Marathon Industries; 550.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
    d. Mon-Eco Industries, Inc.; 55-50.
    e. Vimasco Corporation; WC-1/WC-5.

2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms (1.2 metric perms) at 0.0625-inch (1.6-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

2.4 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.

1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
    b. Vimasco Corporation; 713 and 714.

3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
4. Service Temperature Range: 0 to plus 180 deg F.
5. Color: White.

2.5 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.Eagle Bridges - Marathon Industries; 405.
b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
c. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.

2.6 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 428 AWF ASJ.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
c. Compac Corporation; 104 and 105.
d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces, free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal end at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

L. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

M. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Impale insulation over pins and attach speed washers.

f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1-inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.

b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
d. Do not overcompress insulation during installation.
e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1-inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor supply air, return air, outside air, exhaust air ducts and plenums.

3.7 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Exposed, round and rectangular, supply-air, return air, outside air, exhaust air and plenum duct insulation shall be the following:

   1. Mineral-Fiber Board: 1-1/2 inches thick and nominal density.

B. Concealed, round and rectangular supply air, return air, outside air, exhaust air and plenum duct insulation shall be the following:

   1. Mineral-Fiber Blanket: 1-1/2 inches thick and nominal density.

C. Truss space round and rectangular supply air, return air, outside air and exhaust air ductwork shall be provided with an addition 1-1/2 inches of insulation.

END OF SECTION 230713

SECTION 230900 - INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes control equipment for HVAC systems and components, including control components for heating and cooling units not supplied with factory-wired controls.

B. All electrical wiring, both line and low voltage, which is required to perform automatic control functions described shall be included in the HVAC contract.

1.3 DEFINITIONS

A. DDC: Direct digital control.

B. I/O: Input/output.

C. LonWorks: A control network technology platform for designing and implementing interoperable control devices and networks.

1.4 SEQUENCE OF OPERATION

A. Furnace and condensing units F-1/CU-1 and F-2/CU-2.

1. Furnace/condensing units shall be controlled by a 7-day programmable thermostat.

B. Exhaust fan EF-3, and Ventilation fan VF-1.

1. Exhaust fan and Ventilation fan shall be controlled by a wall switch.

1.5 ACTION SUBMITTALS

A. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics,

finishes for materials, and installation and startup instructions for each type of product indicated.

1.6 INFORMATIONAL SUBMITTALS

A. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with ASHRAE 135.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.8 COORDINATION

A. Coordinate location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 CONTROL WIRING

A. All electrical wiring, both line voltage and low voltage, which is required to perform the automatic control functions described shall be included in this contract.

B. The Electrical Contractor will provide a power source to motors through his starters only. Where power sources are required beyond these starters, or beyond sources explicitly shown on the electrical drawings, these shall be provided by the Controls Contractor. Where auxiliary contacts are required on starters to perform the required functions these, too, shall be provided by the Controls Contractor where not provided under Electrical Contract auxiliary external relays may be provided in lieu of auxiliary contacts.

C. Wiring, both line and low voltage, shall comply with NEC and shall be subject to approval of the local code enforcing authorities.

D. Wire, conduit, and installation methods shall conform to applicable provisions of Division 26, 27 and 28 - Electrical except that wiring smaller than No. 12 and conduit smaller than 3/4" are permitted as appropriate for the application.

E. All line voltage wiring and low voltage wiring (except as stated below) shall be run in conduit. Low voltage wiring concealed above accessible ceilings may be run without conduit. Open wiring dropping into walls shall be run in conduit. Thermostats shall be installed on a single gang box and conduit shall be installed to extend into the plenum. Open wiring shall be bundled and supported at 3 ft. maximum intervals with a system of J-hooks or equivalent supporting means. Open wiring in air plenums shall be rated for such use and so labeled.

F. Electrical circuits serving the direct digital or electronic control panels, transformers and other control equipment and devices shall be from the nearest appropriate emergency electrical panel. Coordinate with the Electrical Contractor.

G. Circuits serving control panels and transformers for low voltage service shall be independent and used for no other purpose. These shall originate from the nearest appropriate emergency electrical panel. Circuit wiring from the electrical panel shall be included in this contract. These circuits shall be clearly identified at the panels.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify location of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation. Install devices 60 inches (1530 mm) above the floor.

B. Install labels and nameplates to identify control components according to Section 230553 "Identification for HVAC Piping and Equipment."

END OF SECTION 230900

SECTION 230995 – GAS MONITORING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes gas monitoring system for ventilation control.

B. Related Sections include the following:

1. Section 230900, item 1.4 “Sequence of Operations for HVAC Controls” for requirements that relate to this Section.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of sensor and control panel/monitor. Include rated capacities, operating characteristics, and accessories.

B. Shop Drawings: plans, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.

2. Wiring diagrams: power and control wiring.

C. Operation and Maintenance Data: include in emergency, operation, and maintenance manuals.

D. Warranty: Special warranty specified in Section 1.5.

1.4 QUALITY ASSURANCE

A. Electrical components, devices, and accessories: Listed and labeled as defined in NFPA by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 WARRANTY

A. Warranty Period: (Five (5) years on all components), from date of substantial completion.

PART 2 - PRODUCTS

2.1 GAS MONITORING SYSTEM

A. Basis-of-design product: Subject to compliance with requirements, provide Toxalert International, Inc. equipment or a comparable product by one of the following:

1. Honeywell.
2. Brasch.

B. The GVU-CO carbon monoxide sensor is designed to interface with Toxalert Internationals GVU series control. The sensor is micropressor based and is temperature and humidity compensated for stability. It has a range from 0 to 250 ppm. The transducer utilizes a tin-oxide sensing element that is cleaned and sampled by the microprocessor. The GVU-CO indicates its status with a two color LED (light emitting diode). When the LED is flashing green, operation is normal and not in alarm. When the LED is flashing red, the unit is in alarm (high CO). A continuous red or green indicates sensor failure and an extinguished LED indicates power failure.

C. The model GVU-NO_2 nitrogen dioxide sensor is designed to interface with Toxalert International GVU series control units. The Model GVU-NO_2 utilizes an electrochemical sensing element and is designed for ambient monitoring applications. It is intended for use in fixed monitoring installations, and therefore continuous operation. The GVU-NO_2 has an effective range of 0-10 ppm. The sensor module requires a four-wire connection from a controller that provides a nominal 24VDC power source, common and return signal input. The GVU-NO_2 has indicators for power on, fault status and high NO_2.

D. The Garage: The GVU-12 series controller can monitor up to twelve (12) GVU-CO sensors, twelve (12) GVU-CO_2 sensors, twelve (12) GVU-VOC sensors; or any combination of these. The GVU-12 Controller consists of the power supply, solid state clocks, time delays, fan control, terminal strips, and power on indicator.

1. Provide the following accessories:

a. Audible alarm with push button audio silence.

b. Exhaust fan and make-up air unit on indicator.

c. Fan override switch.

d. Sensor status indicators per sensor.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install and connect gas monitoring system in accordance with applicable local codes and regulations, and manufacturer's written installation instructions.

B. Adhere to manufacturers’ installation instructions.

3.2 CONNECTIONS

A. Electrical Connections: Comply with applicable requirements in Division 26 Sections.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Obtain adjustment instructions from gas monitoring system manufacturer before making any adjustments to components.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the gas monitoring system. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 230995

SECTION 232300 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes refrigerant piping used for air-conditioning applications.

1.3 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-410A:

1. Suction Lines for Air-Conditioning Applications: 300 psig.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:

1. Thermostatic expansion valves.
2. Solenoid valves.
3. Filter dryers.
4. Strainers.

B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.8 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

1.9 COORDINATION

A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 88, Type K or L (ASTM B 88M, Type A or B) and ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

E. Brazing Filler Metals: AWS A5.8.

F. Flexible Connectors:

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch- long assembly.
4. Pressure Rating: Factory test at minimum 500 psig.
5. Maximum Operating Temperature: 250 deg F.

2.2 VALVES AND SPECIALTIES

A. Diaphragm Packless Valves:

1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
2. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
3. Operator: Rising stem and hand wheel.
4. Seat: Nylon.
5. End Connections: Socket, union, or flanged.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 275 deg F.

B. Check Valves:

1. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
2. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
3. Piston: Removable polytetrafluoroethylene seat.
4. Closing Spring: Stainless steel.
5. Manual Opening Stem: Seal cap, plated-steel stem, and graphite seal.
6. End Connections: Socket, union, threaded, or flanged.
7. Maximum Opening Pressure: 0.50 psig.
8. Working Pressure Rating: 500 psig.
9. Maximum Operating Temperature: 275 deg F.

C. Service Valves:

1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig.

D. Solenoid Valves: Comply with ARI 760 and UL 429; listed and labeled by an NRTL.

1. Body and Bonnet: Plated steel.
2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.

3. Seat: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter, and 24-V ac coil.
6. Working Pressure Rating: 400 psig.
7. Maximum Operating Temperature: 240 deg F.
8. Manual operator.

E. Thermostatic Expansion Valves: Comply with ARI 750.

1. Body, Bonnet, and Seal Cap: Forged brass or steel.
2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
3. Packing and Gaskets: Non-asbestos.
4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
5. Suction Temperature: 40 deg F.
6. Superheat: Adjustable.
7. Reverse-flow option (for heat-pump applications).
8. End Connections: Socket, flare, or threaded union.
9. Working Pressure Rating: 700 psig.

F. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 240 deg F.

G. Permanent Filter Dryers: Comply with ARI 730.

1. Body and Cover: Painted-steel shell.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig.
8. Working Pressure Rating: 500 psig.
9. Maximum Operating Temperature: 240 deg F.

2.3 REFRIGERANTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atofina Chemicals, Inc.
2. DuPont Company; Fluorochemicals Div.
3. Honeywell, Inc.; Genetron Refrigerants.
4. INEOS Fluor Americas LLC.

C. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

B. Safety-Relief-Valve Discharge Piping: Copper, Type ACR or L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

3.2 VALVE AND SPECIALTY APPLICATIONS

A. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.

B. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.

C. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.

D. Install a full-sized, three-valve bypass around filter dryers.

E. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.

F. Install thermostatic expansion valves as close as possible to distributors on evaporators.

1. Install valve so diaphragm case is warmer than bulb.
2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.

G. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.

H. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

I. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:

1. Solenoid valves.
2. Thermostatic expansion valves.
3. Compressor.

J. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.

K. Install receivers sized to accommodate pump-down charge.

L. Install flexible connectors at compressors.

3.3 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Refer to Section 230900 "Instrumentation and Control for HVAC", control wiring, and sequence of operation.

K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

M. Install refrigerant piping in protective conduit where installed belowground.

N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

O. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

P. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

Q. Before installation of steel refrigerant piping, clean pipe and fittings using the following procedures:

1. Shot blast the interior of piping.
2. Remove coarse particles of dirt and dust by drawing a clean, lintless cloth through tubing by means of a wire or electrician's tape.

3. Draw a clean, lintless cloth saturated with trichloroethylene through the tube or pipe. Continue this procedure until cloth is not discolored by dirt.
4. Draw a clean, lintless cloth, saturated with compressor oil, squeezed dry, through the tube or pipe to remove remaining lint. Inspect tube or pipe visually for remaining dirt and lint.
5. Finally, draw a clean, dry, lintless cloth through the tube or pipe.
6. Safety-relief-valve discharge piping is not required to be cleaned but is required to be open to allow unrestricted flow.

R. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

S. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."

3.4 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.5 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.

2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 1/2: Maximum span, 60 inches; minimum rod size, 1/4 inch.
2. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.
3. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.
4. NPS 1-1/4: Maximum span, 96 inches; minimum rod size, 3/8 inch.
5. NPS 1-1/2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
6. NPS 2: Maximum span, 96 inches; minimum rod size, 3/8 inch.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.

    a. Fill system with nitrogen to the required test pressure.
    b. System shall maintain test pressure at the manifold gage throughout duration of test.
    c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.

2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:

1. Open shutoff valves in condenser water circuit.
2. Verify that compressor oil level is correct.
3. Open compressor suction and discharge valves.
4. Open refrigerant valves except bypass valves that are used for other purposes.
5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 232300

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Sheet metal materials.

a. Galvanized sheet metal.
b. Aluminum sheets.

4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.

B. Related Sections:

1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 233119 "HVAC Casings" for factory- and field-fabricated casings for mechanical equipment.
3. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible”.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.

B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Fittings.
4. Reinforcement and spacing.
5. Seam and joint construction.
6. Equipment installation based on equipment being used on Project.
7. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
8. Hangers and supports, including methods for duct and building attachment and vibration isolation.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Lindab Inc.
    b. McGill AirFlow LLC.
    c. SEMCO Incorporated.
    d. Sheet Metal Connectors, Inc.
    e. Spiral Manufacturing Co., Inc.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be

free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 (Z180).
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M) Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

2.4 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Owens Corning – Quite R, Rotary Duct Liner.
b. CertainTeed Corporation; Insulation Group.
c. Johns Manville.
d. Knauf Insulation.

2. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

a. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.

4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Secure liner with mechanical fasteners 4 inches (100 mm) from corners and at intervals not exceeding 12 inches (300 mm) transversely; at 3 inches (75 mm) from transverse joints and at intervals not exceeding 18 inches (450 mm) longitudinally.
7. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

    a. Fan discharges.
    b. Intervals of lined duct preceding unlined duct.
    c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm (12.7 m/s) or where indicated.

8. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

C. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.

2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

E. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of3 cfm/100 sq. ft. at 1-inch wg (0.14 L/s per sq. m at 250 Pa) and shall be rated for10-inch wg (2500-Pa) static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

D. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other

design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.

I. Where ducts pass through non-fire-rated interior partitions and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches (38 mm).

J. Where ducts pass through fire-rated interior partitions, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.

K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA’s “IAQ Guidelines for Occupied Buildings Under Construction,” Appendix G, “Duct Cleanliness for New Construction Guidelines.”

3.2 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches (610 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.5 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.
2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."

a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.7 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, condensate drain pans, and filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.

3.8 DUCT SCHEDULE

A. Supply Ducts:

1. Ducts Connected to Furnaces and Make-up Air Units:

a. Pressure Class: Positive 2-inch wg.
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

B. Return Ducts and Outside Air Ducts:

1. Ducts Connected to Furnaces and Energy Recovery Ventilators:

a. Pressure Class: Positive or negative 2-inch wg.
b. Minimum SMACNA Seal Class: B.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

C. Exhaust Ducts

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

a. Pressure Class: 1-inch wg and 2-inch wg.
b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
c. SMACNA Leakage Class for Rectangular: 12.
d. SMACNA Leakage Class for Round and Flat Oval: 12.

D. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel or carbon steel coated with zinc-chromate primer.

E. Liner:

1. Supply Air Ducts: Fibrous glass, Type I, 1 inch (25 mm) thick.
2. Return Air Ducts: Fibrous glass, Type I, 1 inch (25 mm) thick.

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

a. Velocity 1000 fpm (5 m/s) or Lower:

1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
2) Mitered Type RE 4 without vanes.

b. Velocity 1000 to 1500 fpm (5 to 7.6 m/s):

1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."

a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

1) Velocity 1000 fpm (5 m/s) or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
2) Velocity 1000 to 1500 fpm (5 to 7.6 m/s): 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.

b. Round Elbows, 12 Inches (305 mm) and Smaller in Diameter: Stamped or pleated.
c. Round Elbows, 14 Inches (356 mm) and Larger in Diameter: Standing seam or Welded.

END OF SECTION 233113

SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manual volume dampers.
2. Turning vanes.
3. Duct-mounted access doors.
4. Flexible connectors.
5. Duct accessory hardware.
6. Remote volume damper operator.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:

a. Manual volume damper installations.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60 (Z180).
2. Exposed-Surface Finish: Mill phosphatized.

B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.

C. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.3 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Air Balance Inc.; a division of Mestek, Inc.
b. American Warming and Ventilating; a division of Mestek, Inc.
c. Flexmaster U.S.A., Inc.
d. McGill AirFlow LLC.
e. Nailor Industries Inc.
f. Ruskin Company.

2. Standard leakage rating, with linkage outside airstream.
3. Suitable for horizontal or vertical applications.
4. Frames:

a. Frame: Hat-shaped, 0.094-inch- (2.4-mm-) thick, galvanized sheet steel.
b. Mitered and welded corners.
c. Flanges for attaching to walls and flangeless frames for installing in ducts.

5. Blades:

a. Multiple or single blade.
b. Parallel- or opposed-blade design.
c. Stiffen damper blades for stability.
d. Galvanized steel, 0.064 inch (1.62 mm) thick.

6. Blade Axles: Galvanized steel.
7. Bearings:

a. Oil-impregnated bronze.
b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

2.4 REMOTE VOLUME DAMPER OPERATORS

A. Provide opposed blade damper controlled with a flexible casing and wire. Remote control operator shall be Young Regulator Co. Model 800AW.

2.5 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. Elgen Manufacturing.
4. METALAIRE, Inc.
5. SEMCO Incorporated.

B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."

D. Vane Construction: Single wall for ducts up to 48 inches (1200 mm) wide and double wall for larger dimensions.

2.6 DUCT-MOUNTED ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Warming and Ventilating; a division of Mestek, Inc.
2. Ductmate Industries, Inc.
3. Flexmaster U.S.A., Inc.
4. Greenheck Fan Corporation.
5. McGill AirFlow LLC.
6. Nailor Industries Inc.
7. Ventfabrics, Inc.

B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2 (7-2M), "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."

1. Door:

    a. Double wall, rectangular.
    b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
    c. Vision panel.
    d. Hinges and Latches: 1-by-1-inch (25-by-25-mm) butt or piano hinge and cam latches.
    e. Fabricate doors airtight and suitable for duct pressure class.

2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Number of Hinges and Locks:

    a. Access Doors Less Than 12 Inches (300 mm) Square: No hinges and two sash locks.
    b. Access Doors up to 18 Inches (460 mm) Square: Continuous and two sash locks.
    c. Access Doors up to 24 by 48 Inches (600 by 1200 mm): Continuous and two compression latches[with outside and inside handles].
    d. Access Doors Larger Than 24 by 48 Inches (600 by 1200 mm): Continuous and two compression latches with outside and inside handles.

2.7 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. Ventfabrics, Inc.
4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches (89 mm) wide attached to two strips of 2-3/4-inch- (70-mm-) wide, 0.028-inch- (0.7-mm-) thick, galvanized sheet steel or 0.032-inch- (0.8-mm-) thick aluminum sheets. Provide metal compatible with connected ducts.

E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

2.8 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts.

C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
2. Install aluminum volume dampers in aluminum ducts.

D. Set dampers to fully open position before testing, adjusting, and balancing.

E. Install test holes at fan inlets and outlets and elsewhere as indicated.

F. Connect ducts to duct silencers rigidly.

G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

1. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
2. Adjacent to and close enough to fire dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
3. Upstream or downstream from duct silencers.
4. Elsewhere as indicated.

H. Install access doors with swing against duct static pressure.

I. Access Door Sizes:

1. Two-Hand Access: 12 by 12 inches (300 by 150 mm).

J. Label access doors according to Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

K. Install flexible connectors to connect ducts to equipment.

L. Connect flexible ducts to metal ducts with liquid adhesive plus tape or adhesive plus sheet metal screws.

M. Install duct test holes where required for testing and balancing purposes.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Inspect turning vanes for proper and secure installation.
4. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 233300

SECTION 233416 - HVAC FANS

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: For each product.

1. Centrifugal In-Line Duct Fan.
2. Ceiling Mounted Ventilators.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Include rated capacities, furnished specialties, and accessories for each fan.
2. Certified fan performance curves with system operating conditions indicated.
3. Certified fan sound-power ratings.
4. Motor ratings and electrical characteristics, plus motor and electrical accessories.
5. Material thickness and finishes, including color charts.
6. Dampers, including housings, linkages, and operators.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show fan room layout and relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.

B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For centrifugal fans to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Belts: One set for each belt-driven unit.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AMCA Compliance:

1. Comply with AMCA performance requirements and bear the AMCA-Certified Ratings Seal.
2. Operating Limits: Classify according to AMCA 99.

B. Unusual Service Conditions:

1. High humidity.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 CENTRIFUGAL IN-LINE DUCT FAN

A. Basis-of-Design Product: Subject to compliance with requirements, provide Lorne Cook Company. or a comparable product by one of the following:

1. Greenheck Fan Corporation.
2. Acme Engineering & Mfg.
3. Loren Cook Company.
4. New York Blower Company (The).

B. Description:

1. Factory-fabricated, -assembled, -tested, and -finished, belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor, drive assembly, and support structure.
2. Deliver fans as factory-assembled units, to the extent allowable by shipping limitations.
3. Factory-installed and -wired disconnect switch.

C. Housings:

1. Formed panels to make curved-scroll housings with shaped cutoff.
2. Panel Bracing: Aluminum angle- or channel-iron member supports for mounting and supporting fan scroll, wheel, motor, and accessories.
3. Horizontally split, bolted-flange housing.
4. Spun inlet cone with flange.
5. Outlet flange.

D. Backward-Inclined Wheels:

1. Backward inclined non-overloading aluminum wheel. Single-width-single-inlet and double-width-double-inlet construction with curved inlet flange, backplate, backward-inclined blades, and fastened to shaft with set screws.
2. Tubular centrifugal all aluminum construction.

E. Shafts:

1. Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with adjustable alignment and belt tensioning.
2. Turned, ground, and polished hot-rolled steel with keyway. Ship with protective coating of lubricating oil.
3. Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.

F. Prelubricated and Sealed Shaft Bearings:

1. Self-aligning, pillow-block-type ball bearings.

G. Grease-Lubricated Shaft Bearings:

1. Self-aligning, pillow-block-type, tapered roller bearings with double-locking collars and two-piece, cast-iron housing.

H. Grease-Lubricated Shaft Bearings:

1. Self-aligning, pillow-block-type, ball or roller bearings with adapter mount and two-piece, cast-iron housing.

I. Belt Drives:

1. Factory mounted, with adjustable alignment and belt tensioning.
2. Service Factor Based on Fan Motor Size: 1.5.
3. Fan Pulleys: Cast iron or cast steel with split, tapered bushing; dynamically balanced at factory.

4. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
5. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
6. Belt Guards: Fabricate to comply with OSHA and SMACNA requirements of diamond-mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation. Include provisions for adjustment of belt tension, lubrication, and use of tachometer with guard in place.
7. Motor Mount: Adjustable for belt tensioning.

J. Accessories:

1. Access for Inspection, Cleaning, and Maintenance: Comply with requirements in ASHRAE 62.1.
2. Companion Flanges: Rolled flanges for duct connections of same material as housing.
3. Discharge Dampers: Assembly with opposed blades constructed of two plates formed around and to shaft, channel frame, and sealed ball bearings; with blades linked outside of airstream to single control lever of same material as housing.
4. Inlet Screens: Grid screen of same material as housing.
5. Shaft Cooler: Metal disk between bearings and fan wheel, designed to dissipate heat from shaft.
6. Spark-Resistant Construction: AMCA 99.
7. Shaft Seals: Airtight seals installed around shaft on drive side of single-width fans.
8. Weather Cover: Enameled-steel sheet with ventilation slots, bolted to housing.

2.3 CEILING-MOUNTED VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Greenheck Fan Corporation.
2. JencoFan.
3. Loren Cook Company.
4. PennBarry; division of Air System Components.

B. Housing: Steel, lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel removable for service.

D. Back-draft damper: Integral.

E. Grille: Painted aluminum, louvered grille with flange on intake and thumbscrew or spring retainer attachment to fan housing.

F. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install centrifugal fans level and plumb.

B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.

C. Lift and support units with manufacturer's designated lifting or supporting points.

D. Equipment Mounting:

1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
2. Comply with requirements for vibration isolation devices specified in Section 230548 "Vibration Controls for HVAC."

E. Install units with clearances for service and maintenance.

F. Label fans according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

B. Install ducts adjacent to fans to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Adjust belt tension.
6. Adjust damper linkages for proper damper operation.
7. Verify lubrication for bearings and other moving parts.
8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
9. See Section 230593 "Testing, Adjusting, and Balancing For HVAC" for testing, adjusting, and balancing procedures.
10. Remove and replace malfunctioning units and retest as specified above.

C. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.

END OF SECTION 233416

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Louver face diffusers.
2. Fixed face registers and grilles.
3. Adjustable face register.

B. Related Sections:

1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

PART 2 - PRODUCTS

2.1 REGISTERS AND GRILLES

A. Louver Face Diffuser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Krueger.
b. Price Industries.
c. Titus.

2. Material: Steel or Aluminum.
3. Finish: Baked enamel, white.
4. Face Blade Arrangement: Horizontal spaced as indicated on drawings.
5. Core Construction: Removable.
6. Rear-Blade Arrangement: Vertical spaced 3/4 inch apart.
7. Frame: 1-1/4 inches (32 mm) wide.
8. Mounting: Countersunk screw.
9. Damper Type: Adjustable opposed blade.

B. Adjustable Face Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Krueger.
b. Price Industries.
c. Titus.

2. Material: Steel or Aluminum.
3. Finish: Baked enamel, white.
4. Face Arrangement: Refer to drawings.
5. Core Construction: Removable.
6. Frame: 1-1/4 inches (32 mm) wide.
7. Mounting: Countersunk screw.
8. Damper Type: Adjustable opposed blade.

C. Fixed Face Register and Grille:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Krueger.
b. Price Industries.
c. Titus.

2. Material: Steel or Aluminum.
3. Finish: Baked enamel, white.
4. Face Arrangement: 1/2-by-1/2-by-1/2-inch grid.
5. Core Construction: Refer to schedule on drawings. Removable.
6. Frame: 1-1/4 inches (32 mm) wide.
7. Mounting: Countersunk screw.

2.2 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 235400 – FUEL-FIRED FURNACES (PROPANE)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Gas-fired, condensing furnaces and accessories complete with controls.
2. Media filter cabinet.
3. Refrigeration components.

1.3 ACTION SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each of the following:

1. Furnace.
2. Thermostat.
3. Media filter cabinet.
4. Refrigeration components.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each furnace to include in emergency, operation, and maintenance manuals for each of the following:

1. Furnace and accessories complete with controls.
2. Media filter cabinet.
3. Refrigeration components.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Disposable Air Filters: Furnish one (1) complete set.
2. Fan Belts: Furnish one set for each furnace fan.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

D. Comply with NFPA 70.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace the following components of furnaces that fail in materials or workmanship within specified warranty period:

1. Warranty Period, Commencing on Date of Substantial Completion:

a. Furnace Heat Exchanger: Lifetime.
b. Integrated Ignition and Blower Control Circuit Board: Five years.
c. Draft-Inducer Motor: Five years.
d. Refrigeration Compressors: 5 years.
e. Evaporator and Condenser Coils: Five years.

PART 2 - PRODUCTS

2.1 GAS-FIRED FURNACES, CONDENSING

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings, Bryant "Legacy", Model 916SA or comparable product by one of the following:

1. Carrier Corp.

2. Lennox Industries Inc.
3. York International Corp.; a division of Unitary Products Group.

B. General Requirements for Gas-Fired, Condensing Furnaces: Factory assembled, piped, wired, and tested; complying with ANSI Z21.47/CSA 2.3, "Gas-Fired Central Furnaces," and with NFPA 54.

C. Cabinet:

1. Cabinet interior around heat exchanger shall be factory-installed insulation.
2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
3. Factory paint external cabinets in manufacturer's standard color.
4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.

1. Fan Motors: Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."
2. Special Motor Features: Premium (TM) efficiency, as defined in Section 230513 "Common Motor Requirements for HVAC Equipment," and with internal thermal protection and permanent lubrication.
3. Special Motor Features: Electronically controlled motor (ECM) controlled by integrated furnace/blower control.

E. Type of Gas: Natural.

F. Heat Exchanger:

1. Primary: Aluminized steel.
2. Secondary: Stainless steel.

G. Burner:

1. Gas Valve: 100 percent safety two-stage main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.

H. Gas-Burner Safety Controls:

1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
2. Flame Rollout Switch: Installed on burner box; prevents burner operation.

3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.

I. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.

J. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; adjustable fan-on and fan-off timing; terminals for connection to accessories diagnostic light with viewport.

K. Accessories:

1. Propane gas conversion kit.

2. Combination Combustion-Air Intake and Vent: PVC plastic fitting to combine combustion-air inlet and vent through roof.

3. CPVC Plastic Vent Materials. (As required by furnace manufacturer.)

a. CPVC Plastic Pipe: Schedule 40, complying with ASTM F 441/F 441M.
b. CPVC Plastic Fittings: Schedule 40, complying with ASTM F 438, socket type.
c. CPVC Solvent Cement: ASTM F 493.

1) CPVC solvent cement shall have a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2) Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3) Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

4. PVC Plastic Vent Materials: (As required by furnace manufacturer.)

a. PVC Plastic Pipe: Schedule 40, complying with ASTM D 1785.
b. PVC Plastic Fittings: Schedule 40, complying with ASTM D 2466, socket type.
c. PVC Solvent Cement: ASTM D 2564.

1) PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2) Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3) Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

L. Capacities and Characteristics:

1. Airflow Configuration: Upflow/Downflow
2. Gas:

a. Type: Natural
b. Venting Type: Power venter with combustion-air intake.
c. Minimum Efficiency AFUE: 95 percent.

2.2 THERMOSTATS

A. Controls shall be ECOBEE 3-PRO and comply with requirements in ASHRAE/IESNA 90.1, "Controls."

B. Solid-State Thermostat: Wall-mounting, programmable, microprocessor-based unit with manual switching from heating to cooling, preferential rate control, seven-day programmability with minimum of four temperature presets per day, vacation mode, and battery backup protection against power failure for program settings.

C. Two-Stage, Heating-Cooling Thermostat: Adjustable, heating-cooling, wall-mounting unit with fan on-automatic selector.

D. Control Wiring: Unshielded twisted-pair cabling.

1. No. 24 AWG, 100 ohm, four pair.
2. Cable Jacket Color: Blue.

2.3 MEDIA FILTER CABINET

A. Disposable Filters: 4-inch-thick fiberglass media with ASHRAE 52.2 MERV rating of 8 or higher, in sheet metal frame.

B. Bryant Model FILCAB.

2.4 REFRIGERATION COMPONENTS

A. General Refrigeration Component Requirements:

1. Refrigeration compressor, coils, and specialties shall be designed to operate with CFC-free refrigerants.

2. Energy Efficiency: Equal to or greater than prescribed by ASHRAE/IESNA 90.1, "Energy Standard for Buildings except Low-Rise Residential Buildings."

B. Refrigerant Coil: Copper tubes mechanically expanded into aluminum fins. Comply with ARI 210/240, "Unitary Air-Conditioning and Air-Source Heat Pump Equipment." Match size with furnace. Include condensate drain pan with accessible drain outlet complying with ASHRAE 62.1.

1. Refrigerant Coil Enclosure: Steel, matching furnace and evaporator coil, with access panel and flanges for integral mounting at or on furnace cabinet and galvanized sheet metal drain pan coated with black asphaltic base paint.

C. Refrigerant Line Kits: Annealed-copper suction and liquid lines factory cleaned, dried, pressurized with nitrogen, sealed, and with suction line insulated. Provide in standard lengths for installation without joints, except at equipment connections.

1. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I, 1/2 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine factory-installed insulation before furnace installation. Reject units that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for gas and refrigerant piping systems to verify actual locations of piping connections before equipment installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install gas-fired furnaces and associated fuel and vent features and systems according to NFPA 54.

B. Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.

C. Controls: Install thermostats at mounting height of 60 inches above floor.

D. Wiring Method: Install control wiring in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal control wiring except in unfinished spaces.

E. Install ground-mounted, compressor-condenser components on 4-inch thick, reinforced concrete base; 4 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.

3.3 CONNECTIONS

A. Gas piping installation requirements are specified in Section 221600 "Facility Natural-Gas Piping." Drawings indicate general arrangement of piping, fittings, and specialties. Connect gas piping with union or flange and appliance connector valve.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect plastic piping vent material to furnace connections and extend outdoors. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

    a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
    b. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
    c. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
    d. Requirements for Low-Emitting Materials:

        1) CPVC solvent cement shall have a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
        2) PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
        3) Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
        4) Solvent cement and adhesive primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic

Emissions from Various Sources Using Small-Scale Environmental Chambers."

4. Slope pipe vent back to furnace or to outside terminal.

D. Connect ducts to furnace with flexible connector. Comply with requirements in Section 233300 "Air Duct Accessories."

E. Connect refrigerant tubing kits to refrigerant coil in furnace and to air-cooled, compressor-condenser unit.

1. Flared Joints: Use ASME B16.26 fitting and flared ends, following procedures in CDA's "Copper Tube Handbook."
2. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
3. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Perform electrical test and visual and mechanical inspection.
2. Leak Test: After installation, charge systems with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
4. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.
5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

3.5 STARTUP SERVICE

A. Complete installation and startup checks according to manufacturer's written instructions and perform the following:

1. Inspect for physical damage to unit casings.

2. Verify that access doors move freely and are weathertight.
3. Clean units and inspect for construction debris.
4. Verify that all bolts and screws are tight.
5. Adjust vibration isolation and flexible connections.
6. Verify that controls are connected and operational.

B. Adjust fan belts to proper alignment and tension.

C. Start unit according to manufacturer's written instructions and complete manufacturer's operational checklist.

D. Measure and record airflows.

E. Verify proper operation of capacity control device.

F. After startup and performance test, lubricate bearings and adjust belt tension.

3.6 ADJUSTING

A. Adjust initial temperature and humidity set points.

B. Set controls, burner, and other adjustments for optimum heating performance and efficiency. Adjust heat-distribution features, including shutters, dampers, and relays, to provide optimum heating performance and system efficiency.

3.7 CLEANING

A. After completing installation, clean furnaces internally according to manufacturer's written instructions.

B. Install new filters in each furnace within 14 days after Substantial Completion.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain condensing units.

END OF SECTION 235400

SECTION 235533 - FUEL-FIRED UNIT HEATERS (PROPANE)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes gas-fired unit heaters.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of fuel-fired unit heater indicated. Include rated capacities, operating characteristics, and accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members to which equipment will be attached.
2. Items penetrating roof and the following:

a. Vent and gas piping rough-ins and connections.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuel-fired unit heaters to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace heat exchanger of fuel-fired unit heater that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GAS-FIRED UNIT HEATERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Reznor/Thomas & Betts Corporation Model UDXC or a comparable product by one of the following:

1. Lennox Industries, Inc.
2. Modine Manufacturing Company.
3. Sterling HVAC Products; Div. of Mestek Technology Inc.

B. Description: Factory assembled, piped, and wired, and complying with ANSI Z83.8/CSA 2.6.

C. Fuel Type: Design burner for propane gas having characteristics same as those of gas available at Project site.

D. Type of Venting: Indoor, separated combustion, power vented.

E. Housing: Steel, with integral draft hood and inserts for suspension mounting rods.

1. External Casings and Cabinets: Baked enamel or Powder coating over corrosion-resistant-treated surface.
2. Suspension Attachments: Reinforce suspension attachments at connection to fuel-fired unit heaters.

a. Seismic Fabrication Requirements: Fabricate suspension attachments of fuel-fired unit heaters, accessories mountings, and components with reinforcement strong enough to withstand seismic forces defined in Section 230548 "Vibration and Seismic Controls for HVAC" when fuel-fired unit heater is anchored to building structure.

F. Heat Exchanger: Aluminized steel.

G. Burner Material: Aluminized steel with stainless-steel inserts.

H. Unit Fan: Formed-steel or Aluminum propeller blades riveted to heavy-gage steel spider bolted to cast-iron hub, dynamically balanced, and resiliently mounted.

1. Fan-Blade Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
2. General requirements for motors are specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

    a. Motors: Totally enclosed with internal thermal-overload protection and complying with Section 230513 "Common Motor Requirements for HVAC Equipment."
    b. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
    c. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in electrical Sections.

I. Unit Fan: Steel, centrifugal fan dynamically balanced and resiliently mounted.

1. General requirements for motors are specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

    a. Motors: Totally enclosed with internal thermal-overload protection and complying with Section 230513 "Common Motor Requirements for HVAC Equipment."
    b. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
    c. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in electrical Sections.

J. Controls: Regulated redundant gas valve containing pilot solenoid valve, electric gas valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff all in one body.

1. Gas Control Valve: Single stage.
2. Ignition: Electronically controlled electric spark with flame sensor.
3. Fan Thermal Switch: Operates fan on heat-exchanger temperature.
4. Vent Flow Verification: Flame rollout switch or Differential pressure switch to verify open vent.
5. Control transformer.
6. High Limit: Thermal switch or fuse to stop burner.
7. Thermostat: Single-stage, wall-mounting type with 50 to 90 deg F operating range and fan on switch. Thermostat digital programmable as manufactured by Ecobee (WiFi) EB-STATE3LTIBR-01.

K. Discharge Louvers: Independently adjustable horizontal blades.

L. Accessories:

1. Four-point suspension kit.
2. Power Venter: Centrifugal aluminized-steel fan, with stainless-steel shaft; 120-V ac motor.
3. Concentric, Terminal Vent Assembly: Combined combustion-air inlet and power-vent outlet with wall or roof caps. Include adapter assembly for connection to inlet and outlet pipes, and flashing for wall or roof penetration.

M. Capacities and Characteristics:

1. Refer to Equipment Data on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install and connect gas-fired unit heaters and associated fuel and vent features and systems according to NFPA 54, applicable local codes and regulations, and manufacturer's written installation instructions.

B. Suspended Units: Suspend from substrate using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.

1. Restrain the unit to resist code-required horizontal acceleration.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to fuel-fired unit heater to allow service and maintenance.

C. Gas Piping: Comply with Section 221600 "Facility Natural-Gas Piping." Connect gas piping to gas train inlet; provide union with enough clearance for burner removal and service.

D. Vent Connections: Comply with Section 235100 "Breechings, Chimneys, and Stacks."

E. Electrical Connections: Comply with applicable requirements in electrical Sections.

1. Install electrical devices furnished with heaters but not specified to be factory mounted.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
2. Verify bearing lubrication.
3. Verify proper motor rotation.
4. Test Reports: Prepare a written report to record the following:

a. Test procedures used.
b. Test results that comply with requirements.
c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

3.4 ADJUSTING

A. Adjust initial temperature set points.

B. Adjust burner and other unit components for optimum heating performance and efficiency.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fuel-fired unit heaters. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 235533

SECTION 236200 - PACKAGED COMPRESSOR AND CONDENSER UNITS

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 packaged, refrigerant compressor and condenser units.

1.3 ACTION SUBMITTALS

A. Product Data: For each compressor and condenser unit. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include equipment dimensions, weights and structural loads, required clearances, method of field assembly, components, and location and size of each field connection.

B. Shop Drawings: For compressor and condenser units. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: For compressor and condenser units indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
2. Design Calculations: Calculate requirements for selecting vibration isolators and for designing vibration isolation bases.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members to which compressor and condenser units will be attached.
2. Liquid and vapor pipe sizes.
3. Refrigerant specialties.
4. Piping including connections, oil traps, and double risers.
5. Compressors.

6. Evaporators.

B. Field quality-control reports.

C. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For compressor and condenser units to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fabricate and label refrigeration system according to ASHRAE 15, "Safety Standard for Refrigeration Systems."

C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6, "Heating, Ventilating, and Air-Conditioning."

D. ASME Compliance: Fabricate and label water-cooled compressor and condenser units to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

1.7 COORDINATION

A. Coordinate sizes and locations of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-In-Place Concrete" and Section 033053 "Miscellaneous Cast-In-Place Concrete."

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."

C. Coordinate location of piping and electrical rough-ins.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of compressor and condenser units that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Compressor failure.
b. Condenser coil leak.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 COMPRESSOR AND CONDENSER UNITS, AIR COOLED, 2 TON

A. Basis-of-Design Product: Subject to compliance with requirements, provide Bryant Model 134SAN or comparable product by one of the following:

1. Carrier Corp.
2. Lennox International Inc.
3. YORK; a Johnson Controls company.

B. Description: Factory assembled and tested; consisting of compressor, condenser coil, fan, motors, refrigerant reservoir, and operating controls.

C. Compressor: Scroll, hermetically sealed, with rubber vibration isolators.

D. Refrigerant: R-454B.

E. Condenser Coil: Seamless copper-tube, aluminum-fin coil; circuited for integral liquid subcooler, with removable drain pan and brass service valves with service ports.

F. Condenser Fan: Direct-drive, aluminum propeller fan; with permanently lubricated, totally enclosed fan motor with thermal-overload protection and ball bearings.

G. Accessories:

1. Crankcase heater.
2. Cycle Protector: Automatic-reset timer to prevent rapid compressor cycling.
3. Evaporator Freeze Thermostat: Temperature-actuated switch that stops unit when evaporator reaches freezing temperature.
4. Filter-dryer.
5. High-Pressure Switch: Automatic-reset switch cycles compressor off on high refrigerant pressure.
6. Liquid-line solenoid.
7. Low-Ambient Controller: Cycles condenser fan to permit operation down to 0 deg F with time-delay relay to bypass low-pressure switch.
8. Low-Pressure Switch: Automatic-reset switch cycles compressor off on low refrigerant pressure.
9. PE mounting base.
10. Precharged and insulated suction and liquid tubing.
11. Sound Hood: Wraps around sound attenuation cover for compressor.
12. Thermostatic expansion valve.
13. Hard start kit.

14. Time-Delay Relay: Continues operation of evaporator fan after compressor shuts off.

H. Unit Casing: Galvanized steel, finished with baked enamel; with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Mount service valves, fittings, and gage ports on exterior of casing.

2.2 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.3 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate compressor and condenser units according to ARI 210/240.

B. Energy Efficiency: Equal to or greater than prescribed by ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings," Section 6, "Heating, Ventilating, and Air-Conditioning."

C. Testing Requirements: Factory test sound-power-level ratings according to ARI 270.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of compressor and condenser units.

B. Examine roughing-in for refrigerant piping systems to verify actual locations of piping connections before equipment installation.

C. Examine walls, floors, and roofs for suitable conditions where compressor and condenser units will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install unit's level and plumb, firmly anchored in locations indicated; maintain manufacturer's recommended clearances.

B. Install compressor and condenser units on concrete base. Concrete materials and installation requirements are specified in Section 033000 "Cast-In-Place Concrete" and Section 033053 "Miscellaneous Cast-In-Place Concrete."

C. Concrete Bases:

1. Install dowel rods to connect concrete base to concrete slab. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of the base.

D. Vibration Isolation: Mount compressor and condenser units on rubber pads with a minimum deflection of 1/4 inch. Vibration isolation devices and installation requirements are specified in Section 230548 "Vibration and Seismic Controls for HVAC Piping and Equipment."

E. Maintain manufacturer's recommended clearances for service and maintenance.

F. Loose Components: Install electrical components, devices, and accessories that are not factory mounted.

3.3 CONNECTIONS

A. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

B. Connect precharged refrigerant tubing to unit's quick-connect fittings. Install tubing so it does not interfere with access to unit. Install furnished accessories.

C. Connect refrigerant piping to air-cooled compressor and condenser units; maintain required access to unit. Install furnished field-mounted accessories. Refrigerant piping and specialties are specified in Section 232300 "Refrigerant Piping."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test. Certify compliance with test parameters.
2. Leak Test: After installation, charge system with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor operation and unit operation, product capability, and compliance with requirements.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Verify proper airflow over coils.

C. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

D. Compressor and condenser units will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions and perform the following:

a. Inspect for physical damage to unit casing.
b. Verify that access doors move freely and are weathertight.
c. Clean units and inspect for construction debris.
d. Verify that all bolts and screws are tight.
e. Adjust vibration isolation and flexible connections.
f. Verify that controls are connected and operational.

B. Lubricate bearings on fan motors.

C. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.

D. Adjust fan belts to proper alignment and tension.

E. Start unit according to manufacturer's written instructions and complete manufacturer's startup checklist.

F. Measure and record airflow and air temperature rise over coils.

G. Verify proper operation of condenser capacity control device.

H. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

I. After startup and performance test, lubricate bearings.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain compressor and condenser units.

END OF SECTION 236200

SECTION 238239.19 – ELECTRIC WALL HEATERS

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 wall heaters with propeller fans and electric-resistance heating coils.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings:

1. Include plans, elevations, sections, and details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include details of anchorages and attachments to structure and to supported equipment.
4. Include equipment schedules to indicate rated capacities, operating characteristics, furnished specialties, and accessories.
5. Wiring Diagrams: Power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wall unit heaters to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Berko; Marley Engineered Products.
2. Chromalox, Inc.
3. QMark; Marley Engineered Products.

2.2 DESCRIPTION

A. Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 CABINET

A. Front Panel: Stamped-steel louver, with removable panels fastened with tamperproof fasteners.

B. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by Architect, applied to factory-assembled and -tested wall heaters before shipping.

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

D. Surface-Mounted Cabinet Enclosure: Steel with finish to match cabinet.

2.4 COIL

A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high-temperature protection.

2.5 FAN AND MOTOR

A. Fan: Aluminum propeller directly connected to motor.

B. Motor: Permanently lubricated, multispeed. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.6 CONTROLS

A. Controls: Unit-mounted thermostat.

B. Electrical Connection: Factory wire motors and controls for a single field connection.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive wall unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical connections to verify actual locations before unit-heater installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wall unit heaters to comply with NFPA 90A.

B. Install wall unit heaters level and plumb.

C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

END OF SECTION 238239.19

INDEX

DIVISION 26 - ELECTRICAL

LIFE FIRST AMBULANCE DISTRICT
EMERGENCY MEDICAL SERVICES (EMS) STATION

4585 State Route 98
Sulphur Springs, Ohio 44881

TRIAD Architects
172 E. State St., Suite 600
Columbus, Ohio 43215

O'Reilly Engineering Group, LLC
5404 Via Alvito Drive
Westerville, Ohio 43082
OEG Project No. 2026P02

Section	Section Title
DIVISION 26	ELECTRICAL
260505	Common Work Results for Electrical
260519	Low-Voltage Electrical Power Conductors and Cables
260526	Grounding and Bonding for Electrical Systems
260529	Hangers and Supports for Electrical Systems
260533	Raceways and Boxes for Electrical Systems
260553	Identification for Electrical Systems
260923	Lighting Control Devices
262416	Panelboards
262726	Wiring Devices
262816	Enclosed Switches and Circuit Breakers
263200	Generator (ALTERNATE)
265100	Interior Lighting - LED
265619	LED Exterior Lighting

AUGUST, 2026

SECTION 260505 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of this Section apply to all sections of Division 26 and 28.

B. All provisions of the Bidding Requirements, General Conditions, and Division 1 General Requirements apply to work specified in this Division.

1.2 SUMMARY

A. The scope of the Electrical work includes furnishing, installing, testing and warranty of all Electrical work and complete Electrical systems shown on the Electrical drawings and specified herein.

1.3 ALTERNATES

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

B. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

C. Schedule of Alternates

1. Alternate No. 3: Provide all Electrical work as required for the additional garage bay as indicated on the drawings, Sheet E-100, Alternate Garage Bay Plan – Lighting and Sheet E-101, Alternate Garage Bay Plan – Power.

2. Alternate No. 4: Provide Generator (18 kW) and all electrical work as indicated on the drawing and in the specifications.

3. Alternate No. 7: Provide lighting fixture and switch for the front porch. Refer to lighting fixture schedule, Sheet E-102, Fixture D2.

1.4 PERMITS AND REGULATIONS

A. Include payment of all permit and inspection fees applicable to the work in this Division. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.

B. Work must conform to applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.

1.5 QUALITY ASSURANCE

A. Mechanical, electrical and associated systems shall be safe, reliable, efficient, durable, easily and safely operable and maintainable, easily and safely accessible, and in compliance with applicable codes as specified. The systems shall be comprised of high quality institutional-class and industrial-class products of manufacturers that are experienced specialists in the required product lines. All construction firms and personnel shall be experienced and qualified specialists in industrial and institutional Electrical.

B. Products Criteria:

1. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years (or longer as specified elsewhere). The design, model and size of each item shall have been in satisfactory and efficient operation on at least three installations for approximately three years. However, digital electronics devices, software and systems such as controls, instruments, computer work station, shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years. See other specification sections for any exceptions and/or additional requirements.

2. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.

3. Conform to codes and standards as required by the specifications. Conform to local codes, if required by local authorities such as the natural gas supplier, if the local codes are more stringent then those specified. Refer any conflicts to the Engineer.

4. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

5. Assembled Units: Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.

6. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.

7. All equipment/material shall be new and listed for the application, unless otherwise authorized in writing by the Owner before installation.

C. Equipment Service Organizations:

1. Electrical: Products and systems shall be supported by service organizations that maintain a complete inventory of repair parts and are located within 50 miles to the site.

D. Execution (Installation, Construction) Quality:

1. Apply and install all items in accordance with manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Engineer for resolution. Provide written hard copies or computer files of manufacturer’s installation instructions to the Engineer at least two weeks prior to commencing installation of any item. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations is a cause for rejection of the material.

2. Provide complete layout drawings required by Paragraph, SUBMITTALS. Do not commence construction work on any system until the layout drawings have been approved.

1.6 SUBMITTALS

A. Certificate of Compliance with Build America/Buy America Grant Requirements.

B. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

C. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

D. Submit in accordance with Section 013300, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, and with requirements in the individual specification sections.

E. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.

F. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.

G. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.

H. Submittals and shop drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient installation.

I. Six (6) sets of submittals and descriptive information shall be assembled by each Contractor of equipment and materials furnished in their contract, and submitted to the Architect and/or Engineer for review as stated in the General Conditions and Supplementary Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and factory test data and documents showing conformance to relevant standards. Shop drawings for equipment, fixtures, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review.

J. In lieu of “paper submittals” the Contractor can submit “electronic submittals” of all items requiring shop drawings.

Electronic submittals shall identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single specification section and transmittal form with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

K. The review of submittals by the Architect or Engineer shall not relieve the Contractor from responsibility for errors in the submittals. Deviations from specifications and drawing requirements shall be called to the Engineer's attention in a separate clearly stated notification at the time of submittal for the Engineer's review.

L. Submittals of the following Electrical equipment and materials shall be submitted:

1. Enclosed switches.

2. Low-voltage electrical power conductors and cables.

3. Lighting fixtures and lamps.

4. Exterior lighting.

5. Panelboards.

6. Wiring devices and coverplates (include color selections).

7. Disconnect switches.

8. Wire, cable and fiber.

9. Raceways.

10. Meter base.

11. Data cabinets and accessories.

12. Surge suppressors at panel/service entrance.

13. Communication system equipment.

14. Fire alarm system equipment.

15. Generator (ALTERNATE).

1.7 CLOSEOUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.8 DRAWINGS AND SPECIFICATIONS

A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are- necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Architect for approval before proceeding with the work.

B. Make all necessary field measurements to insure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay.

C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Architect for interpretation or correction, so that misunderstandings at a later date may be avoided. The contract drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems.

D. The Architect shall reserve the right to make minor-adjustment in locations of system runs and components where considered desirable in the interest of concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.

E. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of ductwork, piping, etc., where conflict arises.

F. Provide offsets in system runs, additional fittings and devices required to complete the installation, or for the proper operation of the system. Each Contractor shall exercise

due and particular caution to determine that all parts of the work are made quickly and easily accessible.

G. Should overlap of work among the trades become evident, this shall be called to the attention of the Architect. In such event, none of the trades or their suppliers shall assume that he is relieved of the work which is specified under his branch until instructions in writing are received from the Architect.

1.9 DELIVERY, STORAGE AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

B. Protection of Equipment:

1. Equipment and material placed on the job site shall remain in the custody of the Contractor until phased acceptance, whether or not the Owner has reimbursed the Contractor for the equipment and material. The Contractor is solely responsible for the protection of such equipment and material against any damage.

2. Place damaged equipment in first class, new operating condition; or, replace same as determined and directed by the Engineer. Such repair or replacement shall be at no additional cost to the Owner.

3. Protect interiors of new equipment and conduit systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.

4. Existing equipment being worked on by the Contractor shall be under the custody and responsibility of the Contractor and shall be protected as required for new work.

C. Cleanliness of Conduit and Equipment Systems:

1. Exercise care in storage and handling of equipment and conduit material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.

2. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

3. Seal as needed to prevent ingress of water, insects, or animals. Apply fire seal where required by Code.

1.10 INSPECTION

A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Architect, Engineer and Owner.

B. Final inspection certificates shall-be obtained by the Contractor and given to the Owner.

1.11 RECORD DRAWINGS

A. Each Contractor shall maintain a separate set of prints of the contract documents and shall show all changes or variations, in a manner to be clearly discernible, which are made during construction. Upon completion of the work, these drawings shall be turned over to the Architect.

B. Interface with substation and PV site drawings as needed. Coordinate submission of as-builts in accord with Owner's documentation requirements.

1.12 OPERATING AND MAINTENANCE MANUALS

A. Two (2) copies each of operating and maintenance manuals shall be assembled for Electrical work by the respective Contractor.

B. All shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. In addition, the Contractor shall prepare a chart listing all items of equipment which are furnished under his contract and indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required.

C. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included; these shall be submitted to the Architect or Engineer for review. Upon approval, manuals shall be turned over to the Owner.

D. Digital copies in PDF and native format are required for all manuals and drawings.

1.13 FINAL INSPECTION AND PUNCH LIST

A. As the time of work completion approaches, the Contractor shall survey and inspect his work and develop his own punch list to confirm that it is complete and finished. He shall then notify the Architect and request that a final inspection be made. It shall not be considered the Architect's or Engineer's Obligation to perform a final inspection

until the Contractor has inspected the work and so states at the time of the request for the final inspection.

B. Requests to the Architect, Engineer or Owner for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.

C. The Architect, Engineer and Owner will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken by the Contractor to the satisfaction of Architect and Engineer within 30 days of receipt of the Architect/Engineer's punch list.

1.14 WARRANTY

A. This Contractor shall warrant all workmanship, equipment and material entering into this contract for a period of two years from date of final acceptance or date of beneficial use, as agreed to between Contractor and Architect. Any materials or equipment proving to be defective during this warranty period shall be made good by this Contractor without expense to the Owner.

B. This provision is intended specifically to cover deficiencies in contract completion or performance which are discovered after systems are placed in operation. Also included shall be supplementary assistance in balancing, adjusting or providing operating instructions as the need develops, and replacing overload heater elements in starters where necessary to keep systems in operation. Heater element sizes shall not exceed the motor manufacturer's recommendations.

C. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

PART 2 - PRODUCTS

2.1 FACTORY-ASSEMBLED PRODUCTS

A. Provide maximum standardization of components to reduce spare part requirements.

B. Manufacturers of equipment assemblies that include components made by others shall assume complete responsibility for final assembled unit.

1. All components of an assembled unit need not be products of same manufacturer.

2. Constituent parts that are alike shall be products of a single manufacturer.

3. Components shall be compatible with each other and with the total assembly for intended service.

4. Contractor shall guarantee performance of assemblies of components, and shall repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly.

C. Components of equipment shall bear manufacturer's name and trademark, model number, serial number and performance data on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment.

D. Major items of equipment, which serve the same function, must be the same make and model. Exceptions will be permitted if performance requirements cannot be met.

2.2 REFERENCE STANDARDS

A. Where standards (NFPA, NEC, ASTM, UL, NETA ATS 2021, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the authority having jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used. NECA-NEIS, especially NECA1 and NECA90.

2.3 EQUIPMENT SELECTION

A. The selection of materials and equipment to be furnished under this contract shall be governed by the following:

1. Where trade names, brands, or manufacturers of equipment or materials are listed in the specification, the exact equipment listed shall be furnished. Where more than one name is used, the Contractor shall have the option of selecting between anyone of the several specified. All products shall be first quality line of manufacturer's listed.

2. Where the words "or approved equal" appear after a manufacturer's name, specific approval must be obtained from the Architect and Owner during the bidding period in sufficient time to be included in an addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.

3. Where the words "equal to" appear, followed by a manufacturer's name and sometimes a model or series designation, such designation is intended to establish quality level and standard features. Equal equipment by other manufacturers will be acceptable, subject to the Engineer's and Owner’s approval.

B. Substitute equipment of equal quality and capacity will be considered when the listing of such is included as a separate item of the bid. State the deduction or addition in cost to that of the specified product.

C. Before bidding equipment, and again in the preparation of shop drawings, the Contractor and his supplier shall verify that adequate space is available for entry and installation of the item of equipment, including associated piping and accessories. Also verify that adequate space is available for servicing of the equipment.

D. If extensive changes in equipment layout or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in the contract.

PART 3 - EXECUTION

3.1 ARRANGEMENT AND INSTALLATION OF EQUIPMENT

A. Coordinate location of conduit, sleeves, inserts, hangers and equipment. Locate conduit, sleeves, inserts, hangers, and equipment clear of windows, doors, openings, light outlets, and other services and utilities. Prepare equipment layout drawings to coordinate proper location and personnel access of all facilities. Submit the drawings for review. Follow manufacturer's published recommendations for installation methods not otherwise specified.

B. Operating Personnel Access and Observation Provisions: Select and arrange all equipment and systems to provide clear view and easy access, without use of portable ladders, for maintenance and operation of all devices including, but not limited to: all equipment items, transmitters, sensors, control devices. Do not reduce or change maintenance and operating space and access provisions that are shown on the drawings.

C. Equipment and Conduit Support: Coordinate structural systems necessary for conduit and equipment support with pipe and equipment locations to permit proper installation.

D. Location of conduit, sleeves, trenches and chases shall be accurately coordinated with equipment and conduit locations. Consider frost heave (e.g. with slip fittings).

E. Cutting Holes:

1. Cut holes through concrete and masonry by rotary core drill. Pneumatic hammer, impact electric, and hand or manual hammer type drill will not be allowed, except as permitted by Engineer where working area space is limited.

2. Locate holes to avoid interference with structural members such as beams or grade beams. Holes shall be laid out in advance and drilling done only after approval by the Engineer. If the Contractor considers it necessary to drill through structural members, this matter shall be referred to Engineer for approval.

3. Do not penetrate membrane waterproofing.

F. Interconnection of Instrumentation or Control Devices: Generally, electrical interconnections are not shown but must be provided.

G. Electrical Interconnection of Controls and Instruments: This generally not shown but must be provided. This includes interconnections of sensors, transmitters, transducers, control devices, control and instrumentation panels, instruments and computer workstations. Comply with NFPA-70.

H. Protection and Cleaning:

1. Equipment and materials shall be carefully handled, properly stored, and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the Engineer. Damaged or defective items in the opinion of the Engineer, shall be replaced.

I. Inaccessible Equipment:

1. Where the Engineer determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action performed as directed at no additional cost to the Owner.

3.2 OPERATING AND PERFORMANCE TESTS

A. Prior to the final inspection, perform required tests as specified in Section 010000, GENERAL REQUIREMENTS and submit the test reports and records to the Engineer.

B. Should evidence of malfunction in any tested system, or piece of equipment or component part thereof, occur during or as a result of tests, make proper corrections, repairs or replacements, and repeat tests at no additional cost to the Owner.

C. When completion of certain work or system occurs at a time when final control settings and adjustments cannot be properly made to make performance tests, then make performance tests for heating systems and for cooling systems respectively during first actual seasonal use of respective systems following completion of work.

3.3 OPERATING DEMONSTRATION AND INSTRUCTIONS

A. The Contractor shall set the various systems into operation and demonstrate to the Owner and Architect that the systems function properly and that the requirements of the Contract are fulfilled. See NECA90.

B. The Contractor shall provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and systems. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings.

C. O&M manuals shall be submitted, reviewed and approved prior to scheduling of demonstrations.

3.4 WORKMANSHIP

A. Materials and equipment shall be installed and supported in a first-class and workmanship manner by mechanics skilled in their particular trades. Workmanship shall be first-class in all respects, and the Architect shall have the right to stop the work if highest quality workmanship is not maintained. See NECA1.

B. Electrical work shall be performed by licensed Electrical Contractors in accordance with requirements of the jurisdiction.

3.5 PROTECTION

A. Each Contractor shall be entirely responsible for all material and equipment furnished in connection with his work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Architect.

B. The Owner's property and the property of other contractors shall be scrupulously respected at all times. Provide drop cloths and visqueen or similar barriers where dust and debris is generated, to protect adjacent areas.

3.6 MISCELLANEOUS EQUIPMENT CONNECTIONS

A. Certain categories of equipment, including water source heat pumps, require electrical connections as shown on the drawings. Equipment will be furnished and set in place by the HVAC Contractor.

B. Make all final connections to the HVAC equipment, as indicated and in accordance with the manufacturer's recommendations.

C. Use NEC compliant “soft connections” such as LFMC to any apparatus that can vibrate as part of normal operation. (LFNC is to be avoided.)

D. Roughing-in drawings shall be obtained for the heat pumps as the time approaches when such information is required; allow a reasonable period, from the time of notice, to obtain this information.

E. Connections to equipment shall be in accordance with manufactures installation guidelines. Any additional accessories recommended by the manufacturer shall be provided by this Contractor.

END OF SECTION 260505

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Field quality-control reports.

C. Factory type tests.

D. UL / IEEE conformance data.

E. Factory unit tests.

F. Field acceptance tests (VLF, Megger).

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide conductors and cables by Southwire Incorporated or comparable product by one of the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. Alpha Wire.
3. Belden Inc.
4. Encore Wire Corporation.
5. General Cable Technologies Corporation.
6. Okonite.

C. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.

D. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THW-2, Type THHN-2-THWN-2 or Type XHHW-2. 90-degree C. rating, sized to operate at 75 degrees.

E. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for armored cable, Type AC and metal-clad cable, Type MC with ground wire.

F. Aluminum conductors shall be permitted for feeders. Size feeders to match copper ratings per NEC 310, 75 deg. C ratings.

G. Aluminum conductor for service feeders shall be rated for underground use.

H. Type THHW, THWN, THW for internal feeders.

I. Aluminum is not permitted for branch circuits.

2.2 CONNECTORS AND SPLICES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide O-Z/Gedney or comparable product by one of the following:

1. AFC Cable Systems, Inc.
2. Gardner Bender.
3. Hubbell Power Systems, Inc.
4. Ideal Industries, Inc.
5. Ilsco; a branch of Bardes Corporation.
6. NSi Industries LLC.
7. 3M; Electrical Markets Division.
8. Tyco Electronics.

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 8 AWG and smaller; stranded for No. 6 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Feeders: Type THHN-2-THWN-2, single conductors in raceway, Type XHHW-2, single conductors in raceway. 90-degree C. rating, sized to operate at 75 degrees.

B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway.

C. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway, Armored cable, Type AC (use limited to lighting fixture whips, 6 foot or less in length). Metal-clad cable, Type MC (use limited to existing walls and partitions). LFMC allowed for above-grade whips, especially to outdoor equipment.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections; (As required per NETA ATS, NECA 90):

1. After installing conductors and cables and before electrical circuitry has been energized, test conductors feeding the following critical equipment and services for compliance with requirements.

a. Test wiring devices for ground continuity.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

B. Test and Inspection Reports: Prepare a written report to record the following:

1. Procedures used.

2. Results that comply with requirements.
3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
4. Pass / Fail acceptance criteria.

C. Cables will be considered defective if they do not pass tests and inspections.

D. Splice repairs are not permitted on new cable; the entire run must be replaced.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

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: Grounding systems and equipment.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

C. Due to close proximity, coordinate with Substation Engineer / Contractor and use suitable materials. Portions of IEEE 80 may also apply.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. **8** AWG and smaller, and stranded conductors for No. **6** AWG and larger unless otherwise indicated.

B. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

D. Stranded conductor is preferred for all sizes. Use copper-clad steel cable for any exposed outdoor connections, to deter theft.

3.2 EQUIPMENT GROUNDING

A. Install separate insulated equipment grounding conductors with all feeders and branch circuits and grounding bushings where passing through metallic conduit.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
4. Apply permanent engraved tags “ELECTRICAL GROUNDING – DO NOT REMOVE” (or similar) at all exposed locations where grounding electrode conductors bond to pipes, steel, etc.

C. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing of the fire alarm system.

B. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.

2. Due to proximity, consult geotechnical and substation grounding studies. IEEE 81 test methods may apply. Maximum 5 ohms.

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify the Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 70.

1.5 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Allied Tube & Conduit.
    b. Cooper B-Line, Inc.; a division of Cooper Industries.
    c. ERICO International Corporation.
    d. GS Metals Corp.
    e. Thomas & Betts Corporation.
    f. Unistrut; Tyco International, Ltd.
    g. Wesanco, Inc.

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Cooper B-Line, Inc.; a division of Cooper Industries.
2) Empire Tool and Manufacturing Co., Inc.
3) Hilti Inc.
4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or Spring-tension clamps.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, and other devices on slotted-channel racks attached to substrate .

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

   1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Metal wireways and auxiliary gutters.
3. Boxes, enclosures, and cabinets.
4. Non-metal conduits, tubing and fittings.

1.3 DEFINITIONS

A. ARC: Aluminum rigid conduit.

B. RMC: Rigid metal conduit.

C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, hinged-cover enclosures, and cabinets.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:

1. Structural members in paths of exposed conduit groups with common supports.
2. HVAC and plumbing items and architectural features in paths of exposed conduit groups with common supports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. AFC Cable Systems, Inc.
2. Allied Tube & Conduit; a Tyco International Ltd. Co.
3. Anamet Electrical, Inc.
4. Electri-Flex Company.
5. O-Z/Gedney; a brand of EGS Electrical Group.
6. Picoma Industries, a subsidiary of Mueller Water Products, Inc.
7. Republic Conduit.
8. Robroy Industries.
9. Southwire Company.
10. Thomas & Betts Corporation.
11. Western Tube and Conduit Corporation.
12. Wheatland Tube Company; a division of John Maneely Company.

B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. GRC: Comply with ANSI C80.1 and UL 6.

D. ARC: Comply with ANSI C80.5 and UL 6A.

E. IMC: Comply with ANSI C80.6 and UL 1242.

F. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch (1 mm), minimum.

G. EMT: Comply with ANSI C80.3 and UL 797.

H. FMC: Comply with UL 1; zinc-coated steel.

I. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

J. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Fittings for EMT:

a. Material: Steel.

b. Type: Setscrew.

2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

K. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.
6. Condux International, Inc.
7. Electri-Flex Company.
8. Kraloy.
9. Lamson & Sessions; Carlon Electrical Products.
10. Niedax-Kleinhuis USA, Inc.
11. RACO; a Hubbell company.
12. Thomas & Betts Corporation.

B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

D. Rigid HDPE: Comply with UL 651A.

E. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

F. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Cooper B-Line, Inc.
2. Hoffman; a Pentair company.
3. Mono-Systems, Inc.
4. Square D; a brand of Schneider Electric.

B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 or Type 3R unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type or Flanged-and-gasketed type unless otherwise indicated.

E. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Adalet.
2. Cooper Technologies Company; Cooper Crouse-Hinds.
3. EGS/Appleton Electric.
4. Erickson Electrical Equipment Company.
5. FSR Inc.
6. Hoffman; a Pentair company.
7. Hubbell Incorporated; Killark Division.
8. Kraloy.
9. Milbank Manufacturing Co.
10. Mono-Systems, Inc.
11. O-Z/Gedney; a brand of EGS Electrical Group.
12. RACO; a Hubbell Company.
13. Robroy Industries.
14. Spring City Electrical Manufacturing Company.

15. Stahlin Non-Metallic Enclosures; a division of Robroy Industries.
16. Thomas & Betts Corporation.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.

G. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).

H. Gangable boxes are allowed.

I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 or Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic.
3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:

a. Loading dock.
b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
c. Mechanical rooms.
d. Gymnasiums.

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
8. Below grade: EPC-40-PVC.

B. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

C. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Conduits: Use only fittings listed for use with this type of conduit. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use setscrew, steel fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

E. Install surface raceways only where indicated on Drawings.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

E. Install no more than the equivalent of four 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

G. Support conduit within 12 inches (300 mm)of enclosures to which attached.

H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

I. Raceways Below Floor Slabs:

1. Run conduit, parallel or at right angles to main reinforcement.
2. Arrange raceways to keep a minimum of 6 inches below the concrete cover to avoid damage from future saw-cut of floor.
3. Transition to EMT just below grade for EMT stub-ups. All stub-ups shall be type EMT.

J. Stub-ups to Above Recessed Ceilings or into the attic:

1. Use EMT, IMC, or RMC for raceways.
2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

M. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

N. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

O. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

P. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

Q. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.

R. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service raceway enters a building or structure.
3. Where otherwise required by NFPA 70.

S. Expansion-Joint Fittings:

1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C) and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).
2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:

    a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
    b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
    c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

T. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.

U. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

3.3 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Identification of power and control cables.
2. Identification for conductors.
3. Equipment identification labels.
4. Miscellaneous identification products.

1.3 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

PART 2 - PRODUCTS

2.1 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

2.2 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

E. Stenciled Legend: In nonfading, waterproof, black <Insert color> ink or paint. Minimum letter height shall be 1 inch (25 mm) <Insert dimension>.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

3.2 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in pull and junction boxes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.

a. Color shall be factory applied.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.

c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

d. Neutral conductors shall be separately identifiable per NEC.

B. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, terminal cabinets, and racks of each system. Systems include power, lighting, control, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
b. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Replace the directory in panelboards where modified within this project.
b. Access doors and panels for concealed electrical items.
c. Enclosed switches.

d. Switchboards: Provide new labels where the switches are modified as a part of this project.

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Time switches
2. Indoor occupancy sensors.
3. Room lighting controller.
4. Dimmers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.
2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of lighting control device to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Industries, Inc.
2. Intermatic, Inc.

3. Invensys Controls.
4. Leviton Manufacturing Co., Inc.
5. NSi Industries LLC.

B. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Contact Configuration: SPST.
3. Contact Rating: 30-A inductive or resistive, 240-V ac.
4. Programs: Eight on-off set points on a 24-hour schedule and an annual holiday schedule that overrides the weekly operation on holidays.
5. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program on selected channels.
6. Astronomic Time: All channels.

2.2 INDOOR OCCUPANCY SENSORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

1. Cooper Industries, Inc.
2. Hubbell Building Automation, Inc.
3. Leviton Mfg. Company Inc.
4. Lithonia Lighting; Acuity Lighting Group, Inc.
5. Sensor Switch, Inc.
6. Square D; a brand of Schneider Electric.
7. Watt Stopper.

B. General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a separate power pack.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
5. Mounting:

a. Sensor: Suitable for mounting in any position on a standard outlet box.
b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

6. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
7. Bypass Switch: Override the "on" function in case of sensor failure.
8. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lux); turn lights off when selected lighting level is present.

C. PIR Type: Ceiling mounted; detect occupants in coverage area by their heat and movement.

1. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm).
2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
3. Detection Coverage (Corridor): Detect occupancy within 90 feet (27.4 m) when mounted on a 10-foot- (3-m-) high ceiling.

D. Ultrasonic Type: Ceiling mounted; detect occupants in coverage area through pattern changes of reflected ultrasonic energy .

1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. (56 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. (186 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
5. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet (27.4 m) when mounted on a 10-foot- (3-m-) high ceiling in a corridor not wider than 14 feet (4.3 m).

E. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of

technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

2.3 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

1. Cooper Industries, Inc.
2. Hubbell Building Automation, Inc.
3. Leviton Mfg. Company Inc.
4. Lithonia Lighting; Acuity Lighting Group, Inc.
5. Sensor Switch, Inc.
6. Square D; a brand of Schneider Electric.
7. Watt Stopper.

B. General Requirements for Sensors: Automatic-wall-switch occupancy sensor, suitable for mounting in a single gang switchbox.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).
3. Switch Rating: Not less than 800-VA fluorescent at 120 V, 1200-VA fluorescent at 277 V, and 800-W incandescent.

C. Wall-Switch Sensor S1:

1. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft. (84 sq. m).
2. Sensing Technology: Dual technology - PIR and ultrasonic.
3. Switch Type: SP, dual circuit or SP field selectable automatic "on," or manual "on" automatic "off."
4. Voltage: Match the circuit voltage type.

5. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lux). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
6. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
7. Concealed "off" time-delay selector at 30 seconds, and 5, 10, and 20 minutes.
8. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.

2.4 GENERAL-USE DIMMER SWITCHES

A. Source Quality Control:

1. Samples for Initial Selection: One for each kind of general-use dimmer switch in each specified rating, size, finish, and color.

B. Type I Dimmer Switch:

1. Listing Criteria: UL CCN EOYX and UL 1472.
2. Standard Features:

a. UL 1472 Type I dimmer.
b. Device Color: As selected by Architect.
c. Switch Style: Push-button
d. Dimming Control Style: Slide

3. Accessories:

a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.5 ROOM CONTROLLER

A. Refer to drawings for room controller specification and dimmers.

2.6 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 WIRING INSTALLATION

A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.3 ADJUSTING

A. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

3.4 DEMONSTRATION

A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control systems specified in Section 260943.13 "Addressable-Fixture Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls."

END OF SECTION 260923

SECTION 262416 – PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.

1.3 DEFINITIONS

A. SVR: Suppressed voltage rating.

B. SPD: Surge Protective Device – Transient voltage surge suppressor (TVSS).

1.4 ACTION SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment modified within the scope of the work for this project.

1. Detail current, and voltage ratings.
2. Short-circuit current rating of overcurrent protective devices.
3. Include evidence of NRTL listing for series rating of installed devices.
4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Two spares for each type of panelboard cabinet lock.
2. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer to be the same as the existing equipment manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Construction Manager and Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Construction Manager's and Owner's written permission.
3. Comply with NFPA 70E.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Minimum of one (1) year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Enclosures: Flush mounted cabinets.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 1.

2. Front: Secured to box with concealed trim clamps. For flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Directory Card: Inside panelboard door, mounted in transparent card holder.

B. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

C. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.

D. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

E. Overcurrent protective devices installed in existing distribution equipment shall be by the same manufacturer as the distribution equipment and shall have the same or greater short circuit rating.

F. Surge Suppression: Factory installed as integral part of indicated panelboards, complying with UL 1449 SPD. (As indicated on drawings.)

2.2 DISTRIBUTION PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide Square D "I-Line", or comparable products by one of the following:

1. Eaton.
2. ESL Power Systems, Inc.
3. General Electric Company; GE Energy Management - Electrical Distribution.

B. Panelboards: NEMA PB 1, distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

D. Mains: Circuit breaker.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers or Plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers or Plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

G. Branch Overcurrent Protective Devices: Fused switches.

H. Contactors in Main Bus: NEMA ICS 2, Class A, electrically or mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.

1. External Control-Power Source: 120-V branch circuit.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Provide circuit breakers with same rating (A.I.C.) and by the same manufacturer as existing equipment.

B. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

C. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

B. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:

Panelboards and Switchboard:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

C. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long- and short-time time adjustments.
    d. Ground-fault pickup level, time delay, and I^2t response.

4. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
5. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
6. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
7. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    d. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
    e. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

f. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

D. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

1. Fuses, and Spare-Fuses: Comply with requirements specified in Section 262813 "Fuses."
2. Fused Switch Features and Accessories: Standard ampere ratings and number of poles.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

B. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

C. Install filler plates in unused spaces in panelboards and switchboards.

D. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

E. Comply with NECA 1.

3.3 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a

computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards modified within the scope of work for this project. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable component to function smoothly and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as indicated.

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour

services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.

3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Isolated-ground receptacles.
4. Snap switches.
5. Floor service fittings.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
2. Cord and Plug Sets: Match equipment requirements.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

1.6 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand (Pass & Seymour).
5. Legrand/Wiremold.

B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

2.3 STRAIGHT-BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 5351 (single), CR5362 (duplex).
b. Hubbell; HBL5351 (single), HBL5352 (duplex).
c. Leviton; 5891 (single), 5352 (duplex).
d. Pass & Seymour; 5361 (single), 5362 (duplex).

B. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; IG5362RN.
b. Hubbell; IG5362.
c. Leviton; 5362-IG.
d. Pass & Seymour; IG5362.

2. Description: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

2.4 TAMPER-RESISTANT DUPLEX STRAIGHT-BLADE RECEPTACLE

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper.
b. Hubbell.
c. Leviton.
d. Pass & Seymour.

2. Listing Criteria: Investigated, labeled, and marked by qualified electrical testing laboratory in accordance with guide information and standards specified for the following UL product categories:

a. Receptacles for Plugs and Attachment Plugs: UL CCN RTRT and UL 498.
b. Surge Protective Devices: UL 1449, Type 3.

3. Standard Features:

a. Device Color: As selected by Architect.
b. Configuration:

1) General-duty, NEMA 5-15R.

4. Other Available Features Required by the Project:

a. Has factory-terminated connectors on wiring device pigtails for quick installation.

5. Accessories:

a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.5 GFCI RECEPTACLES

A. General Description:

1. Straight blade, non-feed-through type.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; VGF20.
b. Hubbell; GFR5352L.
c. Pass & Seymour; 2095.
d. Leviton; 7590.

2.6 TWIST-LOCKING RECEPTACLES

A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration L5-20R, and UL 498.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; CWL520R.
b. Hubbell; HBL2310.
c. Leviton; 2310.
d. Pass & Seymour; L520-R.

2.7 PENDANT CORD-CONNECTOR DEVICES

A. Description:

1. Matching, locking-type plug and receptacle body connector.
2. NEMA WD 6 Configurations L5-20P and L5-20R, heavy-duty grade, and FS W-C-596.
3. Body: Nylon, with screw-open, cable-gripping jaws and provision for attaching external cable grip.
4. External Cable Grip: Woven wire-mesh type made of high-strength, galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

2.8 CORD AND PLUG SETS

A. Description:

1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.
3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.9 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

1) Single Pole:
2) Cooper; AH1221.
3) Hubbell; HBL1221.
4) Leviton; 1221-2.
5) Pass & Seymour; CSB20AC1.
6) Two Pole:
7) Cooper; AH1222.
8) Hubbell; HBL1222.
9) Leviton; 1222-2.
10) Pass & Seymour; CSB20AC2.

11) Three Way:
12) Cooper; AH1223.
13) Hubbell; HBL1223.
14) Leviton; 1223-2.
15) Pass & Seymour; CSB20AC3.
16) Four Way:
17) Cooper; AH1224.
18) Hubbell; HBL1224.
19) Leviton; 1224-2.
20) Pass & Seymour; CSB20AC4.

2.10 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: Unbreakable heavy-duty plastic or nylon. Color as selected by Architect.

B. Wet-Location, Weatherproof in-use Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, thermoplastic with lockable cover.

2.11 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: As selected by Architect from manufacturers standard color selections submitted with the shop drawings, unless otherwise indicated or required by NFPA 70 or device listing.
2. Isolated-Ground Receptacles: Orange.

2.12 FLOOR SERVICE FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hubbell Incorporated; Wiring Device-Kellems.
2. Pass & Seymour/Legrand (Pass & Seymour).
3. Square D; by Schneider Electric.

B. Type: Modular, flush-type, dual-service units suitable for wiring method used.

C. Compartments: Barrier separates power from voice and data communication cabling.

D. Service Plate: Round, die-cast aluminum with satin finish.

E. Power Receptacle: NEMA WD 6 Configuration 5-20R, gray finish, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

    a. Cut back and pigtail or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets to suit arrangement of partitions and furnishings.

3.2 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.3 FIELD QUALITY CONTROL

A. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

B. Wiring devices will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 262726

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).

B. Shop Drawings: For enclosed switches.

1. Include enclosure type and fuse clip size.

2. Identify each switch submitted with the label for the associated equipment to be connected. Example HVAC unit CU2.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NFPA 70.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
2. Altitude: Not exceeding 6600 feet (2010 m).

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Construction Manager no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Construction Manager's written permission.
4. Comply with NFPA 70E.

1.8 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Lugs: Mechanical type, suitable for number, size, and conductor material.
5. Service-Rated Switches: Labeled for use as service equipment.

2.2 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install individual wall-mounted switches with tops at uniform height unless otherwise indicated.

B. Install fuses in fusible devices.

C. Comply with NECA 1.

3.3 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

D. Enclosed switches will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies enclosed switches. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262816

SECTION 263200 – GENERATOR (ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY

A. Work included: Furnishing and installing a complete, permanently installed, air-cooled gaseous-fueled standby generator system.

B. Included Components: The system shall include the generator unit, automatic transfer switch (ATS), battery, and remote monitoring capabilities.

1.2 REFERENCES

A. UL 2200: Standard for Stationary Engine Generator Assemblies.

B. NFPA 37: Standard for the Installation and Use of Stationary Combustion Engines.

C. NFPA 70: National Electrical Code (NEC).

D. NEMA MG1: Motors and Generators.

1.3 SYSTEM DESCRIPTION

A. Ratings: Standby power ratings at 120/240V, single phase, 60 Hz:

1. 18 kW: 18,000 W Liquid Propane (LP)

B. Fuel Type: Dual fuel capability operating on either Natural Gas (NG) or Liquid Propane (LP).

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: Generac Power Systems, Guardian Series Model G0072590 or equal by Kohler Model 20RCA(L).

2.2 ENGINE

A. Type: Generac G-Force Engine, 4-cycle, overhead valve (OHV), pressure lubricated.

B. Displacement: 18 kW Model 999 cc.

C. Governor: Electronic governor maintains constant 60 Hz frequency and voltage regulation…

D. Lubrication: Pressurized with full flow filter; low oil pressure shutdown system.

E. Cold Start: Improved cold weather start capability with built-in electronic fuel and ignition control (EFIC).

2.3 GENERATOR (ALTERNATOR)

A. Design: Revolving field, heavy-duty, 2-pole.

B. Voltage Regulation: Automatic Voltage Regulator (AVR) providing regulations of output voltage to +/- 1%. Prevents damaging voltage spikes.

C. Total Harmonic Distortion (THD): Less than, allowing for clean and safe operation of sensitive electronic equipment.

D. Insulation: Class H.

2.4 ENCLOSURE

A. Material: Heavy-duty, all-weather aluminum enclosure for superior rust prevention.

B. Sound Attenuation: Sound-insulating panels to reduce noise levels. Operates at roughly 65 dBA at 7 meters.

C. Air Intake: Sloped roof and hooded air intake designed to resist snow and ice intrusion.

2.5 CONTROLS

A. Controller: Power Zone ™ 200 Controller featuring a multi-line, multilingual LCD display for simple operation and diagnostics.

B. Quiet-Test ™ Model: Low-RPM exercise mode that runs 5 to 12 minutes to reduce noise and fuel consumption.

C. Connectivity: Built-in Wi-Fi and Bluetooth capabilities for Mobile Link ™ remote monitoring via smartphone or PC.

D. Smart Battery Charger: Regulates charging voltage based on ambient outdoor temperature.

2.6 AUTOMATIC TRANSFER SWITCH (ATS)

A. Type: 2-pole, 200-Amp service entrance-rated ATS with built-in load management capability.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that the installation area meets the required clearances from building, combustibles, windows, and doors, as dictated by NFPA 37 and local codes.

B. Inspect concrete mounting pad for levelness and structural capacity.

3.2 INSTALLATION

A. Placement: Install the generator on a concrete equipment pad. Level unit to prevent vibration.

B. Fuel Piping: Connect fuel lines according to sizing requirements for LP in accordance with NFPA 54/NFPA 58. Include a sediment trap and manual shutoff valve.

C. Electrical Wiring: Terminate power leads from the generator to the ATS and complete low-voltage control wire connections. Ground the generator system per NEC and manufacturer instructions.

3.3 FIELD QUALITY CONTROL

A. Testing: Perform a start-up and operational test according to the manufacture’s operational manual. Simulate a utility power outage to verify automatic transfer switch operation.

B. Warranty: Verify registration and activation of the 5-Year Limited Warranty.

END OF SECTION 263200

SECTION 265100 - INTERIOR LIGHTING - LED

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and ballasts.
2. Lighting fixture supports.

1.3 DEFINITIONS

A. BF: Ballast factor.

B. CCT: Correlated color temperature.

C. CRI: Color-rendering index.

D. HID: High-intensity discharge.

E. LER: Luminaire efficacy rating.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.
2. Ballast, including BF.
3. Energy-efficiency data.
4. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.
5. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing & Calculation Guides, of each lighting

fixture type. The adjustment factors shall be for lamps, ballasts, and accessories identical to those indicated for the lighting fixture as applied in this Project.

a. Testing Agency Certified Data: For sanctuary fixtures, photometric data shall be certified by manufacturer.
b. Manufacturer Certified Data: Photometric data shall be certified by a manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Shop Drawings: For sanctuary pendants and wall sconces, include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

C. Installation instructions.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings for theatrical/dimming system luminaires: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Lighting fixtures.
2. Structural members to which suspension systems for lighting fixtures will be attached.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps: 10%, minimum of one (1) of each type and rating installed. Furnish at least one of each type.

1.8 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NFPA 70.

1.9 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction including HVAC equipment, and structural assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated on Drawings.

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. LED Fixtures: Comply with UL and IESNA standards and testing.

B. Metal Parts: Free of burrs and sharp corners and edges.

C. Diffusers and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
b. UV stabilized.

2. Glass: Annealed crystal glass unless otherwise indicated.

D. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and ballasts. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

2.3 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Section 260529 "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

C. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.

D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

E. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures:

1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
2. Install lamps in each luminaire.

B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.

C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 STARTUP SERVICE

A. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by Owner.

END OF SECTION 265100

SECTION 265619 - LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
2. Luminaire supports.
3. Luminaire-mounted wireless sensors.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color rendering index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale and coordinated.

B. Product Certificates: For each type of the following:

1. Luminaire.

2. Photoelectric relay.

C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.6 FIELD CONDITIONS

A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.7 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 2 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event."

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.

C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

D. UL Compliance: Comply with UL 1598 and listed for wet location.

E. Lamp base complying with ANSI C81.61 or IEC 60061-1.

F. CRI of minimum 65. CCT of 2700 K.

G. L70 lamp life of 35,000 hours.

H. Lamps dimmable from 100 percent to 0 percent of maximum light output.

I. Nominal Operating Voltage: 120 V ac.

J. In-line Fusing: On the primary for each luminaire.

K. Lamp Rating: Lamp marked for outdoor use and in enclosed locations.

L. Source Limitations: Obtain luminaires from single source from a single manufacturer.

M. Source Limitations: For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

2.3 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Sheet Metal Components: Corrosion-resistant aluminum; Stainless steel; Epoxy-coated steel. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.

D. Diffusers and Globes:

1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

E. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

F. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

G. Housings:

1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
2. Provide filter/breather for enclosed luminaires.

2.4 FINISHES

A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

C. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20 requirements; and seal aluminum surfaces with clear, hard-coat wax.
3. Class I, Clear-Anodic Finish: AA-M32C22A41 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Class I, Color-Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker), complying with AAMA 611.

D. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1 or SSPC-SP 8.
2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

    a. Color: As selected from manufacturer's standard catalog of colors.

2.5 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Install lamps in each luminaire.

D. Fasten luminaire to structural support.

E. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Support luminaires without causing deflection of finished surface.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

F. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.

G. Wiring Method: Install cables in raceways. Conceal raceways and cables.

H. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.

I. Coordinate layout and installation of luminaires with other construction.

J. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.

K. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

3.2 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Verify operation of photoelectric controls.

C. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):

a. IES LM-5.
b. IES LM-50.
c. IES LM-52.
d. IES LM-64.
e. IES LM-72.

2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

D. Luminaire will be considered defective if it does not pass tests and inspections.

E. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

END OF SECTION 265619

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Clear site of plant life, trees and grass.

2. Remove root system of existing shrubs.

3. Remove existing surface debris.

4. Demolition of any existing construction foundations.

B. Related Sections:

1. Section 31 25 00 - Erosion and Sediment Controls

2. Section 02 41 00 – Site Demolition

1.2 REGULATORY REQUIREMENTS

A. Conform to applicable local building code for disposal of debris on site.

B. Dispose of unsuitable solid waste materials off site in a manner complying with local, state and Federal agencies having jurisdiction over the Work.

C. Endangered Species / Bats: Tree Clearing must occur between October 1st and March 31st. If tree clearing will occur outside of these dates, Contractor shall first perform a Bat Survey to confirm that no endangered bat species are nested in the trees to be removed. Survey must follow joint USFWS and ODNR guidelines. Surveys must be conducted by qualified, permitted biologists during specific summer windows.

D. Coordinate clearing work with utility companies.

1.3 JOB CONDITIONS

A. Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent facilities.

B. Do not close or obstruct streets, walks, or other facilities without permission from appropriate authorities.

C. Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

D. Schedule work of this Section so as not to interfere with work required by other Sections.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that soil erosion and water pollution controls as specified in Section 02170 are properly located and installed prior to initiating work.

3.2 CLEARING

A. Clear areas required for access to site and execution of work.

B. Method of Clearing: Use equipment and procedures as required to complete the work.

C. Remove existing shrubs, trees and other vegetation within marked areas. Grub out roots and surface rock.

D. Clear undergrowth and deadwood, without disturbing subsoil.

E. Existing trees scheduled to remain: Do not tunnel through tree roots; do not nail anything to trees; do not drive trucks over tree root system.

F. Restore existing materials, systems, or improvements damaged during work of this Section to their original condition as acceptable to Architect at no additional cost to Owner.

G. Do not burn materials on Owner's property.

H. Abandonment or removal of certain underground conduit or pipe may be included in Division 15 and 16 work and is included under work of those Divisions. Removal of abandoned underground conduit or pipe which interfaces with site clearing is included under scope of this Section.

I. Do not cover up brush and similar debris with earth.

J. Refill depressions created by removal of stumps and large roots with suitable compacted earthfill where necessary to bring grade back to its original elevation or final grade.

3.3 PROTECTIONS

A. Protect above and below grade utilities scheduled to remain.

B. Protect bench marks from damage or displacement.

C. Maintain designated site access for vehicle and pedestrian traffic.

D. Protect exposed bare earth by mulch or other approved method if site clearing operations are completed two days prior to construction, excavation, or utility installations.

3.4 DISPOSAL

A. Remove existing surface debris from site.

B. Properly dispose of debris. Notarize and certify to Owner in writing the following:

1. Locations where debris was disposed off site.

2. That disposal complied with applicable environmental regulations.

END OF SECTION 31 10 00

SECTION 31 20 00 – EARTH MOVING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Building excavations.
2. Building perimeter backfilling to subgrade elevations.
3. Fill under slabs-on-grade, footings, and foundations.
4. Compaction requirements.

B. Related Sections:

1. Section 31 10 00 – Site Clearing
2. Section 31 25 00 – Erosion & Sediment Control

C. Work Excluded:
Do excavation, trenching, backfilling, and compacting incidental to underground installations of Division 22 and 26 Work by appropriate trade. Coordinate such Work of this Section.

1.02 RELATED DOCUMENTS

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

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.03 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to this effective date of this Contract shall be applicable to this Project.

C. All materials, installation, and workmanship shall comply with all applicable requirements and standards.

1.04 DEFINITIONS

A. Borrow: Borrow excavation shall consist of approved select fill material imported from off-site when sufficient approved select fill material is not available from excavations.

B. Clearing: Clearing shall consist in the felling, cutting up, and satisfactory disposal of trees and other vegetation designated for removal in accordance with these specifications.

C. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

D. Fill (in terms of volume): In terms of volume, fill is defined as a compacted post-construction volume in-place.

E. Grubbing: Grubbing shall consist of the removal of roots 1 ½ inch and larger, organic matter and debris, and stumps having a diameter of three inches or larger, to a depth of at least 18 inches below the surface and or subgrade, whichever is lower, and the disposal thereof.

F. Base Course: The layer placed between the subgrade and surface pavement in a paving system.

G. Regular Excavation: Removal and disposal of any and all material above subgrade elevation, except solid rock and undercut excavation, located within the limits of construction.

H. Rock Excavation: Removal and satisfactory disposal of all unsuitable materials, which, in the opinion of the A/E, cannot be excavated except by drilling, blasting, wedging, jack hammering, or hoe ramming. It shall consist of un-decomposed stone, hard enough to ring under hammer. All boulders containing a volume of more than ½ cubic yard and/or solid ledges, bedded deposits, un-stratified masses, and conglomerations of material so firmly cemented as to possess the characteristics of solid rock that cannot be removed without systematic drilling, blasting, or hoe ramming will be classified as rock.

I. Drainage Fill: Course of washed granular material supporting slab on grade placed to cut off upward capillary flow of pore water.

J. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Owner. Unauthorized excavation, as well as remedial work directed by Owner, shall be at Contractor's expense.

   Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Owner.

   In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Owner.

K. Select Fill Material: Non-plastic material obtained from roadway cuts, borrow areas, or commercial sources used as foundation for subgrade, shoulder surfacing, fill, backfill, or other specific purposes.

L. Engineered Fill: Select fill as defined above.

M. Structures: Incidental buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

N. Topsoil: Topsoil shall consist of friable clay loam, free from roots, stones, and other undesirable material and shall be capable of supporting a good growth of grass.

O. Undercut Excavation: Undercut excavation shall consist of the removal and satisfactory disposal of all unsuitable material located below subgrade elevation. Where excavation to the finished grade section results in a subgrade or slopes of muck, peat, matted roots or other unsuitable materials, the Contractor shall immediately notify the A/E.

P. Additional Excavation: When excavation has reached required subgrade elevations, notify Owner, who will make an inspection of conditions. If Owner determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Owner. The Contract Sum may be adjusted by an appropriate Contract Modification.

Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.

Q. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular base, drainage fill, or topsoil materials.

1.05 SUBMITTALS

A. Material Test Reports: Provide from a qualified testing agency test results and interpretation for compliance of the following requirements indicated:

Classification according ASTM D2487 of each on-site or borrow soil proposed for backfill, unless otherwise directed by the A/E.

Laboratory compaction curve according to ASTM D698 for each on-site or borrow soil material proposed for fill or backfill.

Laboratory analysis reports indicating compliance with ODOT gradation and physical properties specifications for all granular materials including bedding, backfill and pavement base.

Field Test Results for each test group as required in item 3.18 of this specification.

1.06 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing as documented according to ASTM D 3740 and ASTM E 548. Comply with all codes, laws,

ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

B. The Contractor shall comply with the latest revision of the Occupational Safety and Health Standards for the Construction Industry.

C. Materials and operations shall comply with the latest revision of the Codes and Standards listed below:

Ohio Department of Transportation
ODOT-CMS Construction and Materials Specifications, Current Edition

American Society for Testing and Materials

ASTM C 33	Concrete Aggregates
ASTM C 136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates Sieve Analysis of Fine and Coarse Aggregate
ASTM D 422	Standard Test Method for Particle-Size Analysis of Soils (for classification purposes only)
ASTM D 698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3) (Standard Proctor)
ASTM D 1556	Standard Method of Test for Density of Soil in Place by the Sand-Cone Method
ASTM D 1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3) (Modified Proctor)
ASTM D1883	Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils
ASTM D 2049	Standard Method of Test for Relative Density of Cohesionless Soils
ASTM D2167	Standard Method of Test for Density of Soil in Place by the Rubber-Balloon Method
ASTM D 2487	Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D 4254	Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D 4318	Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

American Association of State Highway & Transportation Officials

AASHTO T 99	The Moisture-Density Relations of Soils using a 5.5-pound hammer and a 12-inch drop
AASHTO T 180	The Moisture Density Relations of Soils using a 10-pound hammer and an 18-inch drop
ASHTO M 145	The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction

1.07 STANDARD ABBREVIATIONS

ANSI American National Standards Institute
MSDS Material Safety Data Sheets
OSHA Occupational Safety and Health Administration
ODOT Ohio Department of Transportation

1.08 TESTING SERVICES

A. The Testing Laboratory shall be approved by the A/E and will be responsible for conducting and interpreting tests. The Testing Laboratory shall state in each report whether or not the test specimens conform to all requirements of the Contract Documents and specifically note any deviation.

B. Specific test and inspection requirements shall be as specified herein.

1.09 PROJECT CONDITIONS

A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Existing Utilities: The contractor shall contact the Ohio Utilities Protection Service, the Owner of the Utility, and Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility Owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility Owner.

Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Owner and then only after acceptable temporary utility services have been provided.

Provide minimum of 48 hour notice to Owner, and receive written notice to proceed before interrupting any utility.

Demolish and completely remove from Site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

C. The use of explosives is not permitted.

D. Barricade open excavations occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

Perform excavation by hand within dripline of large trees to remain. Protect root systems from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

E. Geotechnical Investigation

Where a Geotechnical report has been provided to the Contractor, the data on sub-surface soil conditions is not intended as a representation or warranty of the continuity of such conditions between borings or indicated sampling locations. It shall be expressly understood that the Owner will not be responsible for any interpretations or conclusions drawn there from by the Contractor. Data is made available for the convenience of the Contractor.

In addition to any report that may be made available to the Contractor, the Contractor is responsible for performing any other soil investigations he/they feel(s) is necessary for proper evaluation of the site for the purposes of planning and/or bidding the project, at no additional cost to the Owner.

F. Environmental: Before crossing or entering into any jurisdictional wetlands, Contractor shall verify whether or not a wetlands permit has been obtained for the encroachment and whether special restrictions have been imposed. Care shall be taken to prevent draining or otherwise destroying non-permitted wetlands. Restore as stated on either the project drawings, the contract documents, and/or as noted in the permit.

1.10 COORDINATION

A. Coordinate tie-ins to municipal system with the utility owner.

B. When traffic signals or their appurtenances are likely to be damaged or interfered with as a result of the construction, coordinate temporary operation with the Local Traffic Engineer. Provide a minimum of 48 hours notice prior to anticipated disturbance or interruption.

C. Benchmark/Monument Protection: Protect and maintain benchmarks, monuments or other established reference points and property corners. If disturbed or destroyed, replace at own expense to full satisfaction of Owner. Work shall be performed by a professional surveyor licensed by the State of Ohio.

PART 2 – PRODUCTS

2.01 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.02 SOIL MATERIALS

A. Provide approved borrow soil materials from off Site when sufficient approved soil materials are not available from excavations. The contractor shall make their own determination regarding the need to bring in fill or haul off excess material and provide fill or haul-off at no additional cost to the owner.

B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups (Unified Classification System) GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter.

C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT; soils that contain rock or gravel larger than 2 inches in any dimension, debris, organic matter, waste, frozen materials, muck, roots, vegetation, and other deleterious matter. Unsatisfactory soils also include satisfactory soils not maintained within 20-percent of optimum moisture content at time of compaction, unless otherwise approved by either the A/E or a Geotechnical Engineer.

D. Select Fill Material: Sandy clay or clayey sand with a Plasticity Index of between 7 and 20, with a minimum Liquid Limit of 30, with less than 50 percent by weight passing a No. 200 sieve, and free of rock or gravel larger than 2 inches in any dimension, debris, waste, vegetable, or other deleterious matter.

E. Bedding Material: Unless otherwise indicated; base materials with 100 percent passing a 1 inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Drainage Fill: Uniformly graded mixture of natural or crushed gravel, crushed stone, and natural sand, conforming to the fine aggregate (Concrete Sand) requirements of ASTM C 33 (ODOT 703.02 Aggregate for Portland Cement Concrete A. fine Aggregate), with 100 percent passing a ¼ inch sieve and 2 percent to 10 percent passing a No. 100 sieve.

G. Filtering Material: Uniformly graded mixture of natural or crushed gravel, or crushed stone and natural sand conforming to ASTM C 33, Coarse Aggregate Size No. 67, with 100 percent passing a 1 inch sieve and 0 percent to 5 percent passing a No. 8 sieve.

H. Impervious Fill: Lean clay with a Liquid Limit of less than 50 and capable of compacting to a dense composite.

I. Cement Stabilized Sand Backfill Material: Uniformly graded mixture of natural or crushed stone, crushed slag or natural or crushed sand conforming to the fine aggregate (Concrete Sand) requirements of ASTM C 33 with 100 percent passing a ¼ inch sieve and less than 15 percent passing a No. 200 sieve and not less than 1½ sacks of portland cement conforming to ASTM C 150, Type 1 requirements per cu. yd. of mixture and enough water free of deleterious materials to produce a mix suitable for mechanical hand compaction. Stamp batch tickets at plant with time of loading. Material not compacted in place 1 1/2 hours

after loading or material which has taken an initial set will be rejected and shall be removed from the Project Site.

J. Topsoil: Topsoil meeting the definition prescribed in paragraph 1.04 and meeting the requirements of specification section SP 32 91 19 Landscape Grading obtained either from on-site or an off-site source.

K. Rock Channel Protection, Riprap and Riprap Bedding: Per ODOT Item 601.

2.03 ACCESSORIES

A. Detectable Warning Tape: Acid and alkali resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick minimum, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to thirty inches deep.

Provide tape colors to utilities as follows:
Red: Electric
Yellow: Gas, oil, steam, and dangerous materials
Orange: Telephone and other communications
Blue: Water systems
Green: Sewer systems

PART 3 – EXECUTION

3.01 GENERAL

A. Contractor shall plan construction to minimize disturbance to properties adjacent to the project site and be within the construction limits shown on the plans.

B. The A/E reserves the right to limit the width of land to be disturbed and to designate on the drawings or in the field certain areas or items within this width to be protected from damage.

C. The Contractor shall provide any grading or excavation required for equipment travel during the course of construction as well as erosion control, access or haul road installation and removal, restoration, seeding and ground cover.

D. The Contractor shall be responsible for damage to areas or items designated by the A/E to be protected. Repairs to, replacement of, or reparations for areas or items damaged shall be made at the Contractor’s expense and to the satisfaction of the A/E before acceptance of the completed project.

E. Any fences disturbed by the Contractor shall be repaired to a condition equal to or better than their original condition or to the satisfaction of the A/E at no additional cost.

F. Contractor shall obtain written permission from property owners for use of any access other than ones located within rights-of-way. Written permission shall contain conditions for use

and restoration agreements between property owner and Contractor. No additional compensation will be made for such access.

G. All areas disturbed shall be restored to a condition equal to or better than their original condition and shall be graded to drain.

H. The Contractor shall protect, replace or repair all damaged or destroyed property pins or other monumentation.

3.02 PROTECTION OF EXISTING UTILITIES

A. Contractor is responsible for locating and protecting existing utilities.

B. If existing utilities are found to interfere with the permanent facilities being constructed under this section, immediately notify the A/E and secure instructions. Do not proceed with permanent relocation of utilities until instructions are received from the A/E.

3.03 TOPSOIL REMOVAL

A. Remove the existing topsoil to a depth of 6 inches or to the depth encountered from all areas in which excavation will occur. The topsoil shall be stored in stockpiles, separate from the excavated material, if the topsoil is to be re-spread. Otherwise, material shall be disposed of off-site at the Contractor's expense.

B. The contractor shall employ erosion control methods per specification 31 25 00 Erosion & Sediment Control for all stockpiled material.

3.04 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer's published recommendations.

3.05 EXCAVATION

A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

B. Excavation shall be performed as indicated on the plans or as directed by the A/E to the lines, grades, and elevations, and shall be finished to a reasonable smooth and uniform surface. During the process of excavation, the grade shall be maintained and surface shall be rolled so that it will be well drained at all times.

When solid rock is incurred in the excavation, the rock shall be removed to a minimum depth of 12 inches below the surface of the subgrade. Material unsatisfactory for subgrade foundation shall be removed to a depth specified to provide a satisfactory foundation. The portion so excavated shall be refilled with suitable material obtained from the grading

operations or borrow area and thoroughly compacted by rolling. Material obtained from on-site grading operations must be approved by the A/E. For areas that do not require fill, scarify and compact to a depth of 6 inches.

Any removal, manipulation, aeration, replacement, and recompaction of suitable materials necessary to obtain the required density shall be considered as incidental to the construction operations, and shall be performed by the Contractor at no additional cost to the Owner.

No rock, stone, or rock fragments, larger than 2 inches in their greatest dimension will be permitted in the top 12 inches of the subgrade. No rock, stone, or rock fragments larger than 8 inches in their greatest dimension will be permitted in the remainder of the fill.

3.06 STABILITY OF EXCAVATIONS

A. Comply with OSHA, local codes, ordinances, and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with OSHA, local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

Provide permanent steel sheet piling or pressure creosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops a minimum of thirty inches below final grade and leave permanently in place.

3.07 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding Project Site and surrounding area. Provide erosion control methods for dewatering operations in conformance with Specification SP 31 25 00 Erosion & Sediment Controls.

Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.08 STORAGE OF EXCAVATED MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage. Provide erosion control measures as needed per specification SP 31 25 00 Erosion & Sediment Controls.

Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.09 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

Excavations for footings and foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

For pile foundations, stop excavations from 6 inches to 12 inches above bottom of footing before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection. Do not disturb bottom of excavations, intended for bearing surface.

3.10 EXCAVATION FOR PAVEMENTS

A. Cut surface under pavements to comply with cross sections, elevations and grades as indicated.

B. Areas to be Paved: After all excavation, undercutting, and backfilling has been completed, the subgrade shall be properly shaped and thoroughly compacted. The compactive effort shall include all areas beneath pavement and shall extend at least a minimum of 1 foot beyond the paving/berm limits. Compaction shall be in accordance with Table 31 20 00-1.

C. Curb and Gutter, Sidewalks and Driveway Aprons: The subgrade shall be constructed true to grade and cross section as may be shown on the drawings. Compaction shall be in accordance with Table 31 20 00-1.

D. All subgrade shall be graded and protected as to prevent an accumulation or standing water, and consequent subgrade saturation, in the event of rain.

E. Grading Tolerances of Finished Surface: Earthwork shall conform to the lines, grades, and typical cross sections shown on the plans or as established by the A/E. Changes in grade shall be accomplished by smooth curves.

Shape subgrade under pavement and curb and gutter to within ½ inch of required subgrade elevations.

Finish pavement and curb and gutter to within ½ inch of required finish elevations.

Shape subgrade under sidewalks to within 0.10 foot of required subgrade elevations.

Finish sidewalks to within 0.10 foot of required finish elevations.

F. Backfill of Curb and Gutter and Sidewalks: Immediately after the removal of forms for curb and gutter, sidewalks and driveways, the space between the back of the curb, sidewalks, and driveways shall be backfilled and smoothed off in a manner to prevent the accumulation of standing water.

3.11 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6 and a maximum of 12 inches of clearance on both sides of pipe or conduit, unless otherwise specified on the construction drawings.

B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

Where rock is encountered, carry excavation 6 inches below required elevation and backfill with a 6 inch layer of crushed stone or gravel prior to installation of pipe.

For pipes or conduit less than 6 inches in nominal size, and for flat bottomed, multiple duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil or specified bedding.

For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with specified backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads ensure continuous bearing of pipe barrel on bearing surface.

3.12 EXCAVATING AND PLACING FOUNDATION DRAINAGE SYSTEM

A. Excavate for foundation drainage system after subgrade material has been compacted but before drainage fill course has been placed. Provide a clear horizontal distance between drain pipe and trench wall on both sides not less than 2 times the diameter of the drain pipe, unless otherwise shown. Grade the bottom of trench excavations to required slope and compact to a firm, solid bed for drain system. Place and compact impervious fill material to raise low areas or where unsatisfactory bearing soil may occur.

B. After concrete footings have been cured and forms removed, place impervious fill material on the subgrade adjacent to the bottom of the footing. Place and compact impervious fill to the dimensions indicated or, if not indicated, 6 inches deep and 12 inches wide.

Place a supporting layer of drainage fill material over compacted subgrade where drainage pipe is to be laid to the depth indicated or, if not indicated, to a compacted depth of not less than 3 inches, followed by a 6 inch layer of compacted filtering material below pipe.

Place sufficient width of filter fabric in trench to cover perimeter of drainage material plus overlap. Place a supporting layer of drainage fill material over filter fabric where drainage pipe is to be laid to the depth indicated or, if not indicated, to a compacted depth of not less than 2 inches.

C. Lay drain pipe solidly bedded in drainage fill material. Provide full bearing for each pipe section throughout its length, to true grades and alignment, and continuous slope in the direction of flow.

Lay perforated pipe with perforations down and joints tightly closed in accordance with pipe manufacturer's recommendations. Provide collars and couplings as required.

Provide recesses in the excavation bottom to receive bells for drain pipe having bell and spigot ends. Lay pipe with bells facing up the slope with spigot end entered fully into adjacent bell. Seal joint in accordance with local practices having jurisdiction.

D. Test or check lines before backfilling to assure free flow. Remove obstructions, replace damaged components, and retest system until satisfactory.

E. After testing of drain lines, place additional drainage fill material as follows:

At exterior perimeter drainage system, completely cover drain lines to a width of at least 6 inches on each side and 12 inches above top of pipe with material unless more coverage is indicated on the Drawings. Place material in layers not exceeding 3 inches in loose depth and compact each layer placed.

At under slab drainage system, provide a minimum of 6 inches on top of drains and 12 inches around sides of drains.

Unless otherwise indicated, backfill exterior perimeter drainage system with drainage fill material over filtering material to within 18 inches of indicated finished grade elevations.

Place drainage fill material over underslab drainage system (maximum 6 inch lifts) and compact.

F. Apply impervious fill material over compacted drainage fill material at exterior perimeter drains, placing the material in layers not exceeding 6 inches in loose depth and thoroughly compacting each layer. Carry impervious fill to indicated finish elevations (except carry to 6 inches below finished grade where indicated to receive topsoil) and slope away from building perimeter.

3.13 BACKFILL AND FILL

A. Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section unless indicated otherwise on the construction drawings.

Under grassed areas, use satisfactory excavated or borrow material.

Under walks and pavements, use base material, satisfactory excavated or borrow material, or a combination.

Under steps, use base material.

Under building slabs, use drainage fill material within 1’ under slab, use select fill deeper than 1’.

Under piping and conduit and equipment, use select fill materials where required over rock bearing surface and for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.

Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.

Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Owner. Use care in backfilling to avoid damage or displacement of pipe systems.

B. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

C. Backfill excavations as promptly as work permits, but not until completion of the following:

Acceptance of construction below finish grade including, where applicable, damp-proofing, waterproofing, and perimeter insulation.

Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.

Removal of concrete formwork.

Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.

Removal of trash and debris from excavation.

Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.14 PLACEMENT AND COMPACTION

A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.

B. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand operated tampers.

C. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Minimum Compaction Requirements: Compaction percentages are percentages of maximum dry density as determined by indicated ASTM Standards. Unless otherwise recommended by a Geotechnical Engineer and authorized by the A/E, the material shall be placed at plus or minus 3% of optimum moisture content.

Table 31 20 00.1

Minimum Compaction Limits

Location	Density
Beneath and within 5 feet of buildings	98% of the maximum dry density by ASTM D 698 (Standard Proctor), AASHTO T-99
Areas under roadway pavement surfaces, shoulders, sidewalks, and curb and gutter	98% of the maximum dry density by ASTM D 698 (Standard Proctor), AASHTO T-99
Under turf, sodded, planted, landscaped, or seeded non-traffic areas	95% of the maximum dry density by ASTM D 698, (Standard Proctor) AASHTO T-99

Compactive Efforts: If compaction efforts should fail to provide a stable subgrade, after subgrade materials have been shaped and brought to optimum moisture, such unstable

materials shall be removed to the extent directed by either the Geotechnical Engineer or the A/E and replaced and compacted using new select material.

Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.

Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.15 GRADING

A. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from building structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.

Walks: Shape surface of areas under walks to line, grade, and cross section, with finish surface not more than 0.10 foot above or below required subgrade elevation.

Pavements: Shape surface of areas under pavement to line, grade, and cross section, with finish surface not more than ½ inch above or below required subgrade elevation.

C. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 10 foot straightedge.

D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.16 PAVEMENT BASE COURSE

A. Base course consists of placing base material, in layers of specified thickness, over subgrade surface to support a pavement base course.

B. During construction, maintain lines and grades including crown and cross slope.

C. Place berms, shoulders, or extended base course as indicated on the construction drawings. Construct shoulder subgrade of acceptable soil materials, placed in such quantity to compact to thickness of each subgrade course layer. Compact and roll at least a 12 inch width of shoulder simultaneous with the compaction and rolling of each layer of subgrade course.

D. Place base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross section and thickness. Maintain optimum moisture content for compacting subgrade material during placement operations.

3.17 BUILDING SLAB DRAINAGE COURSE

A. Drainage course consists of placement of drainage fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.

B. Place drainage fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross section and thickness. Maintain optimum moisture content for compacting material during placement operations.

When a compacted drainage course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.18 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

Perform field in place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable.

Field in place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 3017. When field in place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Owner.

B. Minimum Compaction Testing Frequency: A test group shall consist of compaction tests on each layer of fill and backfill material. One (1) test group shall be performed and summarized written results provided at the frequencies and locations as follows:

Location:	Frequency:
Buildings and structures	Every 5,000 square feet.
Roads, Drives	Every 300 feet of road, drive
Parking Lots	Every 10,000 square feet of pavement
Unpaved Areas	Every 20,000 square feet

Pipe Trench	Every 300 feet of trench

In the absence of a pre-construction Geotechnical investigation, the Geotechnical testing firm is to perform laboratory Proctor tests to establish a moisture-density relationship for all materials that are proposed to be used as fill.

Contractor shall give a 24-hour notice to Geotechnical testing firm when ready for Proctor, compaction, or subgrade testing and inspection.

Should any moisture-density test fail to meet specification requirements, the Contractor shall perform corrective work necessary to bring the material in compliance and retest the failed area at no additional cost to the Owner.

C. Footing Subgrade: At footing subgrades, perform at least one test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Owner.

D. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.

3.19 EROSION CONTROL

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction.

B. As applicable, the Contractor shall comply with the requirements of the Ohio Environmental Protection Agency Construction Stormwater General Permit (as indicated in the Storm Water Pollution Prevention Plan), the Ohio Department of Natural Resources “Ohio’s Standards for Storm Water Management, Land Development and Urban Stream Protection”, and/or any local requirements; latest revision.

3.20 MAINTENANCE

A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Where settling is measurable or observable at excavated areas during general Project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal to Designated Areas on Owner's Property: Transport acceptable excess excavated material to designated soil storage areas on Owner's property. Stockpile soil or spread as directed by Owner.

Transport waste material, including unacceptable excavated material, trash, and debris to designated spoil areas on Owner's property and dispose of as directed.

B. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off Owner's property.

Remove excess excavated material, trash, debris, and waste materials and dispose of it off Owner's property.

END OF SECTION 31 20 00

SECTION 31 25 00 - EROSION & SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Soil erosion.

2. Water pollution control.

B. Related Sections:

1. Section 31 10 00 - Site Clearing.

2. Section 31 20 00 – Earth Moving.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's data identifying product characteristics and limitations.

B. Samples: Submit 12" x 12" sample of each type of silt fence to be used.

C. Manufacturer’s Submittal: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58

D. Requests for substitution and “or equal”: For each product, the submittal shall include the Manufacturer’s Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

1.3 CLOSE-OUT SUBMITTALS

A. Manufacturer’s BABAA Certification: For each type of product indicated, provide Manufacturer’s Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). <u>This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor</u>.

1.4 REGULATORY REQUIREMENTS

A. Comply with applicable Federal, State, and Local statutes and regulations.

B. In the event of a conflict the more restrictive statutes or regulations shall govern.

C. The Associate will arrange a field pre-construction conference with Contractor and regulatory agencies if required.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Coordinate with permanent erosion control features to extent practical to ensure economical effective, and continuous erosion control throughout construction and post construction period.

B. Include temporary control measures as required by statutes, regulations, Associate, and State Inspector to protect fish and wildlife, prevent soil erosion, and comply with other pollution control laws as art of Work of this Section.

1.6 SITE CONDITIONS

A. Schedule and perform Work to minimize amounts and times when soil erosion and water pollution could occur.

B. Be responsible for executing the plan as prepared for this project. If the Contractor deviates from this plan without the necessary approvals or the Associate observes any unsatisfactory construction procedures or operations, the Associate may suspend the performance of any construction until satisfactory conditions are corrected.

C. Such suspension shall not be the basis of any claim by Contractor for additional compensation from the Owner nor for an extension of contract time.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Silt Fence (Filter Fabric Fence): Design, construct, and maintain in accordance with Local and State Standards and Specifications.

B. Straw Bale: Design, construct, and maintain straw barriers in accordance with Local and State Standards and Specifications.

C. Stakes: Wood, minimum 2 x 2 x 36 inches long.

D. Erosion Control Matting: In accordance with ODOT Item 671 Erosion Control Mats, Type A, B, C, E, F, and I, as specified on the drawings.

E. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

2.2 MANUFACTURERS

A. The Contractor is to provide products meeting the performance requirements including those of the Build America, Buy America Act(BABAA) and the Manufacturer can provide the required BABAA certification shown above.

PART 3 - EXECUTION

1.7 GENERAL STATEMENT

A. Proposed plan objectives: Minimize erosion and subsequent sedimentation caused by the construction activities outlined in project scope.

B. Obey following guidelines during construction:

1. Minimize the area and time of exposure.

2. Save existing vegetation, especially trees.

3. Install temporary or permanent measures to control stormwater runoff in order to protect soil bared by construction.

4. Practice proper fine grading and excavation; hold line grading and excavation to a minimum.

5. Establish temporary vegetation until such time that permanent vegetation can be established.

6. Establish permanent vegetation as soon as possible and no later than 10 days after project completion.

7. Lay suitable protection, such as erosion netting, fibermats, etc., over disturbed area when work will cease for a period greater than one day.

1.8 STORMWATER HANDLING

A. Divert runoff from areas above the project site away from excavation areas, where possible.

B. Control soil erosion and sedimentation created by stormwater which naturally flows across, over and/or through areas disturbed by construction by use of a sediment basin, straw bale barriers, or silt fences placed along the contour, and in accordance with the temporary erosion control details for disturbed areas perpendicular and parallel to the ground slope, as well as the TEMPORARY EROSION AND SEDIMENTATION CONTROLS portion of this Plan.

C. Divert stormwater runoff from open excavations or trenches. If any trench or excavation dewatering or well point pumping is necessary, direct pump discharges to a dewatering sediment basin, whenever possible.

1.9 TEMPORARY EROSION AND SEDIMENTATION CONTROLS

A. Control soil erosion and sedimentation during initial earthmoving by placing filter fabric fence on low side of the limit of area to be disturbed prior to engaging in any such activities.

B. Use staked straw bale barriers and filter fabric fence to control soil erosion and sedimentation from entering streams during construction activities. Install temporary controls prior to earth disturbance whenever possible.

C. Install temporary erosion controls for excavation as shown on either of the two typical details, Temporary Erosion Control Perpendicular to Slope and Temporary Erosion Control Parallel to Slope, as shown on Drawings, for whichever slope prevails.

D. Be responsible for installing and maintaining temporary erosion controls for disturbed areas on this project in accordance with this report and the Erosion & Sediment Pollution Control Plans & Details provided in Contract Drawings.

E. Where possible, stake straw bale barriers around perimeter of catch basin grates for the purpose of controlling eroded soil and sedimentation from entering the storm sewer inlets.

F. Excavate a four-inch deep anchoring trench as wide as the bales. Place straw bales in the trench and stake. Place straw bales so that the twine holding the bales together is not in contact with the ground. Drive stakes a minimum 18 inches below ground elevation. Backfill and compact anchoring trench to a density equal to or greater than that of undisturbed site soils.

G. Inspect straw bale barriers weekly or after every precipitation event, whichever is more frequent. If bales become ineffective, dislodged, clogged, or inoperative, repair or replace immediately. Remove accumulated sediments when their height reaches 1/3 of the minimum above ground height of straw bale barrier. Immediately repair undercutting or erosion of the anchor toe with compacted backfill materials.

H. Place filter fabric fences on the contour. Extend both ends of a section of fence uphill, 45 degree angles, to the point that the bottom of the fence equals the top of the fence elevation.

I. Excavate a 6 inch deep by 6 inch wide trench continuously along the bottom of fence. Lay bottom 6 inches of filter fabric fence in the trench and backfill with excavated material. Compact backfill material to a density equal to or greater than that of undisturbed soil.

J. Inspect filter fabric fence weekly or after every precipitation event, whichever is more frequent. If filter fabric fence becomes ineffective, immediately repair and replace as necessary. Remove accumulated sediments when their height reaches 1/2 of the above ground height of the fence. Immediately repair undercutting or erosion of the toe anchor with compacted backfill materials.

K. Leave temporary erosion and sedimentation controls for improved surfaces in place until such time that permanent controls, paving, riprap, etc., are installed. Keep temporary erosion and sedimentation controls for unimproved surfaces in place until such time that a uniform 70 percent vegetative cover is established to stabilize the soil of disturbed area. Once acceptable cover is established, convert sediment basin to permanent detention basin; the details as provided on Drawings and these Specifications.

1.10 EXCAVATION FOR PIPELINES

A. Excavate depth of trench for pipelines such that pipe in its installed position complies with the line and grades shown on Drawings, or with the line and grades established by Owner's Representative in field.

B. In excavation for pipelines where made in open cut and where space permits, excavate trench banks from ground surface to a depth not closer than I foot above the top of the pipe to non-vertical and nonparallel planes.

C. Do not permit trench side walls in pipe zone, defined as that trench area below a point 12 inches above the top of pipe in its installed position, to be other than vertical and parallel planes equidistant from the pipe centerline. Horizontal distance between the vertical planes: be no greater than outside diameter of pipe plus 24 inches nor less than outside diameter of pipe plus 12 inches.

D. Where the available space does not permit and where existing or proposed above ground or underground structures may be endangered, excavate trench sides above the pipe zone to vertical and parallel planes. Horizontal distance between the vertical planes: be no greater than necessary to permit construction of pipeline with required sheeting, shoring, and bracing in place.

1.11 GRADING

A. Before beginning excavation and filling, strip topsoil from areas to be affected to a depth of at least 6 inches and store at a location approved by Associate or Engineer. Excess topsoil shall be disposed of as discussed in the DISPOSAL OF EXCESS MATERIAL portion of these specifications. Place Filter Fabric Fence around low sides topsoil storage areas. Seed and mulch topsoil storage piles in accordance with SEEDING and MULCHING portions of this Plan.

B. Prior to beginning excavation on any areas which currently have impervious surfaces, strip the impervious surface and dispose of it separately at an approved site as discussed in the DISPOSAL OF EXCESS MATERIAL portion of this Plan.

C. After completion of the major construction work, replace topsoil as the upper layer of backfill to a depth of not less than 6 inches so that the final grade will be as required by the Drawings.

D. In general slope grade away from the installed or existing structures to drainage ditches, storm sewer inlets, or culverts. Thoroughly loosen those areas which are not occupied by structures or pavement by harrowing or discing and then rake by hand. Remove stones over 1&1/2 inches, rubbish, and debris. Uniformly space topsoil in piles and distribute by an approved method.

E. Supply additional topsoil required over and above that salvaged from site in order to maintain a minimum of 6 inch depth over entire area defined above, if the area is to be seeded. Correct any surface irregularities to prevent formation of low places where surface water may pool. Do not place topsoil when the subgrade is frozen or when it is excessively wet or dry; do not handled when in a frozen or muddy condition.

1.12 VEGETATION

A. Permanently seed, or if specified, sod grounds disturbed by operations necessary to complete the work for this project, unless occupied by structures or paved. Accomplished as soon as possible after construction and not later than 10 days.

B. If seeding cannot be completed within the 10 day period due to weather conditions, mulch disturbed area with straw at rate of two bales per 1,000 sq. ft. Anchor straw with mulch netting according to manufacturer's recommendations or other appropriate means.

C. Use temporary seeding to protect exposed land surfaces which will not be permanently protected for a period more than 10 days. Temporary vegetation will provide short-term rapid cover until permanent vegetation or other protection can be established.

1.13 TEMPORARY SEEDING

A. Purpose of temporary cover: to provide short-term, rapid cover for control of runoff and erosion until permanent vegetation or other stabilization material can be established. Apply temporary cover on sediment producing areas where the period of exposure will be more than 10 days. Provide mulch cover for no less than two months' exposure.

B. The site preparation and establishment of temporary cover shall be conducted according to the following guidelines:

1. Install needed surface water control measures.

2. Perform all cultural operations at right angles to the slope.

3. Apply ground limestone according to test or at the rate of 100 lb./1000 sq. yd.

4. Apply uniformly recommended analysis fertilizer according to soil test or 10-10-10 at the rate of 10 lb./1000 sq. yd.

5. Work in lime and fertilizer to a depth of 4 inches using any suitable equipment.

6. Temporary cover seed mixture: consist of 100 percent annual ryegrass; apply seed uniformly at rate of 10 lb./1000 sq.yd.

7. Cover grass seed with 1/2 inches of soil with suitable equipment.

C. Establish temporary grass cover in the following areas:

1. Seed stockpiles where soil stockpiles are to be exposed for a period greater than 20 days. When the soil stockpile will be exposed for a period greater than two (2) days, but less than twenty (20) days, cover stockpile with mulch or protective erosion control fabric.

2. Where waterways or ditches will be used to divert stormwater entering the work area, seed those waterways along the bottom, sides and 3 feet above and below the waterway. After

construction is completed, seed or sod permanent waterways or ditches according to this Plan. Restore temporary waterways or ditches restored to natural grade and permanently seed according to this Plan.

3. Install waterways or ditches on slopes above the work area as required.

4. Where disturbed land surfaces will not be permanently protected for a period of more than ten (10) days.

1.14 PERMANENT GRASS COVER

A. Permanent Materials:

1. Topsoil: be acceptable friable loam; reasonably free of subsoil, clay lumps, brush, roots, weeds, and objectionable organic material stones, other inorganic material larger than two inches in any dimension, litter, and other materials harmful to plant growth.

2. Lime: be pulverized agricultural limestone containing a minimum of 85 percent total carbonates, ground so that at least 90 percent passes a No. 20 sieve and at least 50 percent passes a No. 100 sieve.

3. Commercial fertilizer: be a dry formulation of 10-20-20 analysis delivered in bags showing weight analysis and manufacturer's name; conform to the standards of the Association of Official Agricultural Chemists.

4. Slow-release Nitrogen Fertilizer: conform to Publication of 408, Section 804.2 (a).

5. Clean and fresh grass seed: be premixed packed in sealed bags with inspection tag showing net weight, composition of mix, date of germination tests and supplier's name.

6. Grass seed formula: in accordance with ODOT Construction and Material Specifications.

7. Mulch: in accordance with ODOT Construction and Material Specifications.

B. Application:

1. Topsoil:

a. Apply topsoil to all areas to be turfed except slopes 2:1 or greater.

b. Prepare areas to receive topsoil by loosening soil to a depth of two inches. Remove stone and other foreign material two inches or larger.

c. Spread and compact to a uniform six inch depth. Compact with a roller, weighing not over 120 lbs. per foot or roller, or by other acceptable methods.

d. Excess topsoil if any, becomes property of Owner; stockpile and stabilize as directed by Associate.

2. Lime and Fertilizer:

a. Apply pulverized agricultural limestone at a rate of 800 lbs. per 1000 S.Y.

b. Apply 10-20-20 analysis commercial fertilizer at a rate of 140 lbs. per 1000 S.Y.

c. Work lime and fertilizer into soil to two inch minimum depth by raking, discing, or harrowing.

3. Seeding:

a. Apply in accordance with ODOT Construction and Material Specifications.

4. Mulching:

a. Apply mulch within 48 hours after seeding in accordance with ODOT Construction and Material Specifications.

C. Maintenance: Reseed areas and spots damaged or gullied or otherwise not showing a catch of grass. Repeat until a complete coverage is obtained. Keep seeded areas moist until 70 percent catch of grass is established. Mow areas where weeds are smothering new grass seedlings.

1.15 PROTECTION OF STREAM BANKS

A. Clean and grub right-of-way according to above procedures.

B. Earthmoving vehicles: Do not discharge any petroleum product or accumulated sediment to the stream.

C. Store excavated soil on side of trench farthest from stream.

D. If a pipe trench or excavation is dewatered during construction, remove water from pipe trench or keep excavation free of suspended sediment prior to entering any established drainage way. To remove suspended sediment, pump water into sediment basin as discussed in the DEWATERING portion of this Plan.

E. Construction activities within surface water conveyance channels: require utilization of erosion control measures to protect stream banks and stream bed.

1.16 RESTORATION OF DRAINAGE CHANNELS, AND OTHER UNIMPROVED AREAS DISTURBED DURING CONSTRUCTION

A. Hydromulch, fertilizer and seed unimproved areas disturbed during construction, including all drainage channels, as soon after completion of backhoe operations as is practicable; establish a growth, and minimize pollution of streams from erodible fill, backfill, and other materials.

B. Employ a satisfactory method of sowing using hydraulic seeders and other approved equipment where applicable.

C. Drainage channel seeding mixture: consist of 45 percent winter rye, 45 percent tall fescue, and 10 percent perennial ryegrass, or an equivalent ryegrass base formula suitable for drainage channels. Apply drainage channel seed at rate of 3-5 lb./1000 sq. yd. Do seeding only at such times as climatic condition, temperature, and moisture are suitable for growth.

D. Stabilize channels which cannot be stabilized with vegetation with jute matting or specifically designed products approved by Associate.

1.17 DISPOSAL OF EXCESS MATERIAL

A. Disposal of excess material resulting from project construction.

B. Excess material includes but may not be limited to: material resulting from excess material resulting from imbalance of cuts and fills; that material within the pipe zone; material deemed by Associate to be unsuitable for use as backfill material; excavated pavement material; excess material resulting from use of select backfill i.e., beneath improved surfaces; and excavated areas being replaced with a rock riprap lining.

C. Secure an approved on-site waste area for disposal of these materials. If sufficient area is not available on-site, the contractor shall secure an approved off-site waste area for disposal of the excess materials.

1.18 FINAL GRADING

A. *Areas Disturbed by Contractor's Operation.* Bring areas, including those areas used for storage of excavated material, equipment, etc., up to within 6 inches of final grade indicated on Drawings by methods specified. Where not indicated on Drawings, establish final grade equivalent to existing grade unless otherwise specified in field by Owner's Representative. In general slope grade away from the installed or existing structures to drainage ditches, storm sewer inlets or culverts. Thoroughly loosen those areas which are not occupied by structures or pavement by harrowing or discing and then rake by hand. Remove stones over 1 1/2 inches, rubbish, or debris. Uniformly space topsoil spaced in piles and distribute by an approved method.

B. *Additional Topsoil Required.* Provide additional topsoil required over and above that salvaged from the site in order to maintain a minimum of 6 inches of depth over the entire area defined above if the area is to be seeded, or 4 inches of depth if the area is to be sodded or planted. Correct surface irregularities to prevent formation of low places where surface water may pool. Do not place topsoil when the subgrade is frozen or when it is excessively wet or dry; do not handle when in frozen or muddy condition.

1.19 CONTRACTOR'S ASSEMBLY/STOCK YARD

A. Be responsible for securing and maintaining an assembly/stock yard for storing equipment and materials for use on this project. Provide such secured areas with their own erosion and sedimentation control plans submitted to Ohio Environmental Protection Agency for review and approval if necessary.

B. Be responsible for obtaining necessary approvals and permits required for such areas. Utilize and maintain such areas in accordance with laws, rules, and regulations of agencies having jurisdiction over the same.

1.20 IMPLEMENTATION OF THE PLAN

A. The foregoing procedures and requirements of these Specifications are contractual obligations of Contractor performing actual construction work. Said requirements also apply to subcontractors working on the project.

B. At such time, review in detail the final standards and specifications concerning seeding mixtures, cover requirements, barrier and sediment basin location, and any other such items as may be required to complete the Contract work in accordance with the rules and regulations of that agency, and in accordance with the laws, rules, and regulations of other authorities having jurisdiction over the required construction work.

C. The requirements relative to temporary control measures, early permanent restoration, minimizing work areas, are of the most important factors affecting construction performance. In view of those circumstances, it is believed that this particular plan, on this particular project, will be implemented throughout the course of work.

1.21 USE OF THIS PLAN

A. As previously stated herein, this Stormwater Pollution Prevention Plan has been prepared in response to and in accordance with certain rules and regulations promulgated by Ohio Environmental Protection Agency.

B. The handling of stormwater, the topographic features described, the staging of earthwork, the temporary and permanent control measures, and the interpretations and opinions stated in the foregoing pages are to be used only for the purpose of eliminating, minimizing and/or controlling pollution of the streams and waterways from materials anticipated to be eroded from the earthwork to be disturbed as a result of construction of the Contract.

1.22 GENERAL NOTES

A. Make periodic inspections to determine if proper vegetative growth is taking place. Reseed and mulch areas as needed.

B. Remove and restore rock construction entrances when access provided by the entrance is no longer necessary.

C. Store topsoil alongside the trench in a separate pile from other excavated material. Store no material within two feet of trench excavation.

END OF SECTION 31 25 00

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Asphaltic concrete paving.

B. Related Sections:

1. Section 31 20 00 – Earth Moving.

2. Section 32 17 23 – Pavement Markings.

1.2 REFERENCES

A. Construction and Material Specifications, Ohio Department of Transportation.

B. ASTM D995 - Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

1.3 SYSTEM PERFORMANCE

A. Paving: Designed for circulation of automobiles, maintenance vehicles and delivery trucks.

B. Refer to Drawings for thickness of various materials.

1.4 SUBMITTALS

A. Submit proposed design mix for each class of mix to Architect for review prior to commencement of work.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Quality Assurance - Manufacturer:

1. Conform with ASTM D995.

B. Quality Assurance - Installation:

1. Do not place asphalt when base surface temperature is less than 40 degrees F.

2. Do not place asphalt when base surface is wet or contains an excess of moisture which would prevent uniform distribution and required penetration.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphalt Concrete Surface Course Type I: In accordance with Section 441 Surface Course, of ODOT Construction and Material Specifications.

B. Asphalt Concrete Intermediate Course Type II: In accordance with Section 441 Intermediate Course of ODOT Construction and Material Specifications.

C. Bituminous Asphalt Concrete Base: In accordance with Section 301 of ODOT Construction and Material Specifications.

D. Prime Coat: In accordance with Section 408 of ODOT Construction and Material Specifications.

E. Tack Coat: In accordance with Section 407 of ODOT Construction and Material Specifications.

F. Aggregate Base: In accordance with Section 304 of ODOT Construction and Material Specifications.

2.2 MIXING

A. Maintain thorough and uniform mixture for each class of mix.

B. Bring asphalt cement and mineral constituents to required temperature prior to mixing. Ensure aggregates are sufficiently dry so as to prevent foaming in mixture.

C. Combine materials conforming to ASTM D995 and ODOT Construction and Material Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is dry and ready to support paving and imposed loads and is at proper gradients and elevations.

B. Verify that frames of subsurface structures are properly set to meet final payment elevation.

3.2 PREPARATION

A. Apply Bituminous Tack Coat in accordance with manufacturer's instructions to contact surfaces of curbs and subsurface structure frames.

B. Abutting Existing Pavement: Where new paving abuts existing pavement saw cut existing pavement to its final depth to form straight lines or smooth curved lines to expose vertical face.

C. Apply Bituminous Tack Coat to vertical face of existing pavement which interfaces new paving materials.

D. Use fine aggregate to blot excess primer and tack coat materials.

3.3 PLACING SUBBASE

A. Place aggregate material to compacted depth indicated.

B. Spread, shape, and compact all aggregate material deposited on the subgrade during the same day.

C. Extend subbase course minimum 8 inches beyond asphalt pavement width unless otherwise shown on Drawings.

D. Add water during compaction to bring subbase course materials to approximate optimum moisture content, if necessary.

E. Roll and thoroughly compact aggregate material with an approved roller.

F. Properly compact areas adjacent to curbs, catch basins, manholes and other areas not accessible to rollers with mechanical or hand tamping devices.

G. Using crown template, where required, of length and cut to required crown of finished surface of subbase, check the contour thereof at intervals of not more than 25 feet.

H. Approved straightedges 10 ft. in length shall also be furnished and used for testing longitudinal irregularities in the surface of the subbase course.

3.4 TRANSPORTATION OF MATERIALS

A. Transport asphalt concrete mixtures from mixing plant in trucks having tight and clean compartments.

B. Provide covers over hot mixes when transporting to protect from weather and to prevent heat loss.

C. During cold weather or for long-distance deliveries, provide insulation around truck bed surfaces.

3.5 PLACING ASPHALT PAVEMENT

A. Place asphalt pavement within 24 hours of priming specified surfaces and in accordance with Sections 301 and 441. If more than 24 hours elapses between placement of intermediate and surface courses, Item 407 Tack Coat shall be applied at a rate of 0.10 gallons per square yard.

B. Place each course to compacted thickness identified on Drawings.

C. Place surface course within two hours of placing and compacting intermediate course.

D. Ensure asphalt is minimum 245^0 F. immediately after placing and PRIOR to initial rolling.

E. Initiate compaction as soon as pavement will bear equipment without checking or undue displacement.

F. Compact pavement by rolling in accordance with ODOT Construction and Material Specifications. Do not displace or extrude pavement from position. Carry out compaction in three operations:

1. Breakdown Rolling.

2. Second Rolling.

3. Finish Rolling.

G. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks. Keep roller wheels sufficiently moist so as not to pick up material.

H. Perform hand tamping in areas not accessible to rolling equipment. Remove areas that are loose, broken, mixed with dirt, or otherwise defective, or show deficiency of bituminous material. Replace with fresh hot mixture and compact to conform to adjacent area.

I. Line painting and marking is provided under provisions of Section 32 17 23.

3.6 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 20 foot straight edge.

B. Compacted Scheduled Thickness: Within 1/8 inch of design thickness.

C. Variation from True Elevation:

1. Intermediate Course: 1/2 inch in 10 feet.

2. Surface Course: 1/4 inch in 10 feet.

D. Depressions, retaining or ponding water, mounds in pavement, and ridges at joints will be cause for rejection.

3.7 FIELD QUALITY CONTROL

A. Perform field testing under provisions of ODOT Item 448, except that density tests are to be performed each day that asphalt is placed.

B. Test compacted thickness of base, intermediate and surface course during each day of asphalt placement in compliance with ODOT Construction and Material Specifications.

C. If compacted thickness is less than specified tolerances, then provide additional material and roll into hot bituminous paving course. If bituminous paving course falls below specified temperature, then entire bituminous course shall be removed and new materials provided at no additional cost to Owner.

3.8 CLEANING

A. After completion of paving operations, clean surfaces of excess and spilled asphalt materials-to satisfaction of Architect.

3.9 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 3 days, or until properly cooled and resistant to wheel damage.

B. Provide barricades and warning devices as required to protect pavement and general public.

C. Cover openings of structures in area of paving until permanent coverings are placed.

END OF SECTION 32 12 16

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete sidewalks.
2. Concrete curbs and paving.
3. Reinforcement.
4. Surface finish.
5. Curing and Sealing.

B. Related Sections:

1. Section 31 20 00 – Earth Moving.
2. Section 03 00 00 - Concrete.

1.2 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 - Specifications for Structural Concrete for Buildings.
2. ACI 305 - Recommended Practice for Hot Weather Concreting.
3. ACI 306- Recommended Practice for Winter Concrete.
4. ACI 308 - Standard Practice for Curing Concrete.
5. ACI 347 - Recommended Practice for Concrete Formwork.

B. American Society for Testing and Materials (ASTM):

1. ASTM C94 - Ready Mixed Concrete.
2. ASTM C260 - Air-Entraining Admixtures for Concrete.
3. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
4. ASTM D994 - Preformed Expansion Joint Filler for Concrete.

1.3 SUBMITTALS

A. Submit mix design and obtain approval PRIOR to commencement of concrete work.

B. Submit original ready mixed concrete delivery tickets; include air content and admixture if included.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ACI references.

B. Obtain materials from same source where possible.

C. Comply with applicable building code requirements.

D. Maintain log of concrete pours with date, air temperature, time of placement and locations identified.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Mix, transport, place, and protect concrete within temperature ranges and environmental conditions for optimum concrete installation according to referenced standards.

1. Cold Weather: Maintain protection against freezing for 72 hours.

2. Hot Weather: PREVENT rapid drying; maximum concrete temperature of 90^0 F.

B. Do not place concrete during rain, sleet, or snow unless protection is provided.

1.6 TESTS

A. Testing and analysis will be performed under provisions of Section 01400 by Contractor.

B. Three concrete test cylinders will be taken for every 50 or less cu. yds. of concrete placed each day.

C. One additional test cylinder will be taken during cold weather and be cured on site under same conditions as concrete it represents.

D. One slump test will be taken for each set of test cylinders taken.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Conform to ACI 301 and 347.

2.2 REINFORCEMENT

A. Use reinforcement and accessory materials specified under provisions of Section 03 30 00 – Cast-in-place Concrete.

2.3 CONCRETE MATERIALS

A. Use concrete materials specified under provisions of Section 03 30 00 – Cast-in-place Concrete.

B. Cement: Manufacturer's standard gray colors.

C. Sand: Regular sand color.

2.4 ADMIXTURES

A. Air Entrainment: ASTM C260.

2.5 ACCESSORIES

A. Joint Filler: ASTM D994 bituminous impregnated fiberboard; 1/2 inch thick or as detailed on Drawings.

B. Curing and Sealing Compound: ASTM C309, Type 1 water-based liquid membrane forming compound with approximately 30 percent solids content.

1. Design Guide: MasterKure 200W by Master Builders, Inc.

2. Approved Equal: Similar product manufactured by Euclid Chemical Co., Symon Corp., Vexcon Chemicals, or approved equal.

C. Form Release Agent: Colorless material which win not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

2.6 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94 and in quantities for immediate use.

B. Provide concrete with the following characteristics:

1. Compressive strength at 28 days: 4000 psi.

2. Slump Range: 4" +- 1/2".

3. Air Content: 5 - 7%; varying proportional to aggregate size and for severe exposure.

C. Add air entraining agent to concrete mix for concrete work required by this Section.

D. Use other admixtures only when approved by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade, granular base, stabilized soil is ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

C. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete

B. Notify Architect minimum 24 hours prior to commencement of concreting operations.

C. Prior to placing concrete ensure the following:

1. Freestanding water, snow, ice, and foreign materials are removed.

2. Subgrade is moist at time of concreting.

3. Forms are thoroughly cleaned, secured in position, and coated with form release agent.

3.3 FORMING

A. Place and secure forms to correct location, dimension, and profile; comply with ACI 347.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint fillers vertical in position, in straight lines. Secure to formwork during concrete placement.

D. Radii and curve forms shall extend two feet beyond the point of curvature.

E. Set top of form at finished elevation of concrete work.

F. Align form joints.

G. Do not apply form release agent where concrete surfaces receive special finishes or applied coatings which may be affected by agent.

H. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

3.4 REINFORCEMENT

A. Place reinforcement at mid-height of slabs-on-grade using materials in longest practical lengths; adequately support and secure against displacement.

B. Lap and splice bars minimum 30 times diameter; lap wire fabric 1 full mesh aluminum; tie splices with wire. Offset end laps in adjacent widths of wire fabric to prevent continuous laps.

C. Interrupt reinforcement at control contraction, and expansion joints.

D. Place reinforcement to achieve slab and curb alignment as detailed.

E. Provide dowel joints at interruptions of concrete with one end of dowel set in capped sleeve to allow longitudinal movement.

F. Detail fabricate and place reinforcement in accordance with ACI SP-66.

3.5 FORMED JOINTS

A. Expansion Joints (Isolation Joints): Place at 20 foot intervals for sidewalks and for curbs to correct elevation and profile unless shown otherwise, aligning curb, gutter and sidewalk joints; and where concrete abuts permanent objects within paved area.

   1. Place joint filler between paving components and building or other appurtenances. Set top of joint filler equal to adjacent concrete surfaces.

B. Control Joints (Contraction Joints): Provide scored or sawn construction joints at 5 foot intervals of sidewalk curbs and between sidewalks and curbs unless shown otherwise. Provide joint depth at least 1/5 concrete thickness.

   1. Tooled Joints: Form joints in fresh concrete by hand grooving using appropriate tools while concrete is plastic.

   2. Sawed Joints: Form joints using power saw equipped with shatterproof or diamond rimmed blades to create a clean cut.

C. Construction Joints: Provide at end of concrete placements, and at locations where placement operations are stopped for more than 1/2 hour, except where placements terminate at control joints. Construct with dowels as shown on Drawings.

D. Provide joints conforming to ACI 381.

3.6 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

   1. Hot Weather Placement: ACI 305.

   2. Cold Weather Placement: ACI 306.

B. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

C. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

D. Plan concrete to pattern indicated.

E. Deposit in place ready mixed concrete hauled in truck mixers within 90 minutes from time water is added to the mix.

F. Pitch concrete paving to drains or perimeter areas for positive drainage.

G. Complete all joints before uncontrolled shrinkage cracking occurs.

H. Round all edges including joints with 1/4 inch radius edging tool.

I. Provide openings for inserts, sleeves, and other items required by various contractors and subcontractors.

3.7 FINISHING

A. Driveways and Sidewalk Paving: Light broom, perpendicular to path of travel with a new broom.

B. Remove high or low areas after concrete has been struck off and consolidated.

   Minimize use of bullfloat.

C. Ensure finished surfaces do not vary from true lines, levels, or grade by more than 1/4 inch in 10 feet when measured with straightedge.

3.8 CURING

A. Protect concrete against frost and rapid drying and keep moist for at least 6 days after placing; during this period, concrete shall be maintained above 70 degrees F for at least 3 days or above 50 degrees F for at least 5 days.

B. Apply curing and sealing compound at a rate and at appropriate time as recommended by curing compound manufacturer.

C. Apply curing and sealing compound to exposed concrete sidewalks, paving and, paving surfaces after completing concrete finishing.

3.9 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of Section 01400.

B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

3.10 PROTECTION

A. Protect installed Work under provisions of Section 01500.

B. Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, and mechanical injury, including vandalism.

C. Repair or replace broken, defective or vandalized concrete without additional cost to Owner. Vandalism includes writing, graffiti and items thrown on exposed concrete surfaces.

END OF SECTION 32 13 13

SECTION 32 17 23 - PAVEMENT MARKING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Pavement marking and stripping.

B. Related Sections:

1. Section 32 12 16 – Asphalt Paving.

2. Section 32 13 13 - Concrete Paving.

1.02 REFERENCES

A. ADA - American Disabilities Act.

B. ANSI A117.1 - Providing Accessibility and Usability for Physically Handicapped People.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Submit manufacturer's data, descriptive literature, and specifications.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable codes and regulations of agencies having jurisdiction, including those having jurisdiction over airborne emissions and industrial waste disposal.

B. Environmental Requirements: Do not apply marking paint when weather is foggy or rainy, nor when ambient or pavement temperatures are below 40 degrees F, nor when such conditions are anticipated during the 8 hours following application.

C. Comply with manufacturer’s recommendations.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Benjamin Moore and Co.

2. PPG Industries.

a. Referenced as Design Guide.

3. Pratt and Lambert, Inc.

4. Sherwin-Williams Co.

5. Tnemec Co., Inc.

2.02 MATERIALS

A. Traffic Marking Paint: Flat alkyd resins specifically formulated for application to exterior asphalt and concrete surfaces.

B. Accessory Materials: Paint cleaners and other materials not specifically indicated but required to achieve finishes of commercial quality.

2.03 EQUIPMENT

A. Use pressurized, self-contained paint machine capable of applying a straight line without overspray from 3 inches to 4 inches wide, with uniform coverage.

2.04 MIXING

A. Comply with manufacturer’s recommendations.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that paving substrates are fully cured and that conditions are correct for proper application.

3.02 PREPARATION

A. Prepare, apply, cleanup, and protect materials with requirements specified by manufacturer.

B. Protection: Protect previously installed Work and adjacent materials; take precautions necessary to avoid and mitigate the effects of wind drift in application of liquid marking materials.

C. Surface Preparation: Locate markings as shown on Drawings; layout markings using guide lines, templates, and forms. Thoroughly clean surfaces free of dirt, sand, gravel oil and other foreign materials with power broom supplemented by hand brooms.

3.03 APPLICATION

A. Apply marking paint as recommended by paint manufacturer.

B. Apply paint with mechanical equipment:

1. Provide uniform line width of 4 inches, unless otherwise noted on Drawings.

2. Provide hatching in handicapped parking areas as required by handicapped regulations.

3. Use single line striping between parking stalls, or as indicated on the Drawings.

C. Symbol of Accessibility: Apply international handicapped symbol on pavement surface in accordance with ANSI A117.1.

1. On asphalt surfaces, paint blue symbol on white background square.

2. On concrete surfaces, paint white symbol on blue background square.

3. Provide symbol in size indicated on Drawings, or as required by Code.

D. Apply paint in dry film thickness of 2.25 mils per coat for various substrates as follows:

1. Asphalt: 2 coats.

2. Concrete: 1 coat.

3.04 SCHEDULE

A. Use colors as identified in this Article and as indicated on Drawings:

1. Text and directional arrows: White.

2. Parking dividers: White.

3. Handicapped zone markings: Blue.

B. Blue paint for the symbol of accessibility shall match color of Federal Standard.

END OF SECTION 32 17 23

SECTION 32 92 19 - SEEDING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Includes:

1. Seeding grass.

2. Soil amendments.

3. Repair of damaged grass areas.

B. Related Sections:

1. Section 31 20 00 – Earth Moving

1.2 QUALITY ASSURANCE

A. Mix seed by certified dealer with tag bearing dealer's guaranteed statement of composition and percentages of purity and germination of each variety attached to each seed bag or container upon arrival at site.

B. Reject each seed bag without dealer's tag.

1.3 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Submit tags accompanying seed bearing statement of composition and percentages of purity and germination.

C. Manufacturer’s guaranteed statement of fertilizer analysis and warranty, or manufacturer’s certificate of compliance covering analysis.

1.4 TIME OF PLANTING

A. Spring: Between March 15 and June 15.

B. Fall: Between September 1 and October 15.

C. Exceptions: May be granted in writing by Architect upon receipt of written request by Contractor.

1.5 LIMITATIONS

A. Seeding shall not take place, even during specified times, when weather conditions would negate germination or damage sprouting seed, or on days with wind speed greater than 10 mph.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver lime, fertilizer, and seed in original unopened containers or bags. Give 2 days notice so unopened materials may be met and checked.

B. Store materials where directed by Owner's Representative.

C. Protect materials to prevent contamination from subsoil clay, stones, leaves, branches, garbage, and other debris.

D. Delivery: Deliver to site in original unopened containers. Fertilizer shall not have been exposed to rain or wet conditions prior to delivery and shall be protected while stored on site. Do not store fertilizer in direct contact with ground.

PART 2 - PRODUCTS

2.1 FERTILIZER AND LIME

A. Standard commercial fertilizer complying to applicable Federal and State laws and in accordance with Section 659.08 of ODOT Construction and Material Specifications.

B. Certification, Warranty: Provide certification and warranty bearing manufacturer's guaranteed analysis at time of delivery to site. Label shall also state make-up of nitrogen and probable (expected) life of controlled-release nitrogen nutrients; or Manufacturer or Contractor shall warrant life of nitrogen nutrients in writing.

2.2 MULCH

A. Wheat straw or oats straw: Free from mature seed-bearing stalks and roots of non-specified grasses or weeds.

B. Wood cellulose fiber: Having no growth or germination inhibiting factors, and an equilibrium air dry moisture content at time of manufacture of 12 percent. The wood cellulose fiber shall disperse rapidly in water to form a homogeneous slurry and remain in same state when agitated in hydraulic mulching unit. Acceptable manufacturer is Weyerhaeuser Company, or approved equal.

2.3 ACCESSORY MATERIALS

A. Inoculant: Commercial product for treating leguminous seed consisting of suitable carrier containing a culture of nitrogen-fixing bacteria for seed to be inoculated. Do not use inoculant later than date indicated on container.

B. Weed Killer: Systemic type; Round-up by Monsanto Co., or approved equal.

C. Water: Potable.

D. Equipment: Hand tools, hoses, machinery and equipment normal to trade. Do not use roller weighing more than 100 pounds per foot of width.

2.4 SEED MIXTURES

A. Grass Seed Name: ODOT Urban Seed Mix

PART 3 - EXECUTION

3.1 TOPSOIL PREPARATION

A. Spreading: Harrow and hand rake as necessary to spread topsoil. Topsoil surface shall be true lines and gradients, free from unsightly variations, humps, ridges and depressions.

B. Cleaning: Remove stones over 2 inches in any dimension, and stiff clods of topsoil along with items disallowed by topsoil material specification.

C. Rolling: Use lawn roller to settle topsoil and establish firm surface; fill in low spots.

3.2 GRASS SEEDING

A. Fertilizer: Apply standard commercial fertilizer per ODOT 659.04 and work same into upper 1 inch of topsoil by hand rake or other approved method.

B. Seed Application: Rate: 4.5 pounds/1,000 sq.ft.

C. Sow grass seed mixture in two equal quantities, sowing one quantity in one direction and the second quantity at right angles to the first with mechanical spreader.

D. Rake to cover seed no deeper than 1/4 inch. Lightly roll and mulch.

3.3 MULCH

A. Rate for grass seed areas:

1. Wheat or Oats Straw - 100 lbs./1000 sq.ft.

2. Wood Cellulose Mulch - 30 lbs./1000 sq.ft.

B. Stabilization: Ensure mulch is stabilized until grass is established. Cleanup mulch which has been wind blown or otherwise destabilized by contractor within 2 days. After 2 days, Owner will have cleanup done by others and same shall be a legitimate deduction from amount owed contractor.

3.4 REPAIR DAMAGED GRASS AREAS

A. Repair all damaged existing grass areas due to construction activities.

1. Bring disturbed areas to smooth finished grade matching adjacent contours.
2. Add new topsoil to existing to bring to a 6 inch depth.
3. Sow with specified seed mixture.
4. Provide same maintenance and guarantee as new grass areas throughout plan.

3.5 CLEAN UP

A. Remove all topsoil fertilizer, lime, and other debris from all paved areas.

3.6 MAINTENANCE AND GUARANTEE

A. Contractor shall re-visit the site between September 1 and October 15 to inspect the site and reseed and/or repair any areas as needed.

END OF SECTION 32 92 19

SECTION 33 10 00
WATER UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes piping and specialties for combined potable-water and fire-protection water service outside the building.

B. Related Sections include the following:

1. Division 21 Sections for fire-protection piping inside the building.

2. Division 22 Section "Water Distribution Piping" for potable-water piping inside the building.

3. Section 28 31 00 Fire Detection and Alarm Systems

1.3 DEFINITIONS

A. The following are industry abbreviations for plastic and rubber materials:

1. NP: Nylon.

2. PE: Polyethylene.

3. PP: Polypropylene.

4. PTFE: Polytetrafluoroethylene.

5. PVC: Polyvinyl chloride.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Working Pressures: The following are minimum pressure requirements for piping and specialties, unless otherwise indicated:

1. Combined Potable-Water and Fire-Protection Water Service: 160 psig (1100 kPa).

2. Potable-Water Service: 160 psig (1100 kPa).

3. Fire-Protection Water Service: 150 psig (1035 kPa).

1.5 SUBMITTALS

A. Product Data: For the following:

1. Pipe and fittings.

2. Flexible pipe fittings.

3. Valves.

4. Fire hydrants.

B. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58

C. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.6 CLOSE-OUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). <u>This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor</u>.

B. Record Drawings: At Project closeout of installed water-service piping according to Division 1 Section "Contract Closeout."

C. Test Reports: As specified in "Field Quality Control" Article in Part 3.

D. Purging and Disinfecting Reports: As specified in "Cleaning" Article in Part 3.

E. Maintenance Data: For specialties to include in the maintenance manuals specified in Division 1. Include data for the following:

1. Meters (unless maintained by the water provider).

2. Valves.

3. Fire hydrants.

1.6 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of water-service piping specialties and are based on specific types and models indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

B. Comply with requirements of utility supplying water. Include tapping of water mains and backflow prevention.

C. Comply with standards of authorities having jurisdiction for potable water-service piping. Include materials, installation, testing, and disinfection.

D. Comply with NSF 61, "Drinking Water System Components--Health Effects," for materials for potable water.

E. Comply with standards of authorities having jurisdiction for fire-protection water-service piping. Include materials, hose threads, installation, and testing.

F. Comply with NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances," for materials, installations, tests, flushing, and valve and hydrant supervision.

G. Comply with ASTM F 645, "Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems."

H. Comply with NFPA 70, "National Electrical Code," for electrical connections between wiring and electrically operated devices.

I. Provide listing/approval stamp, label, or other marking on piping and specialties made to specified standards.

J. Listing and Labeling: Provide electrically operated specialties and devices specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

1.7 DELIVERY, STORAGE, AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer’s BABAA certification.

B. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.

2. Protect valves against damage to threaded ends and flange faces.

3. Set valves in best position for handling. Set valves closed to prevent rattling.

C. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors, unless necessary for inspection; then reinstall for storage.

2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

D. Handling: Use sling to handle valves and fire hydrants whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

E. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

F. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

G. Protect flanges, fittings, and specialties from moisture and dirt.

H. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.8 PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.

B. Site Information: Reports on subsurface condition investigations made during design of Project are available for informational purposes only; data in reports are not intended as representations or warranties of accuracy or continuity of conditions between soil borings. Owner assumes no responsibility for interpretations or conclusions drawn from this information.

1.9 SEQUENCING AND SCHEDULING

A. Coordinate connection to water main with utility company.

B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building water distribution piping.

C. Coordinate piping materials, sizes, entry locations, and pressure requirements with building fire-protection water piping.

D. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting the performance requirements including those of the Build America, Buy America Act(BABAA) and the Manufacturer can provide the required BABAA certification shown above.

B. Available Manufacturers: Subject to dcompliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

i. Drilling-Machine, Sleeves, and Corporation Stops:

1. Ford Meter Box Co., Inc.
2. Grinnell Corp.; Mueller Co.; Water Products Div.
3. Lee Brass Co.

ii. Bronze Corporation Stops and Valves:

1. Ford Meter Box Co., Inc.
2. Grinnell Corp.; Mueller Co.; Water Products Div.
3. Lee Brass Co.
4. Master Meter, Inc.
5. McDonald: A.Y. McDonald Mfg. Co.
6. Red Hed Manufacturing Co.
7. Watts Industries, Inc.; James Jones Co.

iii. Tapping Sleeves and Valves:

1. American Cast Iron Pipe Co.; Waterous Co.
2. East Jordan Iron Works, Inc.
3. Grinnell Corp.; Mueller Co.; Water Products Div.
4. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa)
5. McWane, Inc.; Kennedy Valve Div.
6. United States Pipe & Foundry Co.

iv. Gate Valves:

1. Mueller Co.; Water Products Div.

v. Indicator Posts and Indicator Gate Valves:

1. American Cast Iron Pipe Co.; American Flow Control Div.
2. American Cast Iron Pipe Co.; Waterous Co.
3. Grinnell Corp.; Grinnell Supply Sales Co.
4. Grinnell Corp.; Mueller Co.; Water Products Div.
5. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa)
6. McWane, Inc.; Kennedy Valve Div.
7. Nibco, Inc.
8. Penn-Troy Machine Co.
9. Stockham Valves & Fittings, Inc.
10. United States Pipe & Foundry Co.

vi. Dry-Barrel, Post Fire Hydrants:

1. Mueller Co.; Water Products Div.
2. American Cast Iron Pipe Co.; American Flow Control Div.
3. Clow Water Products

2. PIPES AND TUBES

a. General: Applications of the following pipe and tube materials are indicated in Part 3 "Piping Applications" Article.

b. Ductile-Iron, Push-on-Joint Pipe: AWWA C151, Class 52, with cement-mortar lining and seal coat according to AWWA C104. Include rubber compression gasket according to AWWA C111.

c. Polyvinyl Chloride Pipe: 4” to 12”, AWWA C900, DR18; 14” or larger, AWWA C905, Fittings: AWWA C153, Ductile Iron; Joints: AWWA C111, Trace wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "water service" in large letters.

d. High Density Polyethylene (HDPE): AWWA C901 (3/4” to 3”), AWWA C906 (4”-54”), DR11, NSF-PW (61), PE 3408 HDPE meeting ASTM cell classification ASTM D3350.

i. HDPE Joints: ASTM D2683 (socket), ASTM D3261 (fusion)

ii. Use butt fusion joining technique for joining pipe segments installed by HDD

iii. When joining HDPE pipe at ends of directional drilling runs, fusion bond to the adjacent pipe section

iv. Mechanical couplings are not permitted for joining of directionally drilled pipe sections

3. PIPE AND TUBE FITTINGS

a. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.

b. Ductile-Iron, Mechanical-Joint Fittings: AWWA C153, ductile-iron, compact type. Include cement-mortar lining and seal coat according to AWWA C104 and glands, rubber gaskets, and bolts and nuts according to AWWA C111.

c. Ductile-Iron, Deflection Fittings: Compound coupling fitting with sleeve and flexing sections, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include 250-psig (1725-kPa) minimum working-pressure rating; cement-mortar lining or epoxy, interior coating according to AWWA C550; deflection of at least 20 degrees (0.34 radians); and glands, rubber gaskets, and bolts and nuts according to AWWA C111.

4. JOINING MATERIALS

a. General: Applications of the following piping joining materials are indicated in Part 3 "Piping Applications" Article.

b. Refer to Division 2 Section "Utility Materials" for commonly used joining materials.

c. Ductile-Iron Piping: The following materials apply:

i. Push-on Joints: AWWA C111 rubber gaskets and lubricant.

ii. Mechanical Joints: AWWA C153 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.

d. Pipe Couplings: Iron-body sleeve assembly, fabricated to match OD of pipes to be joined.

i. Sleeve: ASTM A 126, Class B, gray iron.

ii. Followers: ASTM A 47 (ASTM A 47M), malleable iron; or ASTM A 536, ductile iron.

iii. Gaskets: Rubber.

iv. Bolts and Nuts: AWWA C111.

v. Finish: Enamel paint.

5. PIPING SPECIALTIES

a. Flexible Connectors for Nonferrous, Metal Piping: Bronze hose covered with bronze wire braid; with copper-tube, pressure-type, solder-joint ends or bronze flanged ends; brazed to hose.

b. Flexible Connectors for Ferrous Piping: Stainless-steel hose covered with stainless-steel wire braid; with ASME B1.20.1 threaded steel pipe nipples or ASME B16.5 steel pipe flanges; welded to hose.

c. Dielectric Fittings: Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and corrosion.

i. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld-neck end types and matching piping system materials.

ii. Dielectric Unions: Factory-fabricated union assembly, designed for 250-psig (1725-kPa) minimum working pressure at 180 deg F (82 deg C). Include insulating material isolating dissimilar metals and ends with inside threads according to ASME B1.20.1.

iii. Dielectric Flanges: Factory-fabricated companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum pressure to suit system pressures.

iv. Dielectric-Flange Insulation Kits: Field-assembled companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.

1. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure to suit system pressures.

v. Dielectric Couplings: Galvanized-steel couplings with inert and noncorrosive thermoplastic lining, with threaded ends and 300-psig (2070-kPa) minimum working pressure at 225 deg F (107 deg C).

vi. Dielectric Nipples: Electroplated steel nipples with inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig (2070-kPa) working pressure at 225 deg F (107 deg C).

6. PE ENCASEMENT

a. PE Encasement for Ductile-Iron Piping: ASTM A 674 or AWWA C105, PE film, 0.008-inch (0.20-mm) minimum thickness, tube or sheet.

7. VALVES

a. Non-rising-Stem, Resilient-Seated Gate Valves, 3-Inch NPS (DN80) and Larger: AWWA C509, gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut. Include 200-psig (1380-kPa) minimum working-pressure design, interior coating according to AWWA C550, and push-on- or mechanical-joint ends.

b. Valve Boxes: Cast-iron box with top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches (125 mm) in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.

i. Provide steel tee-handle operating wrench with each valve box. Include tee handle with one pointed end, stem of length to operate valve, and socket-fitting valve-operating nut.

c. Indicator Posts: UL 789, FM-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve.

d. Curb Stops: Bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet to match service piping material.

e. Service Boxes for Curb Stops: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include cover with lettering "WATER," and bottom section with base of size to fit over curb-stop and barrel approximately 3 inches (75 mm) in diameter.

i. Provide steel tee-handle shutoff rod with each service box. Include tee handle with one pointed end, stem of length to operate curb stop, and slotted end fitting curb-stop head.

f. Tapping Sleeve and Tapping Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.

i. Tapping Sleeve: Cast- or ductile-iron, 2-piece bolted sleeve with flanged outlet for new branch connection. Sleeve may have mechanical-joint ends with rubber gaskets or sealing rings in sleeve body. Include sleeve matching size and type of pipe material being tapped and of outlet flange required for branch connection.

g. Service Clamps and Corporation Stops: Complete assembly, including service clamp, corporation stop, and bolts and nuts. Include service clamp and stop compatible with drilling machine.

i. Service Clamp: Stainless Steel with gasket and AWWA C800 threaded outlet for corporation stop, and threaded end straps.

ii. Corporation Stops: Bronze body and ground-key plug, with AWWA C800 threaded inlet and outlet matching service piping material.

iii. Manifold: Copper with 2 to 4 inlets as required, with ends matching corporation stops and outlet matching service piping.

h. Ball Valves: AWWA C507, Class 250. Include interior coating according to AWWA C550.

i. Butterfly Valves: AWWA C504, with 150-psig (1035-kPa) working-pressure rating. Include interior coating according to AWWA C550.

j. Butterfly Valves: UL 1091, with 175-psig (1200-kPa) working-pressure rating.

k. Check Valves: AWWA C508, with 175-psig (1200-kPa) working-pressure rating. Include interior coating according to AWWA C550.

l. Check Valves: UL 312, with swing clapper and 175-psig (1200-kPa) working-pressure rating.

8. FIRE HYDRANTS

a. Description: Cast-iron body, compression-type valve, opening against pressure and closing with pressure, 6-inch (DN150) mechanical-joint inlet, and 150-psig (1035-kPa) minimum working-pressure design.

b. Watch Valve: Each hydrant setting shall include one 6 inch diameter watch valve between the water main and the hydrant.

c. Outlet Threads: NFPA 1963, with external National Standard Thread (Verify size and thread used by local fire department before ordering) Include cast-iron caps with steel chains.

d. Operating and Cap Nuts: Pentagon 1-1/2 inch (40 mm) point to flat. Verify with Fire Dept.

e. Direction of Opening: Open hydrant valve by turning operating nut to left or counterclockwise.

f. Exterior Finish: Two coats of Red alkyd-gloss enamel paint. Verify paint color with local Fire Dept.

g. Dry-Barrel Fire Hydrants: AWWA C502, two 2-1/2-inch National Standard Thread (DN65) and one 4-1/2-inch National Standard Thread (DN115) outlets, 4 1/2-inch (133-mm) main valve or larger, drain valve, and 6-inch NPS (DN150) ductile iron mechanical-joint inlet. Include 200-psig (1725-kPa) minimum working-pressure design and interior coating according to AWWA C550. Contractor to verify type, outlet size and thread with Local Fire Department and Village Water Department prior to ordering hydrants.

9. ANCHORAGES

a. Clamps, Straps, and Washers: stainless steel.

b. Rods: stainless steel.

c. Bolts: stainless steel.

d. Concrete Thrust Blocking: Portland cement concrete mix, 3000 psig (20.7 MPa).

i. Cement: ASTM C 150, Type I.

ii. Fine Aggregate: ASTM C 33, sand.

iii. Coarse Aggregate: ASTM C 33, crushed gravel.

iv. Water: Potable.

10. IDENTIFICATION

a. Refer to Division 2 Section "Earthwork" for underground warning tape materials.

b. Install detectable warning tapes made of solid blue film with metallic core and continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

c. Nonmetallic Piping Label: Engraved, plastic-laminate label at least 1 by 3 inches (25 by 75 mm), with caption "CAUTION--THIS STRUCTURE HAS NONMETALLIC WATER-SERVICE PIPING," for installation on main electrical meter panel.

C. EXECUTION

1. EARTHWORK

a. Refer to Division 2 Section "Earthwork" for excavation, trenching, and backfilling.

b. Refer to Division 2 Section "Hot-Mix Asphalt Paving" for cutting and patching of existing paving.

c. Refer to Division 2 Section "Portland Cement Concrete Paving" for cutting and patching of paving.

2. PIPING APPLICATIONS

a. General: Use pipe, fittings, and joining methods for piping systems according to the following applications:

b. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.

c. Do not use flanges or keyed couplings for underground piping.

    i. Exception: Piping in boxes and structures, but not buried, may be joined with flanges or keyed couplings instead of joints indicated.

d. Flanges, keyed couplings, and special fittings may be used on aboveground piping.

e. Potable Water-Service Piping: Use the following:

    i. 4-Inch NPS (DN100): Ductile-iron, push-on-joint pipe; ductile-iron, push-on-joint fittings; and gasketed joints.

    ii. 4-Inch NPS (DN100): Copper tube, Type K (Type A); copper fittings; and soldered joints.

    iii. 4-Inch NPS (DN100): Copper tube, Type L (Type B); copper fittings; and soldered joints.

    iv. 6-Inch NPS (DN150): Ductile-iron, push-on-joint pipe; ductile-iron, mechanical joint fittings; and gasketed joints.

    v. 5- and 6-Inch NPS (DN125 and DN150): Copper tube, Type K (Type A); copper fittings; and brazed joints.

    vi. 5- and 6-Inch NPS (DN125 and DN150): Copper tube, Type L (Type B); copper fittings; and brazed joints.

    vii. 8-Inch NPS (DN200): Ductile-iron, push-on-joint pipe; ductile-iron, mechanical joint fittings; and gasketed joints.

f. Fire-Protection Water-Service Piping: Use the following:

    i. 4- to 8-Inch NPS (DN100 to DN200): Ductile-iron, push-on-joint pipe; ductile-iron, mechanical joint fittings; and gasketed joints.

    ii. 10- and 12-Inch NPS (DN250 and DN300): Ductile-iron, push-on-joint pipe; ductile-iron, mechanical joint fittings; and gasketed joints.

g. Combined Potable-Water and Fire-Protection Water-Service Piping: Use the following:

i. 6- to 12-Inch NPS (DN150 to DN300): Ductile-iron, push-on-joint pipe; ductile-iron, mechanical joint fittings; and gasketed joints.

3. VALVE APPLICATIONS

a. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

i. Underground Valves, 3-Inch NPS (DN80) and Larger: AWWA C509 gate valves, non-rising stem, with valve box.

4. JOINT CONSTRUCTION

a. Refer to Division 2 Section "Utility Materials" for basic piping joint construction.

b. Ductile-Iron Piping, Gasketed Joints: According to AWWA C600.

c. Ductile-Iron Piping, Gasketed Joints for Fire-Service Piping: According to UL 194 and AWWA C600.

d. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.

e. Threaded Joints: Thread pipes with tapered pipe threads according to ASME B1.20.1, apply tape or joint compound, and apply wrench to fitting and valve ends into which pipes are being threaded.

f. Ductile-Iron, Keyed-Coupling Joints: Cut-groove pipes. Assemble joints with keyed couplings, gaskets, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

g. Copper Tubing, Brazed Joints: According to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

h. Copper Tubing, Soldered Joints: According to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube."

i. Copper Tubing, Soldered Joints: According to CDA's "Copper Tube Handbook."

j. PVC Piping, Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.

5. PIPING SYSTEMS - COMMON REQUIREMENTS

a. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.

b. Install piping at indicated slope.

c. Install components with pressure rating equal to or greater than system operating pressure.

d. Install piping free of sags and bends.

e. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

f. Install fittings for changes in direction and branch connections.

g. Piping Connections: Unless otherwise indicated, make piping connections as specified below:

6. SERVICE ENTRANCE PIPING

a. Extend water-service piping and connect to water-supply source and building water piping systems at outside face of building wall in locations and pipe sizes indicated.

i. Terminate water-service piping 5 feet outside building wall until building water piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water piping systems when those systems are installed.

b. Sleeves and mechanical sleeve seals are specified in Division 15 Section "Basic Mechanical Materials and Methods."

c. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

d. Anchor service-entry piping to building wall.

7. PIPING INSTALLATION

a. Water-Main Connection: Tap water main with size and in location as indicated according to requirements of water utility.

b. Make connections larger than 2-inch NPS (DN50) with tapping machine according to the following:

i. Install tapping sleeve and tapping valve according to manufacturer's written instructions.

ii. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.

iii. Install gate valve onto tapping sleeve. Comply with AWWA C600. Install valve with stem pointing up and with cast-iron valve box.

iv. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.

c. Comply with NFPA 24 for fire-protection water-service piping materials and installation.

d. Install ductile-iron piping according to AWWA C600.

i. Encase piping with PE film according to ASTM A 674 or AWWA C105.

e. Install copper tube and fittings according to CDA's "Copper Tube Handbook."

f. Install AWWA PVC plastic pipe according to AWWA M23 and ASTM F 645.

g. Install PE plastic pipe according to ASTM D 2774, ASTM F 645, and manufacturer's written instructions.

h. Install PEX plastic tubing according to ASTM D 2774, ASTM F 645, and manufacturer's written instructions.

i. Bury piping with depth of cover over top at least 42 inches (750 mm), with top at least 12 inches (300 mm) below level of maximum frost penetration, and according to the following:

i. Under Driveways: With at least 42 inches (900 mm) cover over top.
ii. Under Railroad Tracks: With at least 48 inches (1200 mm) cover over top.

j. Install piping under streets and other obstructions that cannot be disturbed, by tunneling, jacking, or combination of both.

8. ANCHORAGE INSTALLATION

a. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:

i. Gasketed-Joint, Ductile-Iron, Potable-Water Piping: According to AWWA C600.
ii. Gasketed-Joint, PVC Potable-Water Piping: According to AWWA M23.
iii. Fire-Service Piping: According to NFPA 24.

b. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

9. VALVE INSTALLATION

a. General Application: Use mechanical-joint-end valves for 3-inch NPS (DN80) and larger underground installation. Use threaded- and flanged-end valves for installation in pits. Use nonrising-stem UL/FM gate valves for installation with indicator posts. Use bronze corporation stops and valves, with ends compatible with piping, for 2-inch NPS (DN50) and smaller installation.

b. AWWA-Type Gate Valves: Comply with AWWA C600. Install underground valves with stem pointing up and with cast-iron valve box.

c. UL/FM-Type Gate Valves: Comply with NFPA 24. Install underground valves and valves in pits with stem pointing up and with vertical cast-iron indicator post.

d. Bronze Corporation Stops and Curb Stops: Comply with manufacturer's written instructions. Install underground curb stops with head pointed up and with cast-iron curb box.

10. FIRE HYDRANT INSTALLATION

a. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints and anchoring tee, thrust blocks, and support in upright position. Wrap hydrant barrel, valve, and supply line to ground level in P.E. encasement. Backfill with granular material and compact to support hydrant.

b. Wet-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.

c. AWWA-Type Fire Hydrants: Comply with AWWA M17.

d. UL/FM-Type Fire Hydrants: Comply with NFPA 24.

11. IDENTIFICATION INSTALLATION

a. Install continuous plastic underground warning tape during back-filling of trench for underground water-service piping. Locate 16 inches to 24 inches below finished grade, directly over piping.

b. Attach nonmetallic piping label permanently to main electrical meter panel.

12. FIELD QUALITY CONTROL

a. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

b. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure, or 150 psi, whichever is greater, for 2 hours. Furnish all necessary equipment and materials to conduct the test. All taps shall be made prior to conducting the test.

i. Comply with AWWA C-600 for Testing requirements.

c. Prepare reports for testing activities.

13. CLEANING

a. Clean and disinfect water distribution piping and tanks according to AWWA C651, and as follows:

i. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities, use procedure described in AWWA C651 or as described below:

1. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine. Isolate system or part thereof and allow to stand for 24 hours.

2. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.

3. Following allowed standing time, flush system with clean, potable water until chlorine does not remain in water coming from system.

4. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

b. Prepare reports for purging and disinfecting activities.

END OF SECTION 33 10 00

SECTION 33 30 00 - SANITARY SEWERAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes sanitary sewerage outside the building.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. EPDM: Ethylene-propylene-diene-monomer rubber.

C. PE: Polyethylene plastic.

D. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Non-pressure-Piping Pressure Ratings: At least equal to system test pressure. Edit pressure below as required. A lower pressure may be adequate.

1.5 QUALITY ASSURANCE

A. Environmental Agency Compliance: Comply with regulations pertaining to sanitary sewer systems.

B. Utility Compliance: Comply with regulations pertaining to sanitary sewer systems.

1.6 SUBMITTALS

A. Product Data: For the following:

1. Pipe materials including wyes and fittings.

B. Manufacturer's Submittal: For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58

C. Requests for substitution and "or equal": For each product, the submittal shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

1.7 CLOSE-OUT SUBMITTALS

A. Manufacturer's BABAA Certification: For each type of product indicated, provide Manufacturer's Certification that the product meets the requirements of the Build America, Buy America Act (BABAA) to the Owner for record purposes.

B. As part of the Closeout documentation, the Contractor shall provide the Owner and Rural Development a written statement, on company letterhead, attesting that all construction materials and manufactured products, utilized in the construction of the project, meet the domestic preference requirements of the Build America, Buy America Act (BABAA). This documentation must be received and approved by the Owner and Rural Development prior to the release of final payment to the Contractor.

1.8 DELIVERY, STORAGE, AND HANDLING

A. No materials shall be delivered to the jobsite that are not BABAA compliant nor provided with the Manufacturer's BABAA certification.

B. Do not store plastic structures, pipe, and fittings in direct sunlight, and protect pipe, fittings, and seals from dirt and damage.

C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.9 PROJECT CONDITIONS

A . Site Information: Perform site survey, research public utility records, and verify existing utility locations.

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

1. Notify Architect not less than two days in advance of proposed utility interruptions.

Do not proceed with utility interruptions without Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting the performance requirements including those of the Build America, Buy America Act(BABAA) and the Manufacturer can provide the required BABAA certification shown above.

B. Available Manufacturers: Subject to compliance with requirements of the authority having jurisdiction.

2.2 PIPING MATERIALS

A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.3 PIPES AND FITTINGS If a specific type of pipe is specified on the drawings, the specified type must be used. If a type of pipe is not specified on the drawings, one of the following shall be provided:

A. PVC Sewer Pipe and Fittings:

B. Subject to compliance with requirements of the authority having jurisdiction.

2.4 SPECIAL PIPE COUPLINGS AND FITTINGS

A. Sleeve-Type Pipe Couplings: Subject to compliance with requirements of the authority having jurisdiction.

2.5 CLEANOUTS

A. PVC Cleanouts: Subject to compliance with requirements of the authority having jurisdiction.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 IDENTIFICATION

A. Subject to compliance with requirements of the authority having jurisdiction.

3.3 PIPING APPLICATIONS

A. General: Include watertight joints.

B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

C. Gravity-Flow Piping: Subject to compliance with requirements of the authority having jurisdiction.

3.4 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.

C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.

D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow piping and connect to building's sanitary drains, of sizes and in locations indicated. Terminate piping as indicated.

1. Install piping pitched down in direction of flow, at minimum slope of 2.08 percent, unless otherwise indicated.

3.5 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to installations indicated. Subject to compliance with requirements of the authority having jurisdiction.

3.6 CLEANOUT INSTALLATION

A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding grade.

C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.7 TAP CONNECTIONS

A. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.

B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and use a sleeve type coupling with gasket joints to insure a water tight connection.

C. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

D. Subject to compliance with requirements of the authority having jurisdiction.

1. Backfill to grade according to Division 2 Section "Earthwork."

3.8 FIELD QUALITY CONTROL

A. Subject to compliance with requirements of the authority having jurisdiction.

B. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.

1. Place plug in end of incomplete piping at end of day and when work stops.

2. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

C. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again 30 days after completion of installation and placement of backfill.

1. Submit separate reports for each system inspection.

2. Defects requiring correction include the following:

a. Alignment: Less than full diameter of inside of pipe is visible between structures.

b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 95 percent of piping diameter.

c. Crushed, broken, cracked, or otherwise damaged piping.

d. Infiltration: Water leakage into piping.

e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

4. Reinspect and repeat procedure until results are satisfactory.

D. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.

2. Test completed piping systems according to authorities having jurisdiction or those requirements shown on the drawings, whichever is more stringent.

3. Schedule tests and inspections by authorities having jurisdiction with at least 48 hours' advance notice.

4. Submit separate reports for each test.

5. Perform tests meeting Ohio EPA, the Ten States Standards, and the requirements of the authority having jurisdiction, or the tests shown on the drawings, whichever is more stringent.

a. Sanitary Sewerage: Perform hydrostatic test.

6. Manholes: Perform vacuum test according to ASTM C 1244-93

7. Leaks and loss in test pressure constitute defects that must be repaired.

8. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION 33 30 00

SECTION 33 41 00 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Site storm sewerage drainage piping, fittings and accessories, and bedding.

B. Connection of drainage system to public utility.

C. Catch basins, paved area drainage, site surface drainage, outfalls, and detention basin.

D. Connection to drainage boots from building downspouts.

1.2 RELATED SECTIONS

A. Section 31 20 00 – Earth Moving: Excavating for sewer system piping and structures.

1.3 REFERENCES

A. ASTM C14 - Concrete Sewer, Storm Drain, and Culvert Pipe.

B. ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

C. ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.

D. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.

E. AASHTO M 252

F. ASTM F 477

G. ASTM D3034 - Type PSM Polyvinylchloride (PVC) Sewer Pipe and Fittings.

1.4 SUBMITTALS FOR REVIEW

A. Section 01 33 00 - Submittals: Procedures for submittals.

B. Product Data: Provide data indicating pipe, pipe accessories, and structures.

1.5 SUBMITTALS FOR INFORMATION

A. Section 01 33 00 - Submittals: Procedures for submittals.

B. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01 77 00 - Contract Closeout: Procedures for submittals.

B. Accurately record actual locations of pipe runs, connections, catch basins, cleanouts, invert elevations, and other structures.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable codes and local standards for materials and installation of the Work of this section.

1.8 COORDINATION

A. Coordinate the Work with specified earthwork and connections to existing piping, inlets, downspouts and public utility.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The Contractor is to provide products meeting the performance requirements including those of the Build America, Buy America Act(BABAA) and the Manufacturer can provide the required BABAA certification shown above. SEWER PIPE MATERIALS

B. If a specific type of pipe is specified on the drawings, the specified type must be used. If a type of pipe is not specified on the drawings, one of the following shall be provided:

A. Reinforced Concrete Sewer Pipe

1. Reinforced Concrete Sewer Pipe

a. Reinforced Concrete Pipe: ASTM C76, Class III with Wall Type B; mesh or bar reinforcement; inside nominal diameter indicated, bell and spigot end joints.

b. Reinforced Concrete Pipe Joint Device: ASTM C443, rubber compression gasket joint.

B. Plastic Pipe (PVC): Sizes 4” through 12” - ASTM D3034, Type PSM, Polyvinylchloride (PVC) material; inside nominal diameter indicated, bell and spigot style rubber ring sealed gasket joint.

C. Corrugated Polyethylene (PE) Drainage Tubing: 4” through 60” - AASHTO M 252 Interim, Type S, with smooth waterway for gasketed joints.

a. Pipe shall meet ASTM F2648 and shall have a smooth interior and annular exterior corrugations.

b. 4 inch through 60-inch pipe shall meet ASTM F2648.

c. Manning's "n" value for use in design shall be 0.012.

d. Joint Performance Pipe shall be joined using a bell & spigot joint meeting ASTM F2648. The joint shall be soil-tight and gaskets, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly.

e. Fittings shall conform to ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the soil-tight joint performance requirements of ASTM F2306.

2.2 ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, adapters, reducers, traps and other configurations required.

1. Grout: Specified in Section 705.22 of State of Ohio Department of Transportation Construction and Material Specifications.

2.3 CATCH BASINS

A. Lid and Frame: Complying with State of Ohio Department of Transportation Construction and Material Specifications for lid and frame scheduled on Drawings.

B. Shaft Construction and Top Section: Complying with State of Ohio Department of Transportation Construction and Material Specifications for shaft and top construction scheduled on Drawings.

1. Base Pad: Complying with State of Ohio Department of Transportation Construction and Material Specifications for base pad construction scheduled on Drawings.

2.4 MANHOLES

A. Normal-Traffic Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with rubber gasketed joints.

1. Inside Diameter: 48 inches minimum, unless otherwise indicated.

2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.

3. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 5-inch (100-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.

4. Riser Sections: 5-inch (100-mm) minimum thickness, and lengths to provide depth indicated.

5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.

6. Gaskets: ASTM C 443 (ASTM C 443M), rubber.

7. Grade Rings: Include no more than two reinforced-concrete rings, of 6 inch total thickness, that match 24-inch-diameter frame and cover.

8. Steps: Aluminum, individual steps. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches deep.

9. Steps: ASTM C 478 individual steps or ladder. Omit steps for manholes less than 60 inches deep.

10. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Manhole Frames and Covers: Conform to ODOT standards, Item 711.14. Confirm local requirements before ordering frames and covers.

C. Manhole Cover Inserts: Manufactured, plastic form, of size to fit between manhole frame and cover and designed to prevent storm water inflow. Include handle for removal and gasket for gastight sealing.

1. Type: Solid.

2. Type: With drainage and vent holes.

3. Type: With valve.

2.5 CLEANOUTS

A. Cleanout Lid and Frame: Cast iron construction, hinged lid:

1. Lid Design: Checkerboard.

2. Nominal Lid and Frame Size: 8 x 8 inch.

B. Plastic Cleanout: ASTM D3034, Type PSM, Polyvinylchloride (PVC) material; inside nominal diameter indicated, bell and spigot style rubber ring sealed gasket joint for joining to conduits and threaded end for receiving threaded plastic cap.

2.6 BEDDING AND COVER MATERIALS

A. Fine Bedding Material: As specified in Section 31 20 00 – Earth Moving.

B. Coarse Bedding Material: As specified in Section 31 20 00 – Earth Moving.

C. Compacted Granular Material:

1. Furnish material that meets the gradation of ODOT Item 304 (703.17), except 0 to 20 percent may pass the No. 200 sieve.

2. Physical properties meeting ODOT Item 703.17.

2.7 OUTFALLS

A. Riprap/Rock Channel Protection: As Specified on plans per ODOT Item 601.

B. Energy Dissipaters: Construction as indicated, from materials indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that trench cut and excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with Fill complying with requirements of Section 31 20 00 – Earth Moving.

B. Remove large stones and other matter which could damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 20 00 – Earth Moving 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 less than:

1. For sewer pipe 6-inches and less in diameter a depth of 6-inches below bottom of pipe compacted to 98-percent.

2. For sewer pipe over 6-inches diameter a depth of 8-inches below bottom of pipe compacted to 98-percent.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

1. Extend bedding from bottom of pipe up to 1/3 pipe diameter. Shape bedding to receive pipe.

3.4 COVER

A. Place cover material at top of bedding, level materials in continuous layer not less than:

1. For sewer pipe 6-inches and less in diameter a depth of 6-inches above top of pipe compacted to 98-percent.

2. For sewer pipe over 6-inches diameter a depth of 8-inches above top of pipe compacted to 98-percent.

3.5 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal joints watertight.

B. Lay pipe to slope gradients noted on drawings with maximum variation from true slope of 1/8 inch in 10 feet.

C. Install backfill at sides and over top of pipe.

D. Refer to Section 31 20 00 – Earth Moving for trenching and backfilling requirements. Do not displace or damage pipe when compacting.

E. Connect to building downspouts, inlets, existing piping and public utility.

3.6 INSTALLATION - CATCH BASINS

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, or provide Fine Bedding Material to depth required for smooth level base to receive Pre-Cast Catch Basins.

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.

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.7 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.

B. In large, accessible piping, brushes and brooms may be used for cleaning.

C. Place plug in end of incomplete piping at end of day and when work stops.

D. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

E. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

F. Submit separate reports for each system inspection.

G. Defects requiring correction include the following:

1. Alignment: Less than full diameter of inside of pipe is visible between structures.

2. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.

3. Crushed, broken, cracked, or otherwise damaged piping.

4. Infiltration: Water leakage into piping.

5. Exfiltration: Water leakage from or around piping.

H. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.

I. Re-inspect and repeat procedure until results are satisfactory.

J. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

K. Do not enclose, cover, or put into service before inspection and approval.

L. Test completed piping systems according to authorities having jurisdiction.

M. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.

N. Submit separate reports for each test.

O. Where authorities having jurisdiction do not have published procedures, perform tests as follows:

1. Force Main: Perform hydrostatic test after thrust blocks, supports, and anchors have hardened. Test at pressure not less than one and one-half times maximum system operating pressure, but not less than 150 psig.

2. Ductile-Iron Piping: Test according to AWWA C600, Section "Hydraulic Testing."

3. PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.

P. Leaks and loss in test pressure constitute defects that must be repaired.

Q. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.8 PROTECTION

A. Protect finished Work under provisions of contract documents.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

3.9 SCHEDULE

A. Storm Sewer Piping

1. Reinforced Concrete Pipe, Non-reinforced Concrete Pipe, and Plastic pipe where indicated.

2. Size indicated.

3. Bedding

a. Under Paved Areas - Coarse Aggregate Bedding compacted to 98 percent

b. Piping 6-inches and Less in Diameter Under Landscaped Areas - Fine Aggregate Bedding compacted to 98 percent.

c. Piping Over 6-inches in Diameter Under Landscaped Areas - Coarse Aggregate Bedding compacted to 98 percent

4. Cover

a. Under Paved Areas – Compacted Granular Material

b. Piping 6-inches and Less in Diameter Under Landscaped Areas - Fine Aggregate Bedding compacted to 98 percent.

c. Piping Over 6-inches in Diameter Under Landscaped Areas - Coarse Aggregate Bedding compacted to 98 percent.

B. Downspout Conduits

1. Plastic Pipe: 4-inch diameter unless otherwise indicated.

2. Bedding

a. Under Paved Areas - Coarse Aggregate Bedding compacted to 98 percent

b. Piping 6-inches and Less in Diameter Under Landscaped Areas - Fine Aggregate Bedding compacted to 98 percent.

c. Piping Over 6-inches in Diameter Under Landscaped Areas - Coarse Aggregate Bedding compacted to 98 percent

3. Cover

a. Under Paved Areas - Compacted Granular Material

b. Piping 6-inches and Less in Diameter Under Landscaped Areas - Fine Aggregate Bedding compacted to 98 percent.

c. Piping Over 6-inches in Diameter Under Landscaped Areas - Coarse Aggregate Bedding compacted to 98 percent.

C. Finger Drains

1. Perforated Corrugated, Polyethylene (PE) Drainage Tubing

2. 6-inch diameter unless otherwise indicated.

3. Bedding: Filtering Material.

4. Cover: Filtering Material

D. Underdrains

1. Perforated Corrugated, Polyethylene (PE) Drainage Tubing

2. 6-inch diameter unless otherwise indicated.

3. Bedding: Filtering Material.

4. Cover: Filtering Material

END OF SECTION 33 41 00