

PROJECT MANUAL



COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION COLONIAL HEIGHTS, VIRGINIA

MOSELEYARCHITECTS

ARCHITECT/ENGINEER

RICHMOND, VIRGINIA

HG DESIGN GROUP

CIVIL ENGINEERING

RICHMOND, VIRGINIA

ECS MID-ATLANTIC, LLC

HAZARDOUS MATERIALS

RICHMOND, VIRGINIA

BID SET

July 1, 2022

Volume 1

A/E's Proj. #611565
Set No.

VOLUME 1

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004100	Bid Form
004313	Bid Bond (AIA Document A310)
004513	Contractor's Qualification Statement (AIA Document A305) Exhibit A: General Information Exhibit B: Financial and Performance Information Exhibit C: Project Specific Information Exhibit D: Contractor's Past Project Experience Exhibit E: Contractor's Past Project Experience, Continued
005213	Standard Form of Agreement Between Owner and Contractor (AIA Document A101)
006113	Performance Bond (AIA Document A312)
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Prebid Question Form: (Use on-line process. To access go to
www.moseleyarchitects.com, "Bidding", "Submit a Question").

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INVITATION TO BID

Bid Request No. 2022-8000-2

Sealed bids for construction of the **Colonial Heights High School Renovation/Addition** will be received in person, via regular mail by U.S. Postal Service, or via special courier service at the **Colonial Heights School Board Office, 512 Boulevard, Colonial Heights, VA 23834**, until but no later than **2:00 PM**, local prevailing time, **Wednesday, August 3, 2022**, and then publicly opened and read immediately thereafter.

Bids received after the announced time and date for submittal, whether by mail or otherwise, will be rejected. Bidders are responsible for ensuring their Bid is received before the deadline indicated. Bids submitted by telephone, email, text message, or facsimile shall not be accepted.

The Work generally consists of Renovations to the Administration area (approximately 15,000 SF) and Fine Arts area (approximately 9,300 SF) of the existing high school and a Fine Arts Addition (approximately 6,000 SF).

A **non-mandatory** pre-bid conference will be held at **9:00 on Thursday, July 14, 2022**, at **Colonial Heights High School, 3600 Conduit Road, Colonial Heights, VA 23834**. Pre-bid questions will not be answered at the pre-bid conference; submit questions via the process below to allow for record-keeping.

Bidders may obtain Bidding Documents electronically and submit Pre-Bid Questions by visiting www.moseleyarchitects.com. At the top of the website select "Bidding," and find the applicable project.

To obtain Bidding Documents select the "Bid Documents" link and complete the Bid Documents Request Form to receive a key that will allow access to the documents.

To submit a pre-bid question, select the "Submit a Question" link. **The last day questions may be submitted is July 26, 2022 by 5pm. The last addendum will be issued on July 29, 2022 by 5pm.**

Only Bidders or entities who obtain Bid Documents through Moseley Architects via the electronic process above will be considered Planholders. All others who obtain electronic Bid Documents or hard/paper Bid Documents through other means, including Plan Rooms, other Contractors, Owner, or third-party websites (Dodge, BidSource, iSqFt., etc) are not considered Planholders. Only Planholders will be notified of Addenda.

Hard/paper copies of the Bidding Documents may be examined at the following locations:

Moseley Architects (Architect's office)
3200 Norfolk St.
Richmond, VA, 23230

Colonial Heights School Board Office
512 Boulevard
Colonial Heights, VA 23834

Refer to the Instructions to Bidders for bidding procedures and requirements.

END OF INVITATION TO BID



AIA® Document A701™ – 2018

Instructions to Bidders

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

Colonial Heights High School Addition and Renovation
3600 Conduit Road
Colonial Heights, Virginia 23834

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

Colonial Heights School Board
512 Boulevard
Colonial Heights, Virginia 23834
Telephone Number: 804-524-3400

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

Moseley Architects P.C.
3200 Norfolk Street
Richmond, Virginia 23230
Telephone Number: 804-794-7555

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- 8 **ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS**

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.

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, but are subject to and governed by definitions under applicable laws and regulations.

§ 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~~ in conformance with 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.

§ 1.10 A Responsible Bidder means a person or entity that has the capability, in all respects, to perform fully the Contract requirements and the moral and business integrity and reliability that will assure good faith performance.

§ 1.11 A Responsive Bidder means a person or entity that has submitted a Bid which conforms in all material respects to the Invitation to Bid and requirements of the Bidding Documents.

§ 1.12 An informality means a minor defect or variation of a Bid from the exact requirements of the Invitation to Bid and of the Bidding Documents which does not affect the price, quality, quantity or delivery schedule for the goods, services or construction being procured.

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.

- .7 The Bidder has carefully reviewed the Bidding Documents and has verified that all of the Bidding Documents received are complete. The Bidder shall notify the Architect immediately if received Bidding Documents are not complete.
- .8 The Bidder has familiarized itself with all applicable federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work; the Bidder has obtained the necessary licenses for bidding, if applicable, and is licensed or certified to perform the Work.
- .9 The Bidder shall pay all county, city, state and federal taxes required by laws in effect at the time the Bids are received and resulting from the Work or traceable thereto. Said taxes shall not be in addition to the Contract price between the Owner and the Bidder, as the taxes shall be an obligation of the Bidder and not of the Owner, and the Owner shall be held harmless and indemnified for the same by the Bidder.
- .10 The failure or omission of any Bidder to receive or examine any form, instrument, addendum or other documents, or to acquaint itself with conditions existing at the site(s), shall in no way relieve any Bidder from any obligations with respect to its Bid or to the Contract.
- .11 The Bidder agrees that its Bid shall be based on products and work indicated in the Bidding Documents.

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.)

§ 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.~~

§ 3.1.2.1 When the Bidding Documents are returned by the Bidders to the Architect or Owner, the shipping or postage shall be prepaid by the Bidder. The Bidder's deposit will not be refunded if the deposit sum is non-refundable as indicated in the Advertisement or Invitation to Bid.

§ 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.

§ 3.1.4.1 Every Bidder is responsible to review all Bidding Documents received to verify that each set contains a complete set of Contract Documents. Any incomplete Bidding Documents shall be immediately returned to the Architect.

§ 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.)

§ 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.

§ 3.3.1.1 The Bidder assumes all risks using a price or bid proposal representing a product or Work that is not indicated in the Bidding Documents and, if the Bidder elects to use that product or Work he shall submit it in accordance with the Division 1 requirements, and as stated herein. If that product or Work is rejected, the Bidder shall provide a product or Work indicated in the Bidding Documents at its cost. The Architect and the Owner shall not consider any requests for additional payments to provide the Work as required by the Contract Documents.

§ 3.3.2 Substitution Process

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

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

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

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

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

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

§ 3.4 Addenda

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

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

Copies of the Addendum will be posted electronically and a notice of posting will be sent via facsimile/email to each plan holder of record.

§ 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.

§ 3.4.3.1 Depending on the nature of an Addendum (clarifications, limited scope of revisions, added manufacturers) issued less than four days prior to receipt date, the Architect, in its professional judgment, reserves the right to issue said Addendum without postponement of the bid date. However, if in the professional judgment of the Architect, the information contained in the Addendum would be such that it would be unfair or unreasonable to prepare a bid proposal

based on the revisions in the Addendum, then the bid date will be postponed to allow distribution of the Addendum and time to prepare a bid proposal.

§ 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.~~ Where so indicated by the bid form, all amounts shall be expressed in figures only.

§ 4.1.4 ~~Edits to entries made on paper bid forms must be initialed by the signer of the Bid. All changes made by the Bidder to the bid form or outside of the envelope shall be signed or initialed by the Bidder. Bids containing any conditions, omissions, erasures, alterations, or items not called for in the Bid, may be rejected by the Owner as being incomplete or nonresponsive.~~

§ 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. If the Bidder does not desire to bid on an Alternate, enter the words "No Bid". If the Owner elects to accept an Alternate, all Bidders submitting a "No Bid" for the Alternate selected by the Owner will be ruled nonresponsive and their Bid will not be considered in the award of the Contract. If the Bidder does not enter an Alternate Bid amount, "No Change", or "No Bid" for all requested Alternates, and leaves the Alternate information blank, their Bid will be considered nonresponsive and will not be considered in the award of the Contract.

§ 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:~~ bid security in the form of either a cashier's or certified check or an acceptable Bid Bond in the amount of five percent (5%) of the Bid amount, and made payable to the Colonial Heights School Board. The bid security is a guarantee that if the Contract is awarded by the Owner to the Bidder, the Bidder shall enter into the Contract with the Owner for the Work mentioned in this Bid or forfeit the bid security to the Owner, not as a penalty, but as liquidated damages. No forfeiture under a bid security shall exceed the lesser of (i) the difference between the Bid for which the bid security was written and the next low Bid of another Bidder, or (ii) the face amount of the bid security.

(Insert the form and amount of bid security.)

§ 4.2.2 All bonds shall be executed by a surety company selected by the Bidder which is legally authorized to do business in the Commonwealth of Virginia and the bond shall be the same in both form as well as substance as AIA Document A310, Bid Bond. The Bidder shall require the attorney-in-fact, who executed the required bond on behalf of the surety company, to affix thereto a certified and current copy of the power of attorney. The bond premium shall be paid by the Bidder and the cost shall be included in the Bid.

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

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

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

§ 4.3 Submission of Bids

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

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

§ 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.

§ 4.3.2.1 The Bidder shall place on the outside of the envelope containing its Bid the following notation: "Contractor License Number _____ and Class of License."

§ 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.

§ 4.3.6 In the solicitation or awarding of Contracts, the Owner shall not discriminate because of the race, religion, color, sex, age, disability or national origin of the Bidder. The Owner welcomes and encourages the participation of small businesses and businesses owned by women and minorities in procurement transactions made by the Owner.

§ 4.3.7 Trade secrets or proprietary information submitted by a Bidder in connection with a procurement transaction, shall not be subject to public disclosure under the Freedom of Information Act; however, the Bidder must invoke the applicable protection, prior to or upon submission of the data or other materials, and must identify the data or other materials to be protected and state the reasons why protection is necessary. The Owner will not accept responses to the Invitation to Bid in cases where the Bidder declares the entire response to the Invitation to Bid to be proprietary information. The Bidder must designate, in the smallest increments possible, that part of the Bid which is deemed to be proprietary.

§ 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. A Bid may not be modified, withdrawn or canceled by the Bidder after the time and date designated for the receipt of

Bids and for sixty-one (61) calendar days thereafter except as provided in subparagraph 4.4.3 of these Instructions to Bidders and each Bidder so agrees in submitting a Bid.

§ 4.4.1.1 A Bid may be modified or withdrawn by the Bidder any time prior to the time and date set for the receipt of Bids. The Bidder shall notify the Owner in writing of its intentions. Such notice shall be in writing over the signature of the person who submitted the original Bid and the notice shall be received and date and time stamped by the Owner on or before the date and time set for the receipt of Bids.

§ 4.4.1.2 Bidders may indicate modifications to Bid amounts by writing the modification on the outside of the sealed envelope containing the Bid and initialing the modification. Only the Bid amount may be modified by this means; no other qualifications may be made.

§ 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: A Bidder may withdraw its Bid from consideration if the Bid price was substantially lower than other Bids due solely to a mistake therein, provided the Bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of Work, labor made directly in the compilation of a Bid which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the Bid sought to be withdrawn. If a Bid contains both clerical and judgment mistakes, a Bidder may withdraw its Bid from consideration if the Bid would have been substantially lower than the other Bids due solely to the clerical mistake, that was an unintentional arithmetic error or an unintentional omission of a quantity of Work, labor or material made directly in the compilation of a Bid which shall be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the Bid sought to be withdrawn.

§ 4.4.3.1 The Bidder shall submit to the Owner its original work papers, documents and materials used in the preparation of the Bid within one (1) day after the date fixed for submission of Bids. Such work papers shall be delivered to the Owner by the Bidder in person or by registered mail at or prior to the time fixed by the Owner for the opening of Bids. The Contract shall not be awarded by the Owner until such period has elapsed. Such mistake shall be proved only from the original work papers, documents, and materials delivered to the Owner as required herein.

§ 4.4.3.2 No Bidder who is permitted to withdraw a Bid shall for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the Contract is awarded or otherwise benefit directly or indirectly from the performance of the Work for which the withdrawn Bid was submitted.

§ 4.4.3.3 If a Bid is withdrawn under authority of this section, the next lowest responsive and responsible Bidder shall be deemed to be the low Bidder.

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

§ 4.4.3.4 When the procedure set forth in the paragraphs above is utilized, original work papers, documents, and materials used in the preparation of the Bid must be submitted in an envelope or package separate and apart from the envelope containing the Bid marked clearly as to the contents.

§ 4.4.3.5 If the Owner denies the withdrawal of a Bid under the provisions of this section, it shall notify the Bidder in writing stating the reasons for its decision and award the Contract to such Bidder at the Bid price, provided such Bidder is a responsible and responsive Bidder.

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. All Bids received on time in accordance with the Bidding Document requirements shall be opened and publicly

read aloud. Any Bidder, upon request, shall be afforded the opportunity to inspect Bid records within a reasonable time after the opening of all Bids but prior to award, except in the event that the public body decides not to accept any of the Bids and to reopen the Contract. Otherwise, Bid records shall be open to public inspection only after award of the Contract. Any inspection of procurement transaction records shall be subject to reasonable restriction to ensure the security and integrity of the records.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or not in conformance with requirements of the Bidding Documents is subject to rejection.

§ 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, Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Documents and does not exceed the funds available. 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 own best interests.

§ 5.3.1.1 In determining the lowest responsible Bidder, the Owner may consider, among other things, the Bidder's past performance, conduct on other contracts, and other information provided by the Bidder, including in the Contractor's Pre-Qualification Package, if requested.

§ 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.

§ 5.3.3 In case of a tie Bid, preference may be given to goods, services, and construction produced in the City of Colonial Heights or State of Virginia or provided by persons, firms or corporations having principal places of business in the City of Colonial Heights or State of Virginia, if such a choice is available; otherwise the tie shall be decided by lot. A City of Colonial Heights business may be given preference over a State of Virginia business, if such a choice is available.

§ 5.3.4 If a Contract is to be awarded, the Owner will give the Bidder a Notice of Award within sixty (60) calendar days after the day of the Bid opening.

§ 5.4 NEGOTIATION WITH LOWEST RESPONSIVE AND RESPONSIBLE BIDDER

§ 5.4.1 If award of a Contract to the lowest responsive and responsible Bidder is precluded because of limitations on available funds, the Owner reserves the right to negotiate the Bid amount with the lowest responsive, responsible Bidder to obtain a Contract amount within the available funds. The negotiations may involve changes in either the features or scope of the Work. Such negotiations may include reducing the quantity, quality, or other cost saving mechanisms involving items in the Bid amount, including unit prices (if any) and/or allowances (if any) that affect the Bid amount, and/or Alternates (if any).

§ 5.4.2 The Owner shall notify the lowest responsive and responsible Bidder that such a situation exists and the Owner and Bidder shall then conduct their negotiations in person, by mail, by telephone or by any means they find convenient.

§ 5.4.3 If an acceptable Contract can be negotiated, the changes to the Bid amount and Bidding Documents agreed upon in the negotiations shall be summarized in a "Post Bid Addendum," and included in the Contract.

§ 5.4.4 If the Owner and the lowest responsive and responsible Bidder cannot negotiate a Contract within available funds, the Owner shall terminate negotiations and reject all bids.

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 in writing if either the ~~Owner or Architect, Owner,~~ 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, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity. ~~The Bidder may also submit any required entity with an adjustment in the Base Bid or Alternate Bid to account for cover the difference in cost occasioned by such substitution. such substitution, provided such adjustment in cost is justifiable and reasonable.~~ The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner ~~and Architect have~~ has 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.~~ Owner.

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.~~ The successful Bidder shall furnish a Performance Bond covering the faithful performance of the Contract and a Payment Bond covering the payment of all obligations arising thereunder. Each bond shall be written for the full value of the Contract, including all adjustments as authorized by Change Order.

§ 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.~~ All bonds shall be written by sureties or insurance companies licensed to do business in the Commonwealth of Virginia.

§ 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.~~ bond premiums shall be paid by the successful Bidder and the cost shall be included in the Bid price. Any subsequent bond premium costs shall be as authorized by Change Order.

§ 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 successful 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, along with the signed Contract (Agreement) forms and the required Certificate of Insurance to the Owner within fifteen (15) calendar days after the Notice of Award of the Contract.

§ 7.2.2 Unless otherwise provided, the The bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Each bond shall be written for the full amount of the Contract.

§ 7.2.3 The bonds shall be dated on or after the date of the ~~Contract~~ Contract (Agreement).

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

ARTICLE 8 — ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

§ 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, Unless otherwise required in the Bidding Documents, the Contract for the Work will be written on AIA Document A101, 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.)~~

.4 — ~~AIA Document E203™ 2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013.)~~

.5 — ~~Drawings Contractor Where the Basis of Payment Is a Stipulated Sum.~~

Number	Title	Date
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.6 — Specifications

Section	Title	Date	Pages
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.7 — Addenda:

Number	Date	Pages
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.8 — Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

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

—

~~[]~~ The Sustainability Plan:

Title	Date	Pages
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~~[]~~ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
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~~.9~~ Other documents listed below:

(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

§ 8.2 The the Contractor recognize that time is of the essence and that the Owner will suffer financial loss if the Work is not completed by the Substantial Completion date required or as may be amended by the Contract Documents. Contractor recognizes the delays, expenses and damages that are involved in proving in a legal proceeding the actual loss that may be suffered by the Owner if the Work is not completed on time. Accordingly, the Owner and the Contractor agree, stipulate and fix as liquidated damages if delayed, but not as a penalty, the sum indicated on the Bid Form that the Contractor together with the Contractor's surety shall pay the Owner for each calendar day or part thereof that expires after the date required or as may be amended by the Contract Documents for the Substantial Completion of the Work.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 12:51:09 ET on 06/07/2022 under Order No. 2114276300 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A701™ – 2018, Instructions to Bidders, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No: 611565

BID FORM
RENOVATIONS AND ADDITON TO COLONIAL HEIGHTS HGIH SCHOOL
BID REQUEST NO.: 2022-8000-2

DATE: _____

TO: Mr. Troy Hedblom
Colonial Heights School Board
512 Boulevard
Colonial Heights, VA 23834

FROM: _____

Bidder's Name

Bidder's Address

Bidder's Address

FOR: RENOVATIONS AND ADDITION TO COLONIAL HEIGHTS HIGH SCHOOL

Having carefully examined the site, and all of the Bidding and Contract Documents, and in compliance with the "Invitation to Bid," "Instructions to Bidders," the undersigned proposes to provide all labor, materials, supplies, equipment, services, and perform all Work necessary for the construction of this Project in accordance with the Bid Documents, dated July 1, 2022, prepared by Moseley Architects.

Complete this Bid Form in blue or black ink or by typewriter. Discrepancies in the multiplications of units of work and the unit prices will be resolved in favor of the correct multiplication of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

BASE BID PRICE:

The Base Bid Price includes all Work required by and in strict accordance with the Bid Documents for this Project, for the Lump Sum of:

\$ _____ (Figures only).

LUMP SUM ALLOWANCES: (Reference Section 012100 – Allowances)

1. Allowance No. 1: Interior Signage: \$20,000.00
2. Allowance No. 2: Hazardous Materials Abatement: \$200,000.00
3. Allowance No. 3: Building Controls: \$100,000.00
4. Allowance No 4: Installation of Card Readers: \$10,000.00

UNIT PRICE ALLOWANCES: (Reference Section 012110 Sitework Allowances and Section 012200 Unit Prices)

1. Unit Price Allowance No. 1: Import and Place Angular VDOT #57 Stone:
Quantity of 100 c.y. at \$ _____ per c.y. (in-place unit price/measure) =

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No: 611565

- \$_____ (Figures only).
2. Unit Price Allowance No. 2: Import and Place VDOT 21-A/21-B Stone:
Quantity of 500 c.y. at \$_____ per c.y. (in-place unit price/measure) =
\$_____ (Figures only).
3. Unit Price Allowance No. 3: Import and Place Structural Fill:
Quantity of 250 c.y. at \$_____ per c.y. (in-place unit price/measure) =
\$_____ (Figures only).
4. Unit Price Allowance No. 4: Additional Excavation and Stabilize on-site:
Quantity of 500 c.y. at \$_____ per c.y. (in-place unit price/measure) =
\$_____ (Figures only)
5. Unit Price Allowance No. 5: Additional Excavation with Off-Site Disposal:
Quantity of 500 c.y. at \$_____ per c.y. (in-place unit price/measure) =
\$_____ (Figures only)
6. Unit Price Allowance No. 6: Additional Excavation in Trenches
Quantity of 250 c.y. at \$_____ per c.y. (in-place unit price/measure) =
\$_____ (Figures only)
7. Unit Price Allowance No. 7: Concrete Sidewalk, in place

Quantity of 10 s.y. additional concrete sidewalk at \$_____ per s.y. (in-place unit price/measure)
8. Unit Price Allowance No. 8: Mass Rock Excavation:
Quantity of 10 c.y.. at \$_____ per l.f. (in-place unit price/measure) =
\$_____ (Figures only)
9. Unit Price Allowance No. 9: Rock Excavation in Trenches:
Quantity of 10 c.y. at \$_____ per c.y. (in-place unit price/measure) =
\$_____ (Figures only)
10. Unit Price Allowance No. 10: Additional Excavation of Unsuitable Material, Disposal of Unsuitable Material and Replacement with VDOT 21/-A Stone:
Quantity of 100 c.y. at \$_____ per c.y. (in-place unit price measure) =
\$_____ (Figures only)
11. Unit Price Allowance No. 11: Moisture Vapor Treatment (MVT):
Quantity of 5,000 s.f. at \$_____ per s.f. (in-place unit price/measure) =
\$_____ (Figures only)

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No: 611565

UNIT PRICES: (Reference Section 012200 Unit Price)

1. Unit Price #1: Pipe insulation/elbows/fittings (various sizes - per fitting – glove bag)
\$ _____ (Figures only)
2. Unit Price #2: Pipe insulation/elbows/fittings (various sizes - per fitting –within negative pressure containment)
\$ _____ (Figures only)
3. Unit Price #3: CMU block wall filler paint (per square foot) demolition
\$ _____ (Figures only)
4. Unit Price #4: CMU block wall filler paint (per square foot) – using paint stripping
\$ _____ (Figures only)
5. Unit Price #5: Water proofing/vapor barrier (per square foot)
\$ _____ (Figures only)
6. Unit Price #6: Light heat shields (per heat shield)
\$ _____ (Figures only)
7. Unit Price #7: Locker caulk (per linear foot)
\$ _____ (Figures only)
8. Unit Price #8: Fire doors (per door)
\$ _____ (Figures only)

TOTAL BASE BID PRICE

(inclusive of Base Bid Price + all Lump Sum Allowances + all Unit Price Allowances) =

\$ _____ Figures only.

ALTERNATE BID PRICE: (Reference Section 012300 – Alternates)

1. Alternate #1 Bid Price: Music Instrument Storage and Music Storage: Provide all work associated with Music Instrument Storage and Music Storage, in strict accordance with the Bid Documents; Lump Sum + Lump Sum Allowances + associated Unit Price Allowances
\$ _____ (Figures only)
2. Alternate #2 Bid Price: Mechanical Screen on Roof over Room A120 Student Collaboration
\$ _____ (Figures only)

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No: 611565

RECEIPT OF ADDENDA

We acknowledge the receipt of the following Addenda:

Addendum No. _____, dated _____
Addendum No. _____, dated _____
Addendum No. _____, dated _____
Addendum No. _____, dated _____

TIME OF COMPLETION

Based upon a Notice to Proceed within forty-five (45) calendar days from the opening of the bid, Work included in this Contract shall be Substantially Complete no later than December 1, 2023 and finally complete no later than sixty (60) calendar days thereafter.

LIQUIDATED DAMAGES

Liquidated Damages (refer to General Conditions for additional information): \$500.00 per calendar day.

REGISTRATION

The Undersigned is a licensed Class A Contractor in accordance with applicable state statutes and regulations, as amended, Certificate No. _____, dated ____/____/____. A Class A Contractor License is required for this project.

Indicate whether your business ____ is or ____ is not located in the City of Colonial Heights, Virginia and whether you ____ have or ____ have not obtained a City of Colonial Heights, Virginia license to conduct or engage in this business, trade, or occupation in City of Colonial Heights, VA.

A bid by a corporation shall further give the State of incorporation _____, State Corporation Commission ID number _____, and have the corporate seal affixed in the space provided herein.

CERTIFICATION

I certify that the firm name given below is the true and complete name of the Bidder and that the Bidder is legally qualified and licensed, to perform all Work included in the scope of the Contract.

Legal Name of Bidder (Company) _____

Bidder's (Company) Address _____

Corporate
Seal

Signature _____
(Signature of person(s) legally authorized to bind Bidder (Company) to this Contract)

By: _____
(Typed or printed Name(s) of Person(s) Signing)

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No: 611565

Title: _____
(Typed or printed Title(s) of Person(s) Signing)

Telephone Number: _____ E-mail: _____
(include Area Code) (of person indicated above)

(This form may be reproduced in exact detail)

END OF BID FORM



AIA[®]

Document A310™ – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Colonial Heights School Board
512 Boulevard
Colonial Heights, Virginia 23834
Telephone Number: 804-524-3400

BOND AMOUNT: \$

PROJECT:

(Name, location or address, and Project number, if any)
Colonial Heights High School Addition and Renovation
3600 Conduit Road
Colonial Heights, Virginia 23834

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

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

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

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

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

Init.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 12:28:49 ET on 06/07/2022 under Order No. 2114276300 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A310™ – 2010, Bid Bond, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA[®] Document A305™ – 2020

Contractor's Qualification Statement

THE PARTIES SHOULD EXECUTE A SEPARATE CONFIDENTIALITY AGREEMENT IF THEY INTEND FOR ANY OF THE INFORMATION IN THIS A305-2020 TO BE HELD CONFIDENTIAL.

SUBMITTED BY: _____ **SUBMITTED TO:** _____
(Organization name and address.) (Organization name and address.)

TYPE OF WORK TYPICALLY PERFORMED

(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)

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

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:

(Check all that apply.)

- Exhibit A – General Information
- Exhibit B – Financial and Performance Information
- Exhibit C – Project-Specific Information
- Exhibit D – Past Project Experience
- Exhibit E – Past Project Experience (Continued)

CONTRACTOR CERTIFICATION

The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement is true and sufficiently complete so as not to be misleading.

Organization's Authorized Representative Date
Signature

Printed Name and Title

NOTARY

State of: _____
County of: _____
Signed and sworn to before me this day of _____

Notary Signature

My commission expires: _____

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 12:25:27 ET on 06/07/2022 under Order No. 2114276300 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A305™ – 2020, Contractor's Qualification Statement, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA[®] Document A305[™] – 2020 Exhibit A

General Information

This Exhibit is part of the Contractor’s Qualification Statement, submitted by _____ and dated the _____ day of _____ in the year _____.
(In words, indicate day, month and year.)

§ A.1 ORGANIZATION

§ A.1.1 Name and Location

§ A.1.1.1 Identify the full legal name of your organization.

§ A.1.1.2 List all other names under which your organization currently does business and, for each name, identify jurisdictions in which it is registered to do business under that trade name.

§ A.1.1.3 List all prior names under which your organization has operated and, for each name, indicate the date range and jurisdiction in which it was used.

§ A.1.1.4 Identify the address of your organization’s principal place of business and list all office locations out of which your organization conducts business. If your organization has multiple offices, you may attach an exhibit or refer to a website.

§ A.1.2 Legal Status

§ A.1.2.1 Identify the legal status under which your organization does business, such as sole proprietorship, partnership, corporation, limited liability corporation, joint venture, or other.

- .1 If your organization is a corporation, identify the state in which it is incorporated, the date of incorporation, and its four highest-ranking corporate officers and their titles, as applicable.
- .2 If your organization is a partnership, identify its partners and its date of organization.
- .3 If your organization is individually owned, identify its owner and date of organization.

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

- .4** If the form of your organization is other than those listed above, describe it and identify its individual leaders:

§ A.1.2.2 Does your organization own, in whole or in part, any other construction-related businesses? If so, identify and describe those businesses and specify percentage of ownership.

§ A.1.3 Other Information

§ A.1.3.1 How many years has your organization been in business?

§ A.1.3.2 How many full-time employees work for your organization?

§ A.1.3.3 List your North American Industry Classification System (NAICS) codes and titles. Specify which is your primary NAICS code.

§ A.1.3.4 Indicate whether your organization is certified as a governmentally recognized special business class, such as a minority business enterprise, woman business enterprise, service disabled veteran owned small business, woman owned small business, small business in a HUBZone, or a small disadvantaged business in the 8(a) Business Development Program. For each, identify the certifying authority and indicate jurisdictions to which such certification applies.

§ A.2 EXPERIENCE

§ A.2.1 Complete Exhibit D to describe up to four projects, either completed or in progress, that are representative of your organization's experience and capabilities.

§ A.2.2 State your organization's total dollar value of work currently under contract.

§ A.2.3 Of the amount stated in Section A.2.2, state the dollar value of work that remains to be completed:

§ A.2.4 State your organization's average annual dollar value of construction work performed during the last five years.

§ A.3 CAPABILITIES

§ A.3.1 List the categories of work that your organization typically self-performs.

§ A.3.2 Identify qualities, accreditations, services, skills, or personnel that you believe differentiate your organization from others.

§ A.3.3 Does your organization provide design collaboration or pre-construction services? If so, describe those services.

§ A.3.4 Does your organization use building information modeling (BIM)? If so, describe how your organization uses BIM and identify BIM software that your organization regularly uses.

§ A.3.5 Does your organization use a project management information system? If so, identify that system.

§ A.4 REFERENCES

§ A.4.1 Identify three client references:

(Insert name, organization, and contact information)

§ A.4.2 Identify three architect references:

(Insert name, organization, and contact information)

§ A.4.3 Identify one bank reference:

(Insert name, organization, and contact information)

§ A.4.4 Identify three subcontractor or other trade references:

(Insert name, organization, and contact information)



AIA[®] Document A305™ – 2020 Exhibit B

Financial and Performance Information

This Exhibit is part of the Contractor’s Qualification Statement, submitted by _____ and dated the _____ day of _____ in the year _____.
(In words, indicate day, month and year.)

§ B.1 FINANCIAL

§ B.1.1 Federal tax identification number:

§ B.1.2 Attach financial statements for the last three years prepared in accordance with Generally Accepted Accounting Principles, including your organization’s latest balance sheet and income statement. Also, indicate the name and contact information of the firm that prepared each financial statement.

§ B.1.3 Has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, been the subject of any bankruptcy proceeding within the last ten years?

§ B.1.4 Identify your organization’s preferred credit rating agency and identification information.
(Identify rating agency, such as Dun and Bradstreet or Equifax, and insert your organization’s identification number or other method of searching your organization’s credit rating with such agency.)

§ B.2 DISPUTES AND DISCIPLINARY ACTIONS

§ B.2.1 Are there any pending or outstanding judgments, arbitration proceedings, bond claims, or lawsuits against your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A, Section 1.2, in which the amount in dispute is more than \$75,000?
(If the answer is yes, provide an explanation.)

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 failed to complete work awarded to it?

.2 been terminated for any reason except for an owners’ convenience?

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

.3 had any judgments, settlements, or awards pertaining to a construction project in which your organization was responsible for more than \$75,000?

.4 filed any lawsuits or requested arbitration regarding a construction project?

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 been convicted of, or indicted for, a business-related crime?

.2 had any business or professional license subjected to disciplinary action?

.3 been penalized or fined by a state or federal environmental agency?



AIA[®]

Document A305™ – 2020 Exhibit C

Project Specific Information

This Exhibit is part of the Contractor’s Qualification Statement, submitted by _____ and dated the _____ day of _____ in the year _____.
(In words, indicate day, month and year.)

PROJECT:

(Name and location or address.)

Studio 1 Colonial Heights High School Addition and Renovation

CONTRACTOR’S PROJECT OFFICE:

(Identify the office out of which the contractor proposes to perform the work for the Project.)

TYPE OF WORK SOUGHT

(Indicate the type of work you are seeking for this Project, such as general contracting, construction manager as constructor, design-build, HVAC subcontracting, electrical subcontracting, plumbing subcontracting, etc.)

CONFLICT OF INTEREST

Describe any conflict of interest your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A Section 1.2, may have regarding this Project.

§ C.1 PERFORMANCE OF THE WORK

§ C.1.1 When was the Contractor’s Project Office established?

§ C.1.2 How many full-time field and office staff are respectively employed at the Contractor’s Project Office?

§ C.1.3 List the business license and contractor license or registration numbers for the Contractor’s Project Office that pertain to the Project.

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

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

§ C.1.5 Identify portions of work that you intend to self-perform on this Project.

§ C.1.6 To the extent known, list the subcontractors you intend to use for major portions of work on the Project.

§ C.2 EXPERIENCE RELATED TO THE PROJECT

§ C.2.1 Complete Exhibit D to describe up to four projects performed by the Contractor's Project Office, either completed or in progress, that are relevant to this Project, such as projects in a similar geographic area or of similar project type. If you have already completed Exhibit D, but want to provide further examples of projects that are relevant to this Project, you may complete Exhibit E.

§ C.2.2 State the total dollar value of work currently under contract at the Contractor's Project Office:

§ C.2.3 Of the amount stated in Section C.2.2, state the dollar value of work that remains to be completed:

§ C.2.4 State the average annual dollar value of construction work performed by the Contractor's Project Office during the last five years.

§ C.2.5 List the total number of projects the Contractor's Project Office has completed in the last five years and state the dollar value of the largest contract the Contractor's Project Office has completed during that time.

§ C.3 SAFETY PROGRAM AND RECORD

§ C.3.1 Does the Contractor's Project Office have a written safety program?

§ C.3.2 List all safety-related citations and penalties the Contractor's Project Office has received in the last three years.

§ C.3.3 Attach the Contractor's Project Office's OSHA 300a Summary of Work-Related Injuries and Illnesses form for the last three years.

§ C.3.4 Attach a copy of your insurance agent's verification letter for your organization's current workers' compensation experience modification rate and rates for the last three years.

§ C.4 INSURANCE

§ C.4.1 Attach current certificates of insurance for your commercial general liability policy, umbrella insurance policy, and professional liability insurance policy, if any. Identify deductibles or self-insured retentions for your commercial general liability policy.

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project 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?

§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, Insurance A.3.2.2.2? If so, identify.

§ C.5 SURETY

§ C.5.1 If requested, will your organization be able to provide a performance and payment bond for this Project?

§ C.5.2 Surety company name:

§ C.5.3 Surety agent name and contact information:

§ C.5.4 Total bonding capacity:

§ C.5.5 Available bonding capacity as of the date of this qualification statement:



AIA[®] Document A305™ – 2020 Exhibit D

Contractor's Past Project Experience

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:
SUSTAINABILITY CERTIFICATIONS				



AIA[®]

Document A305™ – 2020 Exhibit E

Contractor's Past Project Experience, Continued

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:	<input type="checkbox"/> Design-bid-build <input type="checkbox"/> Design-build <input type="checkbox"/> CM constructor <input type="checkbox"/> CM advisor <input type="checkbox"/> Other:
SUSTAINABILITY CERTIFICATIONS				



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)

Colonial Heights School Board
512 Boulevard
Colonial Heights, Virginia 23834
Telephone Number: 804-524-3400

and the Contractor:
(Name, legal status, address and other information)

To be determined

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

Colonial Heights High School Addition and Renovation
3600 Conduit Road
Colonial Heights, Virginia 23834

The Architect:
(Name, legal status, address and other information)

Moseley Architects P.C.
3200 Norfolk Street
Richmond, Virginia 23230
Telephone Number: 804-794-7555

The Owner and Contractor agree as follows.

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.

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.)

[] Not later than () calendar days from the date of commencement of the Work.

[] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work

Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item

Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement. *(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)*

Item

Price

Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum: *(Identify each allowance.)*

Item

Price

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than () days after the Architect receives the Application for Payment. *(Federal, state or local laws may require payment within a certain period of time.)*

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner’s prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner’s final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect’s final Certificate for Payment, or as follows:

§ 5.3 Interest

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

(Insert rate of interest agreed upon, if any.)

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

- Arbitration pursuant to Section 15.4 of AIA Document A201–2017
- Litigation in a court of competent jurisdiction
- Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner’s convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner’s convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner’s representative:

(Name, address, email address, and other information)

§ 8.3 The Contractor’s representative:

(Name, address, email address, and other information)

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013 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:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

Init.

/

[] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

[] The Sustainability Plan:

Title	Date	Pages
-------	------	-------

[] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
----------	-------	------	-------

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor’s bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

(Printed name and title)

CONTRACTOR (Signature)

(Printed name and title)

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 13:00:45 ET on 06/07/2022 under Order No. 2114276300 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A101™ – 2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

To be determined

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Colonial Heights School Board
512 Boulevard
Colonial Heights, Virginia 23834

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.

CONSTRUCTION CONTRACT

Date:

Amount: \$ 0.00

Description:

(Name and location)

Colonial Heights High School Addition and Renovation
3600 Conduit Road
Colonial Heights, Virginia 23834

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: None See Section 16

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

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

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 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

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: _____

Address: _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: _____

Address: _____

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 13:24:26 ET on 06/30/2022 under Order No. 2114276300 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Performance Bond, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA[®]

Document A312™ – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

To be determined

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Colonial Heights School Board
512 Boulevard
Colonial Heights, Virginia 23834

CONSTRUCTION CONTRACT

Date:

Amount: \$ 0.00

Description:

(Name and location)

Colonial Heights High School Addition and Renovation
3600 Conduit Road
Colonial Heights, Virginia 23834

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: None See Section 18

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

SURETY

Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

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

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

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

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

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

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

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

SURETY

Company: _____ (Corporate Seal)

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

Signature: _____
Name and Title: _____
Address: _____

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, _____, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification at 13:24:21 ET on 06/30/2022 under Order No. 2114276300 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Payment Bond, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)



AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Colonial Heights High School Addition and Renovation
3600 Conduit Road
Colonial Heights, Virginia 23834

THE OWNER:

(Name, legal status and address)

Colonial Heights School Board
512 Boulevard
Colonial Heights, Virginia 23834
Telephone Number: 804-524-3400

THE ARCHITECT:

(Name, legal status and address)

Moseley Architects P.C.
3200 Norfolk Street
Richmond, Virginia 23230
Telephone Number
: 804-794-7555

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

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

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

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

The Specifications are that portion of the Project Manual and 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~~ 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

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produce the indicated results. Notwithstanding such performance, in case of a conflict, disagreement, or ambiguity, provide the better quality of Work. In case of a conflict, disagreement, or ambiguity, provide the greater quantity of Work.

§ 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.

1.2.1.2 Plumbing, Mechanical, Fire Protection and Electrical drawings are diagrammatic, showing general locations and arrangements of piping, wiring, equipment, security and technology, and specialties; not necessarily showing all required offsets, conditions and appurtenances required for maximum practical accessibility for operation, maintenance and clearances. Coordinate this Work in order to achieve the required and intended Work and notify the Architect immediately of conditions which do not comply or will not allow for this condition.

§ 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~~ Unless otherwise required by the Owner and Architect Agreement, 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,~~ 1.7, 1.8, and 1.9 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

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certified or registered mail, or by courier providing proof of ~~delivery~~delivery, including signature of receiver of such notices.

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

§ 1.9 If such Exhibits are not included in the Agreement, the Architect may, with the concurrence of the Owner, furnish to the Contractor versions of the Instruments of Service in electronic form. The Contract Documents executed or identified in accordance with Section 1.1.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations involving computers. The Contractor shall not transfer or reuse Instruments of Service in electronic or machine readable form without the prior written consent of the Architect.

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~~ The Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

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

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

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

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

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

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

§ 2.3.6.1 At the Architect’s sole discretion, selected electronic (CAD) Drawing files may be made available for use by the Contractor after execution of the Contract for Construction, with the exception of civil grading and layout plans, if authorized by the civil consultant. Such electronic files are not part of the Contract Documents. If available, the Architect shall release them to the Contractor subject to the terms and conditions established by the Architect, to which the Contractor must agree without exception prior to release of the electronic files. Refer to www.moseleyarchitects.com for the Architect’s current Request for Electronic (CAD) Files form, which defines the applicable terms and conditions.

§ 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~~ Amounts charged to the Contractor may, pursuant to Section 9.5.1, 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.

§ 3.1.4 During the performance of this Contract, the Contractor will include the provisions of the foregoing Sections 3.1.4.1 and 3.1.4.2 in every Subcontract or purchase order of over ten thousand dollars (\$10,000.), so that the provisions will be binding upon each Subcontractor or vendor; and furthermore, the Contractor agrees as follows:

- 1 The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this non-discrimination clause.
- 2 The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.
- 3 Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting requirements of this section.
- 4 The Contractor does not, and shall not during the performance of this Contract, knowingly employ an unauthorized alien as defined in the Federal Immigration Reform and Control Act of 1986.**
- 5 Contractor hereby represents it is organized as a stock or non-stock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership and is authorized to transact business in the jurisdiction where the Project is located as a domestic or foreign business entity if so required by Title 13.1 or Title 50 or as otherwise required by law.**

§ 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,~~ 2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the

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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. 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.

§ 3.2.4 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.

§ 3.2.5 The Owner shall deduct from the Contract Sum amounts paid to the Architect for the Architect to evaluate and respond to the Contractor's requests for information, where such information was available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior correspondence or documentation.

§ 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, appropriate,~~ 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,~~ alternative in writing, 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~~ found to be acceptable 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

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substitutions only with the consent of the Owner, after ~~evaluation~~ review by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 After the Contract has been executed, the Owner and the Architect will consider a formal request for substitution in lieu of those required by the Contract Documents only under and in addition to, the conditions set forth in the Contract Documents. By making requests for substitutions, the Contractor:

- .1 represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to requirements of the Contract Documents;
- .2 represents that the Contractor will provide the same warranty for the substitution that the Contractor is required to provide under the Contract Documents;
- .3 certifies that the cost data presented is complete and includes all related costs under this Contract including the Architect's redesign costs, and waives all claims for additional costs and time related to the substitution which subsequently become apparent; and
- .4 will coordinate and perform the installation of the accepted substitute, making such changes to the Work as may be required for the Work to be complete in all respects.

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

§ 3.4.4 The Owner shall deduct from the Contract Sum amounts paid to the Architect for the Architect to review the Contractor's proposed substitutions, to make agreed-upon changes in the Instruments of Service, including the Contract Documents, and to provide additional construction phase services made necessary by the Owner's acceptance of such substitutions.

§ 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.

§ 3.6.1 The 179D tax deduction incentivizes building owners and designers for designing energy-efficient building systems, including lighting, HVAC, and building envelope components. Since government entities do not pay taxes, this deduction is not available to the Owner. Current tax code allows for this deduction to be allocated to the Architect by the Owner on eligible projects to help incentivize energy-efficient building design.

§ 3.6.2 The Contractor recognizes that the Architect is the only entity eligible to pursue such allocations in accordance with 26 U.S. Code §179D, which reads in part, "The allocation of the deduction [is] to the person primarily responsible for designing the property in lieu of the owner of such property." The Contractor further acknowledges the Architect as the primary designer of the project for the purposes of 179D and agrees not to pursue the deduction or to request any portion thereof from the Architect or Owner.

§ 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.

§ 3.7.1.1 Unless otherwise provided in the Contract Documents, the Contractor is responsible for obtaining utilities for the Project and providing the Work relating to Project utilities as indicated. Responsibility for payment of fees associated with providing utilities to the Project shall be as follows:

- 1 Any fees assessed by entities for providing permanent utilities to the Project shall be paid directly to the utility entities by Owner. These include “tap fees” and “electrical connection and service fee.” Contractor shall coordinate the permanent utilities and the entity’s related work to comply with the construction schedule.
- 2 Any fees assessed by entities for providing temporary utilities to the Project for use by Contractor during construction of the Project shall be paid by the Contractor. The Contractor’s payment of fees for temporary utilities shall be included in the Base Bid and Contract Sum and will not be reimbursed by the Owner.

§ 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~~ review 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~~ determine that an equitable adjustment should be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect’s determination ~~or recommendation~~, that party may submit a Claim as provided in Article 15.

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness. The Contractor shall identify the date for Owner's selection on the critical path of the Contractor's Construction Schedule and provide the Owner a minimum of two weeks notice before this date.

§ 3.9 Superintendent and Project Manager

§ 3.9.1 The Contractor shall employ a competent superintendent and project manager and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent and project manager shall represent the Contractor, and communications given to the superintendent or project manager 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-Owner may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or project manager or (2) requires additional time for review. Failure of the Architect-Owner 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 or project manager to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent or project manager without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.9.4 The Superintendent employed by the Contractor shall have a minimum of five (5) years commercial experience as the primary Superintendent on projects of similar size and complexity as the Work. The superintendent shall speak fluent English and clearly understand the English language. The Contractor shall submit to the Owner a resume and other supporting documentation showing that the proposed Superintendent is competent and has the minimum work experience required to execute the Work. The Owner reserves the right to request additional supporting documentation regarding the proposed Superintendent's qualifications and to require the Contractor to propose an alternate Superintendent who better meets the requirements contained in this Article, as may reasonably be determined by the Owner. The Contractor shall notify the Architect and Owner in writing of any proposed replacement of the Superintendent. The Contractor shall not replace a competent Superintendent without prior written approval from the Owner. The requirements contained in this Article shall apply to any proposed replacement Superintendent, regardless if the proposed tenure is to be temporary or permanent.

§ 3.9.5 The Contractor shall employ a Project Manager to be assigned to the Work. The Project Manager employed by the Contractor shall have a minimum of five (5) years commercial experience as Project Manager on projects of similar size and complexity as the Work. The project manager shall speak fluent English and clearly understand the English language. The Contractor shall submit to the Owner a resume and other supporting documentation showing that the proposed Project Manager is competent and has the minimum work experience required to execute the Work. The Owner reserves the right to request additional supporting documentation regarding the proposed Project Manager's qualifications and to require the Contractor to propose an alternate Project Manager who better meets the requirements contained in this Article, as may reasonably be determined by the Owner. The Contractor shall notify the Architect and Owner in writing of any proposed replacement of the Project Manager. The Contractor shall not replace a competent Project Manager without prior written approval from the Owner. The requirements contained in this Article shall apply to any proposed replacement Project Manager, regardless if the proposed tenure is to be temporary or permanent. The Project Manager shall not act as the Superintendent or replacement for the Superintendent without written approval from the Owner.

§ 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~~ Unless otherwise required by the Contract Documents; the schedule shall contain details 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 Substantial Completion date and final completion date indicated in 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~~ in accordance with section 3.12. Unless otherwise required by the Contract Documents, 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~~ accepted 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,~~ 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.

§ 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~~ accepted by the Architect or, in the absence of an ~~approved~~ accepted 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

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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-accepted by the Architect.

§ 3.12.8 The Work shall be in accordance with approved-accepted 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-acceptance 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-acceptance to the specific deviation in accordance with 3.12.9 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-acceptance thereof.

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

§ 3.12.10 The Contractor shall not be required (delegated design) 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 such delegated 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-provide 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, licensed in the state where the Project is located, 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-provided 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.

§ 3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and one (1) resubmittal. The Architect's review of additional resubmittals will be made only with the consent of the Owner after notification by the Architect. The Owner shall to deduct from the Contract Sum amounts paid to the Architect for evaluation of such additional resubmittals.

§ 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.

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§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

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

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

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

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

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement. Such terms as 'Architect-Engineer,' 'Engineer,' and 'A-E,' if used in these Contract Documents, is

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intended to mean the Architect and its consultants unless otherwise intended by the context or usage of such terms. Such terms do not mean or include any design professional of the Contractor, Subcontractor, or Owner.

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

§ 4.1.3 Subject to the standard of care for applying professional judgment to information used or relied upon, Architect and its Consultants may use and rely upon design elements, technical standards, test results, and all other information ordinarily or customarily furnished or published by others, including, but not limited to, specialty contractors, manufacturers, fabricators, and suppliers.

§ 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 general compliance 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.~~

§ 4.2.2.1 The Contractor shall reimburse the Owner for compensation paid to the Architect for additional site visits made necessary by the fault, neglect or request of the Contractor.

§ 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 endeavor to~~ 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) known defects and deficiencies ~~observed in the Work~~. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

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

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

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

§ 4.2.7 The Architect will review and ~~approve, or take other~~ appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for general 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.~~ Contractor. 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-acceptance of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval-acceptance of a specific item shall not indicate approval-acceptance 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~~ review and make determinations regarding concealed and unknown conditions as provided in Section 3.7.4.

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

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

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall ~~notify~~ submit to the Owner and Architect ~~of the persons or entities proposed for each principal portion of the Work, Work (list of proposed subcontractors), including those who are to furnish materials or equipment fabricated to a special design.~~ design no later than two days prior to the date of the Pre-construction Conference. Include Contractor's License number and Class for each proposed Subcontractor. Within 14 days of receipt of the information, the ~~Architect~~ Owner 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~~ Owner 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 complete 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~~ shall similarly make available copies of the complete Contract Documents 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 Owner and 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 Owner and 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.

§ 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~~responsible between the Owner, Separate Contractors, and Contractor.

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~~7.1.1.1 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~~7.1.1.2 A Construction Change

~~§ 7.3.1~~Directive shall be used in the absence of total agreement on the terms of a Change Order. 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~~7.1.1.2.1 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~~7.2.

~~§ 7.1.1.2.2~~ 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.

~~§ 7.1.1.2.3~~ 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.

§ 7.1.1.2.4 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 opinion, 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.

§ 7.1.2 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.

§ 7.3.4-7.1.3 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 If a change in the Work results in an adjustment to the Contract Sum, the adjustment (increase or decrease) shall be based on the following, unless noted otherwise:

- .1 Material quantities and unit prices (separated into trades; include sales tax).
- .2 Labor costs (raw cost).
- .3 Labor burden, applied to labor only, including but not limited to, worker's compensation and public liability, social security tax, old age and unemployment insurance, union welfare fund and fringe benefits. Contractor shall be required to substantiate the labor burden percentage applied to any change in contract amount. Labor burden percentage shall not exceed 30% in any case.
- .4 Construction equipment cost.
- .5 Overhead and profit combined (on Claims for net increase only), as defined in Section 7.3.11.
- .6 Cost of Premiums for Bonds (for Contractor only). Evidence of additional premium for bond shall be submitted with Claim.
- .7 Extended Overhead Costs (if applicable) which shall be established by pro-rating the value of supervision, temporary facility, and General Conditions and all other direct and indirect costs of Contractor included in the Contract Sum over the number of days included in the Contract Time.

§ 7.2.1 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, forth, a reasonable amount. In such case, and also under Section ~~7.3.3.3, 7.1.1.2.1.3,~~ 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:~~ data which shall include, at the Architect's sole discretion, a cost breakdown itemized in accordance with the current appropriate Data Book and edition of R. S. Means Company, Inc., or other source of construction industry cost data acceptable to the Architect.

- .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; ~~Overhead shall include, but not be limited to, project management, field office personnel including supervision, superintendence, wages of timekeepers, watchmen and clerks, small tools, incidentals, general office expenses, insurance premiums, and all other expenses not included in "costs."~~
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed; ~~If the net value of the change results in a credit, the credit given shall be the net cost without overhead or profit (for Contractor, Subcontractor, or~~
- .3 ~~Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; Sub-subcontractor). The cost as used herein shall include all items of labor, materials, equipment,~~
- .4 ~~Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and and bonds.~~
- .5 ~~Costs of supervision and field office personnel directly attributable to the change.~~

~~§ 7.3.5-7.2.2~~ 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.

~~§ 7.3.8-7.2.3~~ 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.

~~§ 7.3.10-7.2.4~~ 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.

7.3. In Sections 7.2 and 7.2.1, the amount for overhead and profit combined, included in the total cost to the Owner, shall be based on the following schedule:

- .1 for the Contractor, for Work performed by the Contractor's own forces, 15 percent of the cost.
- .2 for the Contractor, for Work performed by the Contractor's Subcontractors, 5 percent of the amount due the Subcontractors.
- .3 for each Subcontractor involved, for Work performed by that Subcontractor's own forces, 15 percent of the cost.
- .4 for each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractor, 5 percent of the amount due the Sub-subcontractor.
- .5 cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.2.
- .6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs in the manner prescribed above. Where major cost items are changes to Subcontracts, they shall be itemized also. In no case will a change involving over \$500.00 be approved without such itemization.

§ 7.4 Minor Changes in the Work

~~The~~ In the Architect's opinion, 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.

§ 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~~ determine and the Owner approves.

§ 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~~-~~7.1.1.2.4~~, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

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

§ 9.3.1.3 Until final completion, the Owner will pay 95% of the amount due the Contractor on account of progress payments.

§ 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.

§ 9.3.2.1 Contractor shall provide invoices, package slips, or other form of supporting data for materials stored on-site claimed on the progress payment, unless it can be verified through on-site observations. Maintain concise bill of materials and label materials stored on-site for ready identification and verification.

§ 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, unless otherwise agreed upon, within seven working 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-general conformance 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 general 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~~ is not 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

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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;
- .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.

§ 9.6.1.1 The Owner may withhold payments to the Contractor notwithstanding the Architect's certification if it is necessary, in the Owner's opinion, to do so to protect the Owner from loss due to any of the reasons set forth in Sections 9.5.1.1 through 9.5.1.7.

9.6.2 Payment of Subcontractors

§ 9.6.2.1 The Contractor shall pay each Subcontractor, no later than seven working 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.

9.6.2.2 Within seven (7) working days after receipt of amounts paid to the Contractor by the Owner for Work performed under this Agreement, the Contractor shall do one of the following:

- a. Pay each Subcontractor for the proportional share of the total payment received from the Owner attributable to the Work performed by the respective Subcontractor under This Agreement; or
- b. Notify the Owner and Architect, and Subcontractor, in writing, of the Contractor's intention to withhold all

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or part of the Subcontractor's payment with the reason for nonpayment.

9.6.2.3 The Contractor shall pay interest to each Subcontractor on all amounts owed by the Contractor that remain unpaid after seven (7) days following receipt by the Contractor of payment from the Owner for Work performed by the affected Subcontractor under this Agreement, except for amounts withheld as allowed in Section 9.6.8.1. Unless otherwise provided under the terms of this Agreement, for purposes solely of these prompt payment provisions, interest shall accrue at the rate of one percent (1%) per month.

9.6.2.4 In each Subcontract, the Contractor shall include a provision requiring each Subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier Subcontractor (Sub-Subcontractor).

9.6.2.5 The Contractor's obligation to pay interest to a Subcontractor pursuant to the prompt payment provisions is not an obligation of the Owner, and no modification shall be made to this Agreement and no cost reimbursements claim shall be made for the purpose of providing reimbursement by Owner for such interest charge.

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

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

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

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

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

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

§ 9.7 Failure of Payment

~~If~~ if, unless otherwise agreed upon, the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven working days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven working 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 working 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 fully occupy or utilize the Work for its intended use or designated portion thereof, for its intended use with all of the Work's parts and systems operable as required by the Contract Documents. Only incidental cleaning, if required beyond cleaning needed for the Owner's full occupancy or utilization, may remain for final completion.

§ 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~~ corrected. 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~~ Architect 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.

9.8.3.1 The Architect will provide no more than one (1) inspection to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner shall deduct from the Contract Sum amounts paid to the Architect for any additional inspections.

§ 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~~ inspect review the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

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

§ 9.10 Final Completion and Final Payment

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

9.10.1.1 The Architect will provide no more than one (1) inspection to determine whether the Work or a designated portion thereof has attained final completion in accordance with the Contract Documents. The Owner shall deduct from the Contract Sum amounts paid to the Architect for any additional inspections.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect for the record (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.

9.11 LIQUIDATED DAMAGES

9.11.1 The Contractor, and the Contractor's surety shall be liable for and shall pay the Owner the sums stipulated on the Bid Form, if any, as liquidated damages for each calendar day of delay after the date established for Substantial Completion in the Contract Documents until the Work is substantially complete.

9.11.2 The Owner has established this amount as the proper measure of liquidated damages which the Owner will

sustain per day by the failure of the Contractor to substantially complete the Work at the stipulated time and it is not to be construed in any sense as a penalty.

9.11.3 In addition to Liquidated Damages, the Contractor shall pay to the Owner the cost of extended architectural and engineering (including Architect's on-site representative(s), if any, on-site) services rendered beginning at 61 coordinate with Owner/Architect Agreement days from the date of Substantial Completion required by the Contract, as adjusted if applicable, and continuously until final completion is achieved.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

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

§ 10.2 Safety of Persons and Property

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, 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 3.1.8.

§ 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.~~ Owner.

§ 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.

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§ 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 ~~may~~ obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor ~~and Architect~~ the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor ~~and the Architect~~ will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If ~~either the Contractor or Architect~~ has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor ~~and the Architect~~ have ~~has~~ 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~~ working days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

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

~~**§ 11.2.2 Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured –~~ **§ 11.2.2 Property Insurance.** The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum as well as subsequent Contract modifications thereto for the entire Work at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

~~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 Property insurance shall be on an "all-risk" or equivalent policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, collapse, earthquake, flood, windstorm, false work, testing and startup, temporary buildings, and debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's services and expenses required as a result of such insured loss. Coverage for other perils shall not be required unless otherwise provided in the Contract Documents.**

§ 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

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~~cancellation or expiration. Unless the lapse in coverage arises from an act or omission~~ **11.2.4** If the property insurance requires minimum deductibles and such deductibles are identified in the Contract Documents, the Contractor shall pay costs not covered because of such deductibles.

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

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

§ 11.3 Waivers of Subrogation

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

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

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

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

§ 11.5 Adjustment and Settlement of Insured Loss

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

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from

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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~~ review 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~~ review 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~~ expense without change to the contract time.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or Owner 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~~ expense without change to the contract time.

§ 12.2.2 After Substantial Completion

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

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

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

12.2.2.4 If required by the Owner and the Architect and, upon request by the Owner and prior to the expiration of one year from the date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance and the Work.

§ 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.~~ located.

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

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

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

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's ~~expense~~expense without change to contract time.

§ 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~~submitted 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~~in a timely manner 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 working days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

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

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§ 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~~; 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~~ determination 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~~ determined by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

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

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

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

§ 14.4 Termination by the Owner for Convenience

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

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

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

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

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

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

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

~~§ 15.1.3.2~~ ~~Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.~~ 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 Sum, Contract Time, or both 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, ~~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. Time extensions from adverse weather conditions shall not entitle the Contractor to "extended overhead" recovery.

§ 15.1.6.2.1 Weather data utilized to support claims for adverse weather conditions shall be that obtained from the National Oceanic and Atmospheric Administration (NOAA) for the nearest weather station to the Project. Adverse weather conditions are defined as measurable precipitation (MP) of 0.1 " or more, or 1.0" or more of snow or ice pellets, or freezing temperature (FT) for a day (24 hours) when the temperature remains at 32 degrees Fahrenheit or below. Only measurable precipitation (MP) or freezing temperature (FT) shall be permitted to be claimed for any one calendar day. Time extensions for adverse weather conditions shall be cumulative over the duration of the Project time and claims shall not be permitted for days for drying out of rain-soaked soil, snow accumulation, or similar weather-related conditions or resulting Project conditions.

.1 The Contractor agrees that it shall not be entitled to a time extension for normal inclement weather (weather conditions other than "adverse weather conditions") which could have been expected at the Project locale due to precipitation or temperature, based upon actual data from the National Oceanic and Atmospheric Administration (NOAA) for the locality closest to the Project for a five-year period preceding the date of the Contract. The Contractor acknowledges and warrants that in making its proposal or bid and Construction Schedule for the Work, it gave due care and consideration to this expected number of calendar days of inclement weather for the locale of the Project and allowed for the impact of normal inclement weather on subsequent Work. During the time of performance, should the expected number of calendar days of normal inclement weather for the locale of the Project be less than originally anticipated by the Contractor and the Owner, at the time of contracting, those days not so affected by normal inclement weather shall be considered float time in the Construction Schedule.

.2 The Contractor agrees that the measure of adverse weather conditions due to MP or FT during the period covered by this Contract shall be the number of days where adverse weather conditions comply with the weather data referenced in subparagraph 15.1.6.2.1.

.3 Extensions of time will be made only for days in which abnormal adverse weather criteria cited in subparagraph 15.1.6.2.1 occur.

.4 If the total calendar days lost due to adverse weather conditions, from the start of the Work at the Project by the Contractor until the principal portions of the Work are enclosed, exceeds the total number of days to be expected to be lost for the same time period, a time extension, if granted, shall only be for the number of calendar days needed to equal the excess number of calendar days lost to such adverse weather conditions.

§ 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 working days after the Claim has been referred to the Initial Decision Maker, subject to Section 15.2.6 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~~ 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 working 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 working 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.~~ Either party may, within 30 working days from the date of receipt of an initial decision, or if no decision has been rendered in accordance with Section 15.2.1, 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 working days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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

§ 15.3 Mediation

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

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 working days from the date of filing, unless stayed for a longer period by agreement of

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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 order.

§ 15.3.3 Either party may, within 30 working days from the date that mediation has been concluded without resolution of the dispute or 60 working 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 working days after written receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

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

§ 15.4 Arbitration

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

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

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

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

§ 15.4.4 Consolidation or Joinder

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

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

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

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with this certification 12:58:01 ET on 06/07/2022 under Order No. 2114276300 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ - 2017, General Conditions of the Contract for Construction, as published by the AIA in its software, other than changes shown in the attached final document by underscoring added text and striking over deleted text.

(Signed)

(Title)

(Dated)

APPENDIX A

GEO TECHNICAL REPORT

GEOTECHNICAL REPORT

PROJECT

Band and Choral Room
Colonial Heights High School
Colonial Heights, Virginia

CLIENT

HG Design Studio
5701 Grove Avenue
Richmond, VA 23226

SUBMITTED BY

GeoTex Engineering, PLC
701 Coralview Terrace
Midlothian, Virginia 23114

DATE

April 4, 2022

GEOTECHNICAL ENGINEERING STUDY

**Band and Choral Room
Colonial Heights High School
Colonial Heights, Virginia**

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APPENDIX

Figure 1:	Boring Location Plan
Figures 2 - 4:	Logs of Borings
Figure 5:	Reference Notes for Boring Logs
Table 1:	Laboratory Test Results

April 4, 2022
 GTE Job No. 22-052

Ms. Charlene Harper, P.E.
 HG Design Studio
 5701 Grove Avenue
 Richmond, VA 23226

Reference: Geotechnical Engineering Study
 Band and Choral Room - Colonial Heights High School
 Colonial Heights, Virginia

Dear Charlene:

GeoTex Engineering, PLC (GTE) has completed a geotechnical engineering study for the above referenced school addition, to be constructed on the front of the school building located at 3600 Conduit Road in Colonial Heights, Virginia. The findings of our field exploration and laboratory analyses are presented in this report, along with our recommendations for design and construction of a shallow footing foundation to support the structure.

Principal Findings and Footing Design Summary

Presented below are the principal findings and conclusions for use in foundation design as obtained from our geotechnical study at the subject property:

- 1) The addition area is best described as an open, relatively flat, landscape grass covered tract with isolated concrete sidewalks/monument and buried utilities.
- 2) The stratigraphy consists of surficial grading/utility fill deposits overlying strong, native, alluvial, sandy to very sandy, silty clays (CH/CL) and slightly silty sands (SM). The dominant alluvial clays are plastic and possess **moderate shrink-swell potential** when subjected to fluctuating moisture conditions based on soil mineralogy, sand contents, and depth below ground.
- 3) The structure may be supported on continuous wall and widened pad footings proportioned using the following **minimum** design parameters:

Footing Embedment Depth:	48"
Footing Width:	24" (continuous walls) 36" (column widened pads)
Footing Concrete Thickness:	30" (exterior wall/pad footings) 12" (interior wall/pad footings)
Footing Reinforcing Steel:	Two No. 4 longitudinal bars
Allowable Bearing Capacity:	3,000 psf

Purposes and Scope of Work

The purposes of our engineering study were to assess subsurface conditions at the site and develop geotechnical recommendations for design and construction of a building foundation for the improvement proposed. Our work was performed in the following phases:

- Field Exploration Program
- Laboratory Soil Testing
- Engineering Evaluation/Analyses

The results of our study, as well as our recommendations for foundation design and construction, are included in subsequent sections of this report.

Limitations

The analyses and recommendations presented in this report are based on our site observations and the data obtained from three (3) test borings drilled at this site. This report may not reflect the exact variations of soil conditions across this site; this is particularly true of this parcel, where original grades have been altered slightly by past fill grading activities and buried utilities and associated trench backfills are known to traverse the building footprint. The nature and extent of variations across the site may not become evident until construction commences. If variations then appear evident, it may be necessary to reevaluate our recommendations after performing on-site observations and tests to establish the engineering significance of the variations.

The scope of our geotechnical engineering study does not include an environmental assessment of the air, soil or water conditions either on or adjacent to this site. No environmental opinions were prepared for or presented in this report.

Project Description

Improvements proposed include an approximate 6,500 sq ft, single-story (high eave) addition to the high school building. Slab-on-grade construction is anticipated for the structure, with interior/exterior, concrete masonry unit (CMU) walls and isolated steel columns bearing on shallow conventional continuous wall and integral widened pad column footings. Light to moderate structural loads are anticipated for the addition, with column, wall, and floor loads not expected to exceed 30 kips, 3.5 kips per linear foot, and 150 pounds per sq ft, respectively.

Existing Site Conditions

The addition will abut the front right side of the existing school building. The topography within the building footprint is relatively flat with a majority of the ground surface covered with landscape grass. Exceptions include concrete flatwork (sidewalks) servicing the school campus and the small memorial monument located centrally within the building footprint.

Based on the existing topography, site drainage is visually estimated to be fair. Minor stripping and grading activities (1½ to 2 feet in depth/thickness) are anticipated to remove the surficial vegetation/topsoils and possible weak grading fills and achieve finished grade within the addition footprint (finished floor for the addition is expected to coincide with finished floor within the abutting school building). Exceptions include the undercutting anticipated to remove weak trench backfills associated with buried utilities traversing the building footprint.

Field Exploration Program

The geotechnical exploration consisted of drilling a total of three test borings within the building envelope. As shown on the Boring Location Plan (Figure 1) in the Appendix, two of the borings were drilled on the outer corners of the building envelope, with the remaining boring drilled near the center of the addition footprint.

The number and depth of the borings included in this study were selected by GTE based on the dimensions of the building, the presumed finished floor elevation of the building, and the existing topography. The borings were located in the field using tape and right-angle measurements from existing site features (building sides and corners, sidewalks, utilities, etc.). Drilling and sampling activities were performed by Ayers & Ayers, Inc. of Powhatan, Virginia under the supervision of GTE personnel.

The borings were drilled to depths varying from 15.5 to 20 feet below existing grades. Soil samples were obtained in the borings using Standard Penetration Test (SPT) procedures (ASTM D 1587) at approximate 2-ft intervals to a depth of 10 feet, and at 5-ft intervals thereafter.

All SPT soil samples were sealed in plastic bags and returned to the laboratory for classification testing. Logs of stratigraphic conditions encountered in the individual borings are presented on Figures 2 through 4 in the Appendix, with terms and symbols used on the boring logs defined on Figure 5.

Water levels in the hollow stem augers and open boreholes were measured upon completion of drilling, at which time the boreholes were backfilled with the soil auger cuttings for safety purposes. Water levels recorded in the hollow-stem augers and open boreholes at the time of our field exploration are presented on the respective boring logs.

Laboratory Soil Testing Program

All soil samples were visually classified by a staff geotechnical engineer. Soil tests performed in our laboratory on recovered SPT soil samples consist of classification tests, i.e., moisture contents and select Atterberg Limits (plasticity) and minus 200 sieve (percent fines) analyses. The results of the laboratory classification tests are presented on Table 1 in the Appendix.

Subsurface Conditions

A brief description of stratigraphic and groundwater conditions is presented in the following paragraphs. The boring logs provided in the Appendix should be consulted for specific information concerning soil and groundwater conditions beneath this site.

Stratigraphy. Apparent fill soils were penetrated initially in two of the three test borings. The fills, extending to depths of about 1 to 5 feet in the borings, are believed to be associated with past site grading activities for the campus (Boring B-2) as well as excavation backfilling activities for utilities known to traverse the building footprint (Boring B-3).

The fill soils consist of surficial, sandy silt topsoils overlying indigenous, plastic, sandy silty clays. Moisture contents measured in the fill soils at the time of our field exploration were highly variable, ranging between 13 and 29 percent, with moisture contents generally increasing with depth in the deeper fill deposits. SPT resistance values recorded in the fills varied from 3 to 11 blows, indicating soft to stiff clay consistencies. These resistance values suggest the presumed grading fills received some compactive effort during placement (desiccation may have contributed somewhat to the higher resistance value), while the presumed utility backfills received little to no compactive effort during placement.

The underlying native stratigraphy penetrated in the test borings consists of alluvial soils comprised of surficial, very sandy clays overlying sandy to very sandy, silty clays extending to depths of approximately 18 feet in Borings B-1 and B-2, and to the 15½ feet termination depth of Boring B-3. The native, alluvial clays are underlain by slightly silty, fine sands, with sandy, very silty clays encountered near the 20-foot termination depth of Boring B-1.

The clays dominating the soil profiles explored were visually assessed to be plastic, with two specimens tested exhibiting liquid limits of 55 and 59, plasticity indices of 32 and 36, and sand contents of 21 and 27 percent. Natural moisture contents measured in the native clays at the time of our field exploration varied from 18 to 31 percent, with the lower values measured in the very sandy, silty clays encountered below depths of about 7 to 13 feet in the test borings. In general, natural moisture contents were

slightly above the plastic limits measured for the more plastic clays, indicating “moist” conditions with regard to potential soil activity (i.e., shrink-swell potential).

Designated as CH and CL soils under the Unified Soil Classification System (USCS), the native, alluvial clays are recognized to possess moderate shrink-swell potential under fluctuating moisture conditions based on soil mineralogy, sand contents, and depth below ground.

The comments above regarding the potential activity of the native, alluvial clays dominating the shallow stratigraphy underlying this site are further substantiated by a review of the National Cooperative Soil Survey, produced/operated by the Natural Resources Conservation Service of the United States Department of Agriculture, which shows the lot to be situated in a region underlain by the Mattaponi-Urban land complex. The literature reveals the subsoils of this series consist of clay exhibiting a linear extensibility of 4.5. Linear extensibility is used to determine the shrink-swell potential of soils, with values less than 3 considered low shrink-swell potential soils and values between 3 and 6 considered moderate shrink-swell potential soils.

DCP resistance values recorded in the native, alluvial clays/sands varied from 10 to 32 blows, indicating stiff to hard clay consistencies and medium dense sand relative densities.

Ground Water. Ground water was not observed within the test borings either during or immediately upon completion of drilling. Given the existing topography and stratigraphies encountered in the test borings, we would anticipate the groundwater table is located greater than 20 feet below ground. However, shallow groundwater seepage is possible on a transient basis beneath this site, particularly at the contact between the near-surface fill deposits and underlying native, alluvial clays following periods of heavy or prolonged precipitation.

Foundation Design Recommendations

Design Considerations. The following factors are expected to influence foundation design and construction at this site:

- This parcel is characterized by its open, landscape grass-covered terrain, existing hardscape in the form of concrete sidewalks/monument and buried utilities, a stratigraphy consisting of near-surface, indigenous, grading fills/utility trench backfills overlying native, alluvial, plastic, sandy to very sandy, silty clays (CH/CL), and a relatively deep groundwater table.

- The native soils underlying this site possess sufficient strength in their current state to adequately support the building addition. The grading fills (minus the surficial topsoils) also appear to possess adequate strength for at-grade floor slab support. Conversely, the thicker utility trench backfills are very moist and weak

and will require removal from the building envelope (which may be accomplished inevitably if the existing utilities are not abandoned in place but instead relocated outside the building footprint).

- The native, alluvial clays are plastic and recognized to exhibit moderate shrink-swell potential under fluctuating moisture conditions based on soil mineralogy, sand contents, and depth below ground.
- Soil spoils generated during footing/utility excavation activities for the building addition are considered unsuitable for reuse as structural fill materials due to the plasticity and active nature of the clays.
- Ground water is not expected to significantly impact mass grading and footing/utility excavation activities for this project. Any groundwater seepage encountered in footing/utility excavations is expected to be transient and minor in quantity, and controllable using conventional sump and pump dewatering methods.
- Rock was not encountered within the vertical reaches of the test borings. Consequently, conventional soil excavating and moving equipment (dozers, frontend loaders, graders, backhoes and compactors) should suffice in completing mass earthwork and building foundation excavation activities anticipated for this project.

Foundation Types and Depths. The structure may be supported on a shallow foundation system consisting of conventional, continuous wall and widened pad column footings bearing in the strong, native, alluvial, sandy to very sandy, silty clays (CH and CL soils). The footing excavations shall extend below all existing grading fills/utility backfills deemed acceptable following proofrolling to remain within the building footprint for floor slab support.

Continuous wall and widened pad column footings should be founded in the strong, native clays at a minimum depth of 48 inches below perimeter finished grade. A minimum embedment depth of 48 inches is recommended to position the footing bottoms below the “active zone” for this region, defined as the depth below ground where soil moisture contents are influenced by changes in seasonal climatic conditions.

Slightly deeper footing embedment may be required on an intermittent basis to fully penetrate grading fills/utility trench backfills allowed to remain in place within the building footprint following successful proofrolling. Slightly deeper footing embedment (approaching 6 feet in depth) may also be required where new continuous wall footings intersect the existing school building given design footing and finished floor elevations shown on the historical building plans furnished.

Given their eventual permanent coverage, interior footing excavations may be stepped up to bear in the strong, native clays at a minimum depth of 12 inches below floor slab finished subgrade (i.e., the minimum concrete thickness recommended for interior footings) The footing excavation step-ups shall start a minimum distance of 5 feet inside the building perimeter. Interior footings must still penetrate all grading fills/utility backfills deemed suitable for slab support following subgrade proofrolling activities.

The above construction recommendation is heavily dependent upon moisture contents within the floor slab subgrade soils being maintained above the plastic limits measured for the native, moderately-active clays while exposed to the elements (i.e., prior to floor slab concrete placement). As discussed in a subsequent section of this report, such requirements will likely require periodic sprinkling of the subgrade soils during the construction phase. Placement of subslab stone early in the construction phase will aid in maintaining moisture contents within the subgrade soils. If these construction procedures are deemed impracticable/unacceptable, then interior footings shall match the embedment depth and concrete thickness recommended for exterior footings.

If footing bearing elevations are to be referenced to finished floor for the existing building, the elevation differential between finished floor and perimeter finished grade should be considered in designating footing bearing depths for exterior footings shown on the design drawings.

Allowable Bearing Capacity. Continuous wall and widened pad column footings bearing in natural, undisturbed soils at or deeper than the minimum depths specified may be designed for a net allowable bearing pressure of 3,000 pounds per square foot (psf). This bearing capacity is expected to provide a factor of safety in excess of 2 with respect to the design soil shear strength, provided the site is prepared in accordance with the recommendations presented in the **Earthwork Considerations** section of this report.

Foundations must be proportioned so that the maximum net contact pressure under the combined effects of dead, live and transient loads does not exceed the allowable bearing pressure. We recommend a minimum width of 24 inches for continuous wall footings. Integral widened pad column footings should have a least plan dimension of 36 inches to prevent localized shear bearing failure.

A minimum footing concrete thickness of 30 inches is recommended for exterior continuous wall and widened pad column footings. Thicker footing concrete is recommended for exterior footings to increase the distance along the sides of the footings that rain/landscape water ponding intermittently on the exterior footing projections would have to travel to begin impacting the moderately-active foundation soils. Where footing excavations are stepped up on the addition interior starting at a distance of 5 feet within the building perimeter, the footing concrete thickness may be reduced to a minimum of 12 inches (i.e., the footing embedment recommended below floor slab finished subgrade).

All footings should be reinforced sufficiently to prevent shear failure. We recommend continuous footing concrete be reinforced with a minimum two No. 4 longitudinal steel bars, with the bars spliced properly (minimum 24 inches) and extended continuously around right angles (i.e., corners/intersections) in the building foundation as well as beneath all stepped footing bulkheads (if any).

Total settlements of less than 1 inch are anticipated for footings proportioned using the previous design parameters, with differential settlements estimated to be ½ inch or less.

Seismic Design Considerations. With respect to seismic design considerations presented in the current edition of the International Building Code (IBC), we recommend parameters and criteria associated with Site Class D be used in seismic design of the structure.

Floor Slab. Based on the existing topography and presumed finished floor elevation (coinciding with the existing building floor system), the addition floor slab is expected to bear on a combination of the strong, native, alluvial clays, existing grading fills consisting of the indigenous clays deemed acceptable to remain in place following proofrolling, and new, imported structural fills placed to either achieve finished grade or replace weak backfills undercut from utility trenches traversing the addition footprint.

The floor slab can be designed assuming the supporting soils will provide a unit modulus of subgrade reaction of 150 pounds per square inch per inch deflection (pci), provided the site is prepared in accordance with the recommendations presented in the **Earthwork Considerations** section of this report.

To provide a stable working pad and reduce the chances of soil moisture migration into the concrete slab, we recommend the floor slab bear on a minimum 4-inch thick cushion of clean, coarse sand or crushed stone (e.g., VDOT No. 57 aggregate). A suitable vapor barrier (such as minimum 6-mil plastic sheeting) should be placed over the stone to provide additional resistance against moisture migration into the concrete slabs (seams should be taped or properly overlapped).

Perimeter insulation boards will be required beneath the floor slab where the slab abuts exterior walls of the addition. The insulation boards should be a minimum 2-inches thick (R-10) and extend vertically along the interior sides of the CMU foundation walls from the tops of the concrete footings, turning horizontally beneath the at-grade concrete floor slab for a minimum overall length of 24 inches.

We recommend the minimum 4-inch thick slab concrete be fibermesh reinforced or reinforced with welded wire mesh, with the concrete designed for a minimum 28-day compressive strength of 3,500 psi.

Drainage. Surface/roof runoff and other water must be diverted from the building area to reduce the chances of decreased bearing capacity and/or increased settlements resulting from water migration into the foundation soils. We suggest the building be equipped with roof drains, and that water collecting in the roof drains and associated downspouts be piped a sufficient distance away from the structure (preferably into existing stormwater features/utilities).

Exposed ground areas (i.e., ground areas not covered by concrete sidewalks) immediately surrounding the building perimeter should preferably be graded at a 5 percent or steeper slope to prevent surface runoff from ponding adjacent to the building and impacting the foundation bearing soils. Flatwork surrounding the structure should be sloped to promote runoff.

Foundation Inspection. We recommend the GTE Geotechnical Engineer be allowed to visit the site periodically during mass grading and foundation construction to ensure these activities are conducted in accordance with the recommendations presented in this report.

The GTE Geotechnical Engineer or his representative should visually assess and accept subgrade preparation following site stripping and proofrolling activities as well as monitor and validate structural fill material selection and placement/compaction (if any).

The GTE Geotechnical Engineer or his representative should visually and manually assess bearing conditions exposed in the footing excavations and ensure foundation excavation and construction is in accordance with the recommendations presented in this report as well as shown on the design drawings.

The inspection services described above are expected to be part of the scope of work for Special Inspections likely required by Colonial Heights for building construction.

Earthwork Considerations

Site Preparation. Initially, the ceremonial monument should be removed/relocated, and the existing flatwork (sidewalks) demolished and disposed properly off site. Next, the building footprint should be stripped of vegetation and topsoils, with the stripping activities extending at least 3 feet beyond the building footprint.

Following completion of site demolition/stripping activities, the subgrade soils exposed in the building area should be proofrolled with a fully-loaded, tandem-axle dump truck in the presence of the GTE Geotechnical Engineer to help identify/delineate weak areas. Weak, wet areas identified during subgrade proofrolling should be undercut to stable soils at the discretion of the GTE Geotechnical Engineer or his representative.

Subgrade undercutting, if required, is expected to be shallow in depth (likely 12 inches or less) over a majority of the building footprint. Exceptions include where buried utilities traverse the building footprint, where the findings of Boring B-3 suggest an undercut approaching 5 feet in depth may be required to remove weak backfills and possibly soft, native clays directly underlying the backfills.

Excavations resulting from undercutting activities should be backfilled with structural fill materials selected and placed in accordance with the recommendations presented in a subsequent section of this report.

As an alternative to undercutting, it may be possible to improve the support characteristics of existing weak, grading fill soils identified during proofrolling by in-place scarification/aeration and recompacting to a minimum of 95 percent of the ASTM D 698 (standard Proctor) maximum dry density. The success of this site improvement procedure is heavily dependent upon favorable weather conditions prevailing at the time of construction (i.e., success is more likely if earthwork activities take place during the drier summer months). This technique is not expected to apply to deep, weak utility trench backfills.

Due to the moderately-active nature of the native, alluvial clays, special construction practices must be conducted to avoid drying in the clays exposed at finished subgrade within the building footprint. Past experience has shown objectionable movements to occur in slab-on-grade concrete floors completed on subgrade soils consisting of potentially-active clays that have been allowed to dry during the construction phase, with the movements likely the result of capillary rise of lower soil moisture into the drier, active subslab soils.

We recommend the moisture content of the native, alluvial clays exposed at finished subgrade within the building footprint be maintained above the plastic limit of the clays until permanent coverage by the concrete floor slab. This objective will likely require periodic sprinkling of the clays, continuing the wetting processes after placement of the subslab stone cushion.

Structural Fill. Placement of structural fill materials (if any) may commence upon successful completion of site stripping, subgrade proofrolling, and any undercutting activities to remove weak soils identified within the building area.

We recommend the on-site excavated fills and native, alluvial clays not be used as structural fill materials on this project given their mineralogy, plasticity, and moderate shrink-swell potential under fluctuating moisture conditions.

With respect to imported materials, soils classified as GC and SC under the USCS are preferred as structural fills for the improvement proposed. Processed stone products such as VDOT No. 21A/21B aggregate or No. 10 screenings may also be considered for

use as structural fill materials on this project. Some CL and ML materials (such as sandy clays and sandy silts) may also be suitable for use as structural fill materials, provided the clays or silts possess a liquid limit less than 45, a plasticity index less than 20 and a sand content greater than 25 percent. Imported materials proposed for use as structural fill materials on this project should be submitted to GTE for visual assessment and final approval.

All structural fill materials should be placed in maximum 8-inch loose lifts and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D 698 (standard Proctor) compaction procedures. The moisture content of the structural fill materials should be established and maintained within plus or minus 2 percent of optimum moisture content until permanently covered. GTE representatives should be present at the site during structural fill placement activities to ensure the fill materials satisfy the selection and placement/compaction criteria presented in this report.

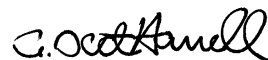
The above soil placement and compaction criteria also pertain to backfill materials for new utility trench excavations traversing the building footprint. Adequate shoring will be required for backfill testing in utility trench excavations with vertical or steeply sloping sidewalls exceeding 4 feet in depth.

* * *

GeoTex Engineering, PLC appreciates the opportunity to be of service to you on this project. We hope this provides you with the information needed. Please call if you have any questions concerning the findings or recommendations presented in this report, or if we may be of additional assistance during the construction and materials testing-quality control phase of the project.

Respectfully,

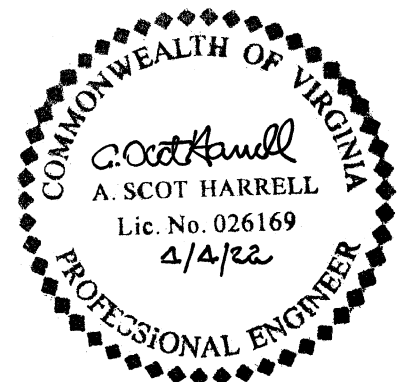
GEOTEX ENGINEERING, PLC



A. Scot Harrell, P.E.
Principal

Enclosures

Copies Submitted: HG Design Studio (2 via mail, 1 via email)



APPENDIX

Figure 1:	Boring Location Plan
Figures 2 - 4:	Logs of Borings
Figure 5:	Reference Notes for Boring Logs
Table 1:	Laboratory Test Results



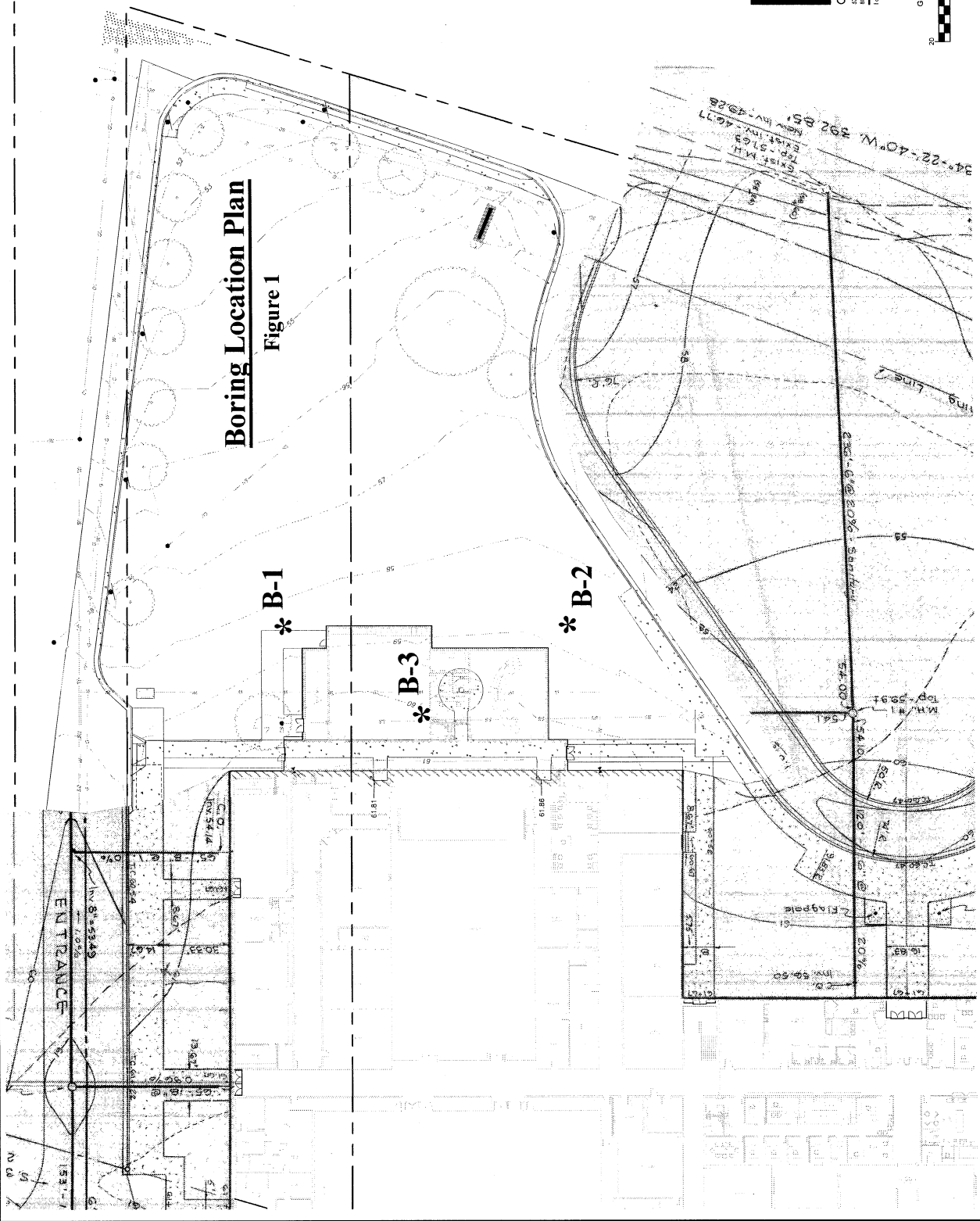
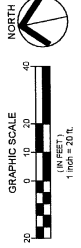
PRELIMINARY SITE PLAN

DESIGNED	DATE
DRAWN	REVISION
CHECKED	
SCALE	
PROJECT NO.	
DATE	



CITY OF COLONIAL HEIGHTS
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION
COLONIAL HEIGHTS HIGH SCHOOL ADDITION
EXISTING CONDITIONS

SHEET NO.
C1.00



OWNER Colonial Heights Public Schools				JOB # GTE 22-052	BORING # B-1	SHEET 1 OF 1		GTE			
PROJECT NAME CHHS Choral-Band Room Addition				ARCHITECT-ENGINEER Moseley Architects/HG Design Studio							
SITE LOCATION Colonial Heights, VA					ELEVATION (FEET)	CALIBRATED PENETROMETER ○ TONS/FT ²					
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	DESCRIPTION OF MATERIAL		FINES (%)	1	2	3	4	5
SURFACE ELEVATION:						WATER CONTENT ● (%)					
						PLASTIC LIMIT + - - - - + LIQUID LIMIT					
						STANDARD PENETRATION ⊗ (BLOWS/FT.)					
						10	20	30	40	50	
0	1	SS	18	TOPSOIL (Grayish-Brown Moist Organic Sandy Silts)	73	⊗		●			
	2	SS	18	Firm Pale Brown Moist Moderately Plastic Very Sandy CLAYS (CL) Firm Yellowish-Brown Moist Plastic Sandy Silty CLAYS (CH)			⊗		●		
4	3	SS	18	- stiff below 2 ft - gray/yellowish-brown mottled below 4 ft			⊗		●		
8	4	SS	18	Stiff Pale Gray/Reddish-Yellow Moist Plastic Very Sandy Silty CLAY (CL-CH)			⊗	●			
	5	SS	18	- gray/brown mottled below 9 ft - w/ intermittent pale brown very fine sand lenses below 14 ft			⊗		●		
12	6	SS	18					⊗	●		
16	7	SS	18	Medium Dense Pale Brown Moist Slightly Silty Fine SANDS (SM) Stiff Yellowish-Red Moist Over-Consolidated Plastic Sandy Very Silty CLAYS (CL) w/ some black mottling				●			
20							⊗				
24											
28											

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU THE TRANSITION MAY BE GRADUAL

WATER DEPTH IN BOREHOLE	BORING STARTED March 2, 2022	CAVE-IN DEPTH AT
AFTER DRILLING Dry FT.	BORING COMPLETED March 2, 2022	DRILLING METHOD Hollow Stem Auger
AFTER 0.1 HRS: Dry FT.	DRILLER Ayers & Ayers, Inc.	

Figure 2

OWNER Colonial Heights Public Schools				JOB # GTE 22-052	BORING # B-2	SHEET 1 OF 1		GTE					
PROJECT NAME CHHS Choral-Band Room Addition				ARCHITECT-ENGINEER Moseley Architects/HG Design Studio									
SITE LOCATION Colonial Heights, VA													
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	DESCRIPTION OF MATERIAL	FINES (%)	ELEVATION (FEET)	CALIBRATED PENETROMETER ○ TONS/FT ²						
							1	2	3	4	5		
							WATER CONTENT ● (%)						
							PLASTIC LIMIT + - - - - + LIQUID LIMIT						
SURFACE ELEVATION:							STANDARD PENETRATION ⊗ (BLOWS/FT.)						
							10	20	30	40	50		
0	1	SS	18	FILL: 0"-3": TOPSOIL (Grayish-Brown Moist Organic Sandy Silts)				⊗●					
	2	SS	18	3"-12": Grayish-Brown/Yellowish-Red Moist Plastic Sandy Silty CLAYS w/ trace fine gravels				⊗		●			
4	3	SS	18	NATURAL: Firm Pale Brown Moist Moderately Plastic Very Sandy CLAYS (CL) Stiff Yellowish-Brown Moist Plastic Sandy Silty CLAYS (CH)	79			⊗		●	- - - - -	- - - - -	
8	4	SS	18	- very stiff below 4 ft				⊗		●			
	5	SS	18	- gray/yellowish-brown mottled below 9 ft						●	⊗		
12													
	6	SS	18	Hard Brown/Gray/Yellow Moist Plastic Very Sandy Silty CLAYS (CL-CH)						●	⊗		
16													
	7	SS	18	Medium Dense Pale Brown Moist Slightly Silty Fine SANDS (SM) - w/ trace gray/yellow clayey sand lenses							⊗		
20													
24													
28													

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU THE TRANSITION MAY BE GRADUAL

WATER DEPTH IN BOREHOLE	BORING STARTED March 2, 2022	CAVE-IN DEPTH AT
AFTER DRILLING Dry FT.	BORING COMPLETED March 2, 2022	DRILLING METHOD Hollow Stem Auger
AFTER 0.1 HRS: Dry FT.	DRILLER Ayers & Ayers, Inc.	

Figure 3

OWNER Colonial Heights Public Schools				JOB # GTE 22-052	BORING # B-3	SHEET 1 OF 1		GTE			
PROJECT NAME CHHS Choral-Band Room Addition				ARCHITECT-ENGINEER Moseley Architects/HG Design Studio							
SITE LOCATION Colonial Heights, VA								CALIBRATED PENETROMETER ○ TONS/FT ²			
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE (IN)	DESCRIPTION OF MATERIAL	FINES (%)	ELEVATION (FEET)	1 2 3 4 5		WATER CONTENT ● (%)		
							PLASTIC LIMIT + - - - - + LIQUID LIMIT		STANDARD PENETRATION ⊗ (BLOWS/FT.)		10 20 30 40 50
0	1	SS	18	FILL: 0"-2": TOPSOIL (Grayish-Brown Moist Organic Sandy Silts) 2"-12": Brown/Gray Moist Plastic Sandy Silty CLAYS (CL) 12"-24": Gray/Yellow Moist Plastic Sandy Silty CLAYS (CL-CH) 24"-60": Combination Brown/Gray Moist Plastic Sandy Silty CLAYS (CL) and Gray/Yellowish-Red Moist Plastic Sandy Silty CLAYS (CL-CH) NATURAL: Firm to Stiff Yellowish-Brown/Gray Moist Plastic Sandy Silty CLAYS (CH) - very stiff, pale gray below 7 ft Very Stiff Gray/Yellowish-Red Moist Plastic Sandy to Very Sandy Silty CLAYS (CL-CH)					⊗	●	
	2	SS	18						⊗		●
4	3	SS	18						⊗		●
	4	SS	18								● ⊗
8	5	SS	18								●
	6	SS	18							⊗	●
12											
16											
20											
24											
28											
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU THE TRANSITION MAY BE GRADUAL											
WATER DEPTH IN BOREHOLE				BORING STARTED March 2, 2022			CAVE-IN DEPTH AT				
AFTER DRILLING Dry FT.				BORING COMPLETED March 2, 2022			DRILLING METHOD Hollow Stem Auger				
AFTER 0.1 HRS: Dry FT.				DRILLER Ayers & Ayers, Inc.							

Figure 4

REFERENCE NOTES FOR BORING LOGS

Drilling and Sampling Symbols		
SS - Split Spoon Sampler	DC - Dutch Cone Penetrometer	DCP - Dynamic Cone Penetrometer
ST - Shelby Tube Sampler	RB - Rock Bit Drilling	HS - Hollow Stem Auger
RC - Rock Core; NX, BX, AX	BS - Bulk Sample of Cuttings	WS - Wash Sample
PM - Pressuremeter	PA - Power Auger (no sample)	

Correlation of Typical Sampler Penetration Resistances to Soil Properties				
Relative Density – Sands, Silts		Consistency of Cohesive Soils		
SPT-N	Relative Density	Unconfined Compressive Strength, tsf	Consistency	SPT-N
0 – 4	Very Loose	Under 0.25	Very Soft	0 - 2
5 – 9	Loose	0.25 - 0.49	Soft	3 - 4
10 – 29	Medium Dense	0.50 - 0.99	Firm	5 - 8
30 – 49	Dense	1.00 - 1.99	Stiff	9 - 16
50 – 80	Very Dense	2.00 - 3.99	Very Stiff	17 - 32
		4.00 - 8.00	Hard	33+

SPT (in blows/ft) refers to the blows required of a 140-lb hammer, falling 30 inches on a 2-inch O.D. split-spoon sampler (as specified in ASTM D 1586) to drive the sampler the last 12 inches. The blow count is commonly referred to as the N value; denoted by ⊗ on the boring logs.

Unified Soil Classification Abbreviations		
GP - Poorly Graded Gravels	SW - Well Graded Sands	CL - Low Plasticity Clays
GW - Well Graded Gravels	SM - Silty Sands	CH - High Plasticity Clays
GM - Silty Gravels	SC - Clayey Sands	OL - Low Plasticity Organic Soils
GC - Clayey Gravels	ML - Low Plasticity Silts	OH - High Plasticity Organic Soils
SP - Poorly Graded Sands	MH - High Plasticity Silts	CL/ML - Dual Classification (Typical)

The recorded water levels are those water levels actually measured in the borehole at the times indicated. The measurements are relatively reliable when augering, without adding fluids, in a coarser granular soil. In clays and silts the accurate determination of water levels may require several days for the water level to stabilize. In such cases additional methods of measurement are generally needed.

Figure 5

TABLE 1 - LABORATORY TEST RESULTS
Band and Choral Room
Colonial Heights High School
Colonial Heights, Virginia
(GTE Job No. 22-052)

<i>Boring No.</i>	<i>Depth, ft</i>	<i>Moisture Content, %</i>	<i>% Passing No. 200 Sieve</i>	<i>Atterberg Limits</i>		
				<i>Liquid</i>	<i>Plastic</i>	<i>Plasticity Index</i>
B-1	1.0	22				
	3.0	26	73	59	23	36
	5.0	28				
	8.0	19				
	10.0	21				
	15.0	20				
	19.5	7				
B-2	1.0	13				
	3.0	31				
	5.0	26	79	55	23	32
	8.0	23				
	10.0	21				
	15.0	21				
	19.5	10				
B-3	1.0	23				
	3.0	27				
	5.0	29				
	8.0	23				
	10.0	18				
	15.0	22				

APPENDIX B

EXISTING HAZARDOUS MATERIAL INFORMATION

ASBESTOS SURVEY AND LEAD BASED PAINT SCREENING



COLONIAL HEIGHTS HIGH SCHOOL

3600 CONDUIT ROAD
COLONIAL HEIGHTS, VIRGINIA 23834

ECS PROJECT NO. 47:5541-C

FOR: MOSELEY ARCHITECTS

JUNE 3, 2022





June 3, 2022

Mr. Doug Westmoreland
Moseley Architects
3200 Norfolk Street
Richmond, Virginia 23230
dwestmoreland@moseleyarchitects.com

ECS Project No. 47:5541-C

Reference: Asbestos Survey and Lead Based Paint Screening, Colonial Heights High School, 3600 Conduit Road, Colonial Heights, Virginia

Dear Mr. Westmoreland:

ECS Mid-Atlantic, LLC (ECS) is pleased to provide Moseley Architects with the results of the above referenced Asbestos Survey and Lead Based Paint Screening performed at Colonial Heights High School located at 3600 Conduit Road in Colonial Heights, Virginia. This report summarizes our observations, analytical results, findings, and recommendations related to the work performed. The work described in this report was performed by ECS in general accordance with the Scope of Services described in ECS Proposal Number 47:22250-EP and the terms and conditions of the agreement authorizing those services.

ECS appreciates this opportunity to provide Moseley Architects with our services. If we can be of further assistance to you, please do not hesitate to contact us.

Sincerely,

ECS Mid-Atlantic, LLC

Robert Curran
Environmental Project Manger
rcurran@ecslimited.com
804-353-6333

Christopher J. Chapman, CIH
Director of Industrial Hygiene
cchapman@ecslimited.com
804-353-6333

EXECUTIVE SUMMARY

The subject property is improved with a school building located at 3600 Conduit Road in Colonial Heights, Virginia. The structure is currently occupied and is proposed for renovations to the main office, guidance office and associated administrative areas, teacher's work room, adjacent classrooms and the fine arts wing of the school. Reportedly the school was originally constructed in the 1960's. A general diagram of the renovation areas that was provided by the client is included in the appendices of this report.

The purpose of the survey was to determine if asbestos-containing materials (ACMs) and lead-based paints (LBPs), are present on the subject property. The survey was performed within interior and exterior areas of the subject building where renovations are scheduled for this project as well as the roof of the building in area where roof penetrations are anticipated.

Based on the laboratory analysis of the bulk samples collected during the survey, the following materials were reported to contain asbestos:

- CMU block wall filler paint (trace <1% asbestos)
- Mudded roof drain fittings
- Various sizes of mudded pipe elbows (various mechanical systems including domestic water and HVAC)
- Pipe hanger saddles
- Door frame caulk at CMU block walls
- Sink acoustical undercoating
- Cementitious peg board
- Lab style counter top

The lead-based paint survey was performed by a Commonwealth of Virginia licensed Lead Risk Assessor. Painted and/or glazed surfaces were assessed for lead content using a Direct-Read X-Ray Fluorescence (XRF) Spectrometer. Detectable levels of lead were detected in many of the painted surfaces tested in the project area, however lead based paint or glaze was not detected on the painted surfaces tested.

The executive summary is an integral portion of this report, however, ECS recommends the report be read in its entirety.

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3.2	Lead in Paint and Surface Coatings	2
4.0	RESULTS	2
4.1	Asbestos-Containing Materials	2
4.2	Suspect or Assumed Asbestos-Containing Materials	4
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TABLE OF APPENDICES

Appendix I: Renovation Area Diagram

Appendix II: Site Photographs

Appendix III: Asbestos Bulk Sample Results

Appendix IV: XRF Lead-Based Paint Readings

Appendix V: Certifications/Licenses

1.0 SITE DESCRIPTION

The subject property is improved with a school building located at 3600 Conduit Road in Colonial Heights, Virginia. The structure is currently occupied and is proposed for renovations to the main office, guidance office and associated administrative areas, adjacent classrooms and the fine arts wing of the school. Reportedly the school was originally constructed in the 1960's.

2.0 PURPOSE

The purpose of the Asbestos Survey and Lead Based Paint Screening was to identify asbestos-containing materials (ACMs), and lead-based paints (LBPs) which may require special handling and/or disposal if removed during construction activities. The identification of ACMs may require trained labor, regulated work practices, and special disposal. The identification of LBP or other lead hazards may require disclosure to contractors and monitoring of lead exposure.

3.0 METHODOLOGY

ECS performed the authorized Scope of Services in general accordance with our proposal, standard industry practice(s) and methods specified by regulation(s) for the identification of ACMs and LBPs.

3.1 Asbestos-Containing Materials

The non-invasive/non-destructive asbestos survey was performed by an asbestos inspector who has received EPA accredited training and is licensed by the Commonwealth of Virginia. Samples of suspect ACMs were collected utilizing hand tools and placed into individual, labeled plastic bags. Unique bulk suspect ACM samples were submitted to Environmental Hazards Services in Richmond, Virginia for analysis via Polarized Light Microscopy (PLM) in accordance with current EPA-600 methodology. Materials consisting of additional layers were analyzed separately. Environmental Hazards Services is listed as an accredited laboratory by the National Voluntary Laboratory Accreditation Plan (NVLAP) managed by the National Institute of Standards and Technology (NIST) for bulk sample analysis by currently approved EPA methodology by PLM.

During the survey, ECS attempted to identify suspect ACMs in readily accessible areas. However, due to the destructive means required to identify some materials, certain areas were deemed inaccessible (i.e. behind walls or sub grade materials) and were not surveyed for suspect ACMs. ECS was unable to access the storage and data closets in Classroom 4. Unidentified suspect ACMs may be located in these and/or other inaccessible areas. The scope of the survey was limited to the administrative areas, fine arts wing areas and classrooms that are anticipated to be impacted as part of this renovation.

Samples were collected in general accordance with EPA Standard 40 CFR 763 Subpart E, Asbestos Hazard Emergency Response Act (AHERA) and OSHA Standard 29 CFR 1926.1101 Inspection Protocol. Multiple samples of each unique material were submitted. Samples were analyzed using "Positive Stop" methodology. If one sample of a homogeneous material is reported to contain asbestos, the remaining samples of that material are not analyzed. EPA regulations stipulate that if one sample contains asbestos the entire quantity of that material contains asbestos, regardless of additional analysis.

3.2 Lead in Paint and Surface Coatings

The Lead-Based Paint (LBP) survey was performed by a Virginia licensed Lead Risk Assessor using a X-Ray Fluorescence (XRF) Spectrometer to identify lead concentrations in painted and glazed surfaces.

The survey was conducted utilizing the U.S. EPA definition of LBP. Under this definition, painted surfaces which contain lead in concentrations equal to or greater than 1.0 milligrams per square centimeter ($\geq 1.0 \text{ mg/cm}^2$) are classified as coated with LBP. Paints with concentrations of lead detectable by the XRF are considered lead-containing paints. Additionally, fixtures or components that are manufactured with a factory applied glazing (i.e., sinks, toilets, ceramic tiles, etc.) are tested as these factory-applied finishes often contain lead. Activities which disturb lead-containing paints and glazing (while not lead-based paints by the U.S. EPA definition) are regulated by OSHA (29 CFR 1926.62).

Because the current or proposed use of the property is not residential or child-occupied, the scope of the LBP survey was not conducted in accordance with HUD Chapter 7 requirements. This representative survey included taking readings from walls, windows, doors, and miscellaneous components. Walls are listed by letter with wall "A" being the entrance of the subject building, proceeding clockwise to "B, C, D", etc.

4.0 RESULTS

The following is a summary of laboratory results, findings and observations.

4.1 Asbestos-Containing Materials

In total, 73 bulk samples from 32 homogeneous areas were submitted to the laboratory of which 97 layers were analyzed.

An Asbestos-Containing Material (ACM) is defined as any material containing more than one percent (>1%) asbestos as determined using the method specified in Appendix E, Subpart E, 40 CFR Part 763, Section 1, PLM. Materials are categorized by the U.S. EPA in the following categories:

- Friable ACMs are defined as any ACM that, when dry, can be crumbled, pulverized or reduced to powder by hand pressure. Non-friable ACMs are defined as any ACM that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.
- Category I non-friable ACM are listed as following: packings, gaskets, resilient floor coverings, and asphalt roofing products containing more than one percent (>1%) asbestos.
- Category II non-friable ACM are listed as any material, excluding Category I non-friable ACM, containing more than one percent (>1%) asbestos.

Regulated Asbestos Containing Materials (RACM) are friable ACM or non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, been pulverized, or reduced to powder in the course of renovation and/or demolition operations.

Environmental Hazards Services submitted signed final laboratory reports to ECS on May 16 and May 25, 2022. Materials identified as asbestos containing are summarized below. A complete list of the sampled materials submitted for analysis and sample locations are located in the Appendix

of this report. Additional details regarding the overall locations of the materials identified as asbestos-containing are provided further in the report. Photographs of collected samples reported as asbestos-containing are also located in the Appendix of this report.

Summary of Asbestos-Containing Materials Identified

Location	Material Description	Analytical Result	Category
Throughout Building	CMU Block Wall Filler Paint	Trace <1% Chrysotile	NA
Sporadic Throughout Building	Roof Drain Mudded Fitting	10% Chrysotile	Friable
At all pipe run hangers	Pipe Hanger Saddle	15% Chrysotile	Friable
All frames at CMU walls	Door Frame Caulk	1.25% - 1.75% Chrysotile	Category II Non-Friable
All sheet metal sinks	Acoustical Undercoating	3% Chrysotile	Category II Non-Friable
Throughout School	~2" Diameter Mudded Pipe Elbows	12% Chrysotile	Friable
Throughout School	~8" Diameter Mudded Pipe Elbow	18% Chrysotile	Friable
Throughout School	Mudded Elbows	25% Chrysotile	Friable
Throughout Chorus and Band Rooms	Cementitious Peg Board	20% Chrysotile	Category II Non-Friable
Room 58	Lab Counter Top	20% Chrysotile	Category II Non-Friable
Throughout Cafeteria	CMU Block Wall Filler Paint	Trace <1% Chrysotile	NA

All materials in the buildings similar to the materials identified in the table above should be assumed to contain asbestos unless proven otherwise by testing. ECS recommends that all asbestos containing materials be removed by a Commonwealth of Virginia licensed asbestos abatement contractor prior to any planned remediation or renovation activities.

This survey was focused on building materials expected to be impacted as part of current renovation project planned for the building as previously discussed.

Several different types of asbestos containing thermal system insulation in the form of mudded pipe elbows, roof drain fittings and pipe hanger saddles were identified in several areas of the project area. ECS recommends that all mudded pipe elbows and pipe saddles in the school be assumed

to be asbestos containing and any replacement or disturbance of these materials be performed by a Virginia licensed Asbestos abatement contractor per applicable OSHA and USEPA regulations concerning asbestos abatement.

Asbestos was also detected in samples collected of the sink acoustical undercoating, cementitious peg board in the band and chorus rooms, and the door frame caulking on the CMU block walls. These materials are non-friable and can be managed within the schools O&M plan. These materials will need to be abated by a Virginia Licensed asbestos abatement contractor if disturbed by planned renovations.

The asbestos containing materials identified during these sampling events should be properly incorporated with the schools Operations and Maintenance (O&M) plan. If an O&M plan has not been prepared for the school then ECS recommends the preparation of an O&M plan for the school by a Virginia licensed Asbestos Management Planner in accordance with US EPA AHERA requirements. The complete list of materials found to contain asbestos is listed in the table above.

A trace amount of asbestos ($\leq 1\%$) was detected in the bulk sample(s) of CMU block wall filler paint analyzed by the laboratory. ECS recommends that the CMU block wall filler paint be assumed to contain trace $<1\%$ asbestos throughout the school. Although materials that contain trace amounts of asbestos are not subject to U.S. EPA or Virginia regulations for the handling and disposal of asbestos, OSHA still regulates any work which will disturb materials identified with trace amounts of asbestos (reference the November 24, 2003 OSHA Interpretation document - Compliance Requirements For Renovation Work Involving Materials Containing Less Than 1% Asbestos). Therefore, any Contractors disturbing these materials will need to comply with components of 29 CFR 1926.1101, as detailed in the 2003 OSHA Interpretation document.

4.2 Suspect or Assumed Asbestos-Containing Materials

Due to the inaccessibility or the destructive means that asbestos sampling requires, additional suspect ACMs may remain within the building hidden behind inaccessible areas that include, but are not limited to, sub-grade walls, structural members, topping slabs, sub-grade sealants, flooring located below underlayments, areas behind exterior walls, pipe trenches, and subsurface utilities, etc. These areas were deemed inaccessible and were not assessed.

If these materials are discovered during construction activities, they should be presumed to contain asbestos and be treated as ACMs or be sampled immediately upon discovery and prior to disturbance for asbestos content by a certified asbestos inspector in accordance with 29 CFR 1926.1101.

Based upon our past experience in the identification of ACMs in similarly constructed buildings, the following additional suspect ACMs may also be located in inaccessible areas of the structure:

- Vermiculite insulation (CMU block wall cells)
- Waterproofing/vapor barrier (beneath slab and perimeter wall)
- Fan coil insulation/mastic (classrooms throughout) and in water fountains
- Window stool mastic
- Ceramic floor and wall tile mastic/thinset (classrooms and bathrooms)
- Plaster ceilings (bathrooms)

- Lab countertop adhesive (Room 58)
- Blackboard/bulletin board mastic
- Light heat shields
- Metal locker mastic

4.3 Lead in Paint and Surface Coatings

Paint and surface coatings which contain detectable concentrations of lead are considered "lead-containing paints". Since OSHA has no specific action level for lead in paint, all paint and glazed materials on the site found to have a measurable concentration of lead should be assumed to be lead containing. Work performed which may disturb lead-containing paint is regulated under OSHA as referenced under 29 CFR 1926.62. A total of 80 readings were collected during the survey, including calibration readings.

Detectable amounts of lead (lead containing paint) were detected in the paint on the following surfaces: All painted CMU walls, yellow ceramic wall tile, black wood baseboards, all metal door jambs, all structural steel, all metal door frames with window lights, cementitious wall peg board and all metal stair handrails.

Lead-based paint/glazing (as defined by U.S. EPA) was not detected associated with the painted surfaces tested.

5.0 RECOMMENDATIONS AND REGULATORY REQUIREMENTS

Based on our understanding of the purpose of the Asbestos Survey and Lead Based Paint Screening, the results of laboratory analysis, and our findings and observations, ECS presents the following recommendations.

5.1 Asbestos-Containing Materials

ECS recommends where a material type has been identified as asbestos containing that all other materials with similar color, texture, age and size throughout the building's interior and exterior be assumed to contain asbestos. Please refer to Section 4.1 for a complete list of building materials that were reported positive for asbestos and to Section 4.2 for materials that were assumed or suspected to contain asbestos.

If ACMs are to be removed, it is recommended that a licensed/accredited asbestos abatement contractor be retained to perform this work. Depending on the size and nature of the project, regulatory notification may also be required. This will be the responsibility of the asbestos abatement contractor. Note: ECS is scheduled to prepare asbestos abatement specifications for this project.

ECS also recommends that the Owner retain an asbestos project monitor/industrial hygienist as an independent third party to inspect the asbestos abatement contractor for general compliance with applicable asbestos regulations, document completion of work, and to perform air monitoring/final clearance air testing as needed. ECS can provide this service if needed.



The asbestos containing materials identified during these sampling events should be properly incorporated with the schools Operations and Maintenance (O&M) plan. If an O&M plan has not been prepared for the school then ECS recommends the preparation of an O&M plan for the school by a Virginia licensed Asbestos Management Planner in accordance with US EPA AHERA requirements.

A trace amount of asbestos ($\leq 1\%$) was detected in the bulk sample(s) of CMU block wall filler paint analyzed by the laboratory. ECS recommends that the CMU block wall filler paint be assumed to contain trace $<1\%$ asbestos throughout the school. Although materials that contain trace amounts of asbestos are not subject to U.S. EPA or Virginia regulations for the handling and disposal of asbestos, OSHA still regulates any work which will disturb materials identified with trace amounts of asbestos (reference the November 24, 2003 OSHA Interpretation document - Compliance Requirements For Renovation Work Involving Materials Containing Less Than 1% Asbestos). Therefore, any Contractors disturbing these materials will need to comply with components of 29 CFR 1926.1101, as detailed in the 2003 OSHA Interpretation document.

Suspect ACMs not observed due to inaccessibility or not sampled due to the destructive means that sampling would require may also be encountered during construction activities. At the time of the survey, only limited destructive means were used to locate or sample suspect ACMs; therefore, additional suspect ACMs may remain within inaccessible areas that include, but are not limited to, sub-grade walls, structural members, topping slabs, exterior areas, sub-grade sealants, flooring located below underlayments, vapor barriers, pipe trenches and other subsurface utilities, etc. If additional suspect ACMs are uncovered which were not accessible during this survey, it is recommended that these materials either be assumed to contain asbestos or be sampled prior to disturbance upon discovery for asbestos content by an asbestos inspector in accordance with 29 CFR 1926.1101.

5.2 Lead in Paint and Surface Coatings

Based on the findings of the lead survey, detectable concentrations of lead were identified on some paints and surface coatings.

The presence of lead is a concern primarily when conditions exist where it may be inhaled or ingested. Regardless of the analytical results of a material, all painted and/or glazed surfaces may still contain concentrations of lead in the paint, which when disturbed, may generate lead dust greater than the Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) as an 8-hour Time Weighted Average (TWA) established by the OSHA "Lead Exposure in Construction Rule (29 CFR 1926.62)."

The OSHA standard gives no guidance on acceptable levels of lead in paint at which no exposure to airborne lead (above the action level) would be expected. Rather, OSHA defines airborne concentrations, and references specific types of work practices and operations from which a lead hazard may be generated (reference 29 CFR 1926.62, section d). Environmental and personnel monitoring should be conducted during any removal/demolition process (as appropriate) to verify that actual personal exposures are below the Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) as an 8-hour Time Weighted Average (TWA). Under OSHA requirements, the contractor performing renovation work will be required to conduct this monitoring and follow applicable requirements under 29 CFR 1926.62 if disturbing lead-containing paint.

6.0 LIMITATIONS

The conclusions and recommendations presented within this report are based upon a reasonable level of assessment within normal bounds and standards of professional practice for a site in this particular geographic setting. ECS is not responsible or liable for the discovery and elimination of hazards that may potentially cause damage, accidents, or injuries.

The observations, conclusions, and recommendations pertaining to environmental conditions at the subject site are necessarily limited to conditions observed, and/or materials reviewed at the time this study was undertaken. No warranty, expressed or implied, is made with regard to the conclusions and recommendations presented within this report. This report is provided for the exclusive use of the client. This report is not intended to be used or relied upon in connection with other projects or by other unidentified third parties without the written consent of ECS and the client.

During this study, samples were submitted for analysis at an accredited laboratory via polarized light microscopy. As with any similar survey of this nature, actual conditions exist only at the precise locations from which samples were collected. Certain inferences are based on the results of this sampling and related testing to form a professional opinion of conditions in areas beyond those from which the samples were collected. No warranty, expressed or implied, is made.

Our recommendations are in part based on federal, state, and local regulations and guidelines. ECS does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state, or federal public agencies, any conditions at the site that may present a potential danger to public health, safety, or the environment. Under this scope of services, ECS assumes no responsibility regarding any response actions initiated as a result of these findings. General compliance with regulations and response actions are the sole responsibility of the Client and should be conducted in accordance with local, state, and/or federal requirements.

Appendix I: Renovation Area Diagram



Appendix II: Site Photographs



1 - Trace <1% Asbestos - CMU Block Filler Paint



2 - ACM - Mudded Roof Drain Fitting



3 - ACM - Pipe Hanger Saddle



4 - ACM - Door Frame Caulk at CMU Block Walls



5 - ACM - Sink Acoustical Undercoating



6 - ACM - ~2" Mudded Elbow



7 - ACM - ~8" Mudded Elbow



8 - ACM - Cementitious Peg Board

Appendix III: Asbestos Bulk Sample Results



Environmental Hazards Services, L.L.C.
 7469 Whitepine Rd
 Richmond, VA 23237
 Telephone: 800.347.4010

Asbestos Bulk Analysis Report

Report Number: 22-05-02367

Client: ECS Mid-Atlantic - Richmond
 2119 D North Hamilton St
 Richmond, VA 23230

Received Date: 05/11/2022
Analyzed Date: 05/13/2022, 05/16/2022
Reported Date: 05/16/2022

Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Client Number:
 200625

Fax Number:
 804-353-9478

Laboratory Results

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-001 1-1		Tan/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
			Total Asbestos: Trace <1%	
22-05-02367-002 1-2		Tan/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
			Total Asbestos: Trace <1%	
22-05-02367-003 1-3		Tan/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
			Total Asbestos: Trace <1%	
22-05-02367-004 1-4		White/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
			Total Asbestos: Trace <1%	
22-05-02367-005 1-5		Tan/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	2% Chrysotile	98% Non-Fibrous
			Total Asbestos: 2%	
22-05-02367-006 1-6		<i>CMU Block Wall Filler Paint</i>	Did Not Analyze (Positive Stop)	

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-007 1-7		CMU Block Wall Filler Paint	Did Not Analyze (Positive Stop)	
22-05-02367-008 2-1		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Off-white Fissure Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-009 2-2		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Off-white Fissure Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-010 2-3		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Off-white Fissure Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-011 2-4		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Off-white Fissure Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-012 2-5		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Off-white Fissure Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-013 3-1		White Paint-Like; Gray Fibrous; Inhomogeneous <i>White Fissure Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625

Report Number: 22-05-02367

Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-014 3-2		White Paint-Like; Gray Fibrous; Inhomogeneous <i>White Fissure Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-015A 4-1	Cove Base	Black Pliable; Homogeneous <i>4" Vinyl Cove Baseboard and Mastic</i>	NAD	100% Non-Fibrous
22-05-02367-015B 4-1	Mastic	Yellow Adhesive; Homogeneous <i>4" Vinyl Cove Baseboard and Mastic</i>	NAD	2% Cellulose 98% Non-Fibrous
22-05-02367-016A 4-2	Cove Base	Black Pliable; Homogeneous <i>4" Vinyl Cove Baseboard and Mastic</i>	NAD	100% Non-Fibrous
22-05-02367-016B 4-2	Mastic	Yellow Adhesive; Homogeneous <i>4" Vinyl Cove Baseboard and Mastic</i>	NAD	2% Cellulose 98% Non-Fibrous
22-05-02367-017 5-1		Gray Powdery; Fibrous; Homogeneous <i>Roof Drain Insulation</i>	10% Chrysotile	25% Fibrous Glass 65% Non-Fibrous
Total Asbestos: 10%				
22-05-02367-018 5-2		<i>Roof Drain Insulation</i>	Did Not Analyze (Positive Stop)	

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-019 5-3		Roof Drain Insulation	Did Not Analyze (Positive Stop)	
22-05-02367-020 6-1		Gray Chalky; Fibrous; Homogeneous <i>Pipe Hanger Saddle</i>	15% Chrysotile	25% Cellulose 60% Non-Fibrous
			Total Asbestos: 15%	
22-05-02367-021 6-2		<i>Pipe Hanger Saddle</i>	Did Not Analyze (Positive Stop)	
22-05-02367-022 6-3		<i>Pipe Hanger Saddle</i>	Did Not Analyze (Positive Stop)	
22-05-02367-023 7-1		Tan Paint-Like; Gray-Black Flaky; Homogeneous <i>Window Stool</i>	NAD	100% Non-Fibrous
22-05-02367-024 7-2		Tan Paint-Like; Gray-Black Flaky; Homogeneous <i>Window Stool</i>	NAD	100% Non-Fibrous
22-05-02367-025A 8-1	Cove Base	Black-Brown Pliable; Homogeneous <i>6" Vinyl Cove Baseboard and Mastic</i>	NAD	100% Non-Fibrous
22-05-02367-025B 8-1	Mastic	Brown Adhesive; Homogeneous <i>6" Vinyl Cove Baseboard and Mastic</i>	NAD	2% Cellulose 2% Talc 96% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625

Report Number: 22-05-02367

Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-026A 8-2	Cove Base	Black Pliable; Homogeneous <i>6" Vinyl Cove Baseboard and Mastic</i>	NAD	100% Non-Fibrous
22-05-02367-026B 8-2	Mastic I	Yellow Adhesive; Homogeneous <i>6" Vinyl Cove Baseboard and Mastic</i>	NAD	2% Cellulose 98% Non-Fibrous
22-05-02367-026C 8-2	Mastic II	Brown Adhesive; Homogeneous <i>6" Vinyl Cove Baseboard and Mastic</i>	NAD	2% Cellulose 98% Non-Fibrous
22-05-02367-027 9-1		Tan/Blue Paint-Like; Gray-Tan Soft; Inhomogeneous <i>Door Frame Caulk @ CMU Walls</i>	2% Chrysotile	98% Non-Fibrous
Total Asbestos: 2%				
Chrysotile present throughout				
22-05-02367-028 9-2		<i>Door Frame Caulk @ CMU Walls</i>	Did Not Analyze (Positive Stop)	
22-05-02367-029 10-1		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Inset 2'x2' Divot Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-030 10-2		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Inset 2'x2' Divot Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-031A 11-1	Covering/Jacket	White Fibrous; Gray Adhesive-Like; Silver Foil-Like; Inhomogeneous <i>Pipe Wrap with Black Mastic</i>	NAD	60% Cellulose 15% Fibrous Glass 25% Non-Fibrous
22-05-02367-031B 11-1	Mastic	Black Adhesive-Like; Homogeneous <i>Pipe Wrap with Black Mastic</i>	NAD	2% Cellulose 2% Fibrous Glass 96% Non-Fibrous
22-05-02367-031C 11-1	Insulation	Yellow Fibrous; Homogeneous <i>Pipe Wrap with Black Mastic</i>	NAD	98% Fibrous Glass 2% Non-Fibrous
22-05-02367-032A 11-2	Covering/Jacket	White Fibrous; Gray Adhesive-Like; Silver Foil-Like; Inhomogeneous <i>Pipe Wrap with Black Mastic</i>	NAD	60% Cellulose 15% Fibrous Glass 25% Non-Fibrous
22-05-02367-032B 11-2	Mastic	Black Adhesive-Like; Homogeneous <i>Pipe Wrap with Black Mastic</i>	NAD	2% Cellulose 2% Fibrous Glass 96% Non-Fibrous
22-05-02367-032C 11-2	Insulation	Yellow Fibrous; Homogeneous <i>Pipe Wrap with Black Mastic</i>	NAD	98% Fibrous Glass 2% Non-Fibrous
22-05-02367-033 12-1		Tan Cementitious; Homogeneous <i>Terazzo Flooring</i>	NAD	100% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-034A 12-2	Flooring	Tan Cementitious; Homogeneous <i>Terazzo Flooring</i>	NAD	100% Non-Fibrous
22-05-02367-034B 12-2	Felt	Black Tar-Like Fibrous; Homogeneous <i>Terazzo Flooring</i>	NAD	35% Cellulose 65% Non-Fibrous
22-05-02367-035 12-3		Tan Cementitious; Homogeneous <i>Terazzo Flooring</i>	NAD	100% Non-Fibrous
22-05-02367-036 13-1		Red Brittle; Homogeneous <i>Red Mastic on Fiberglass HVAC Duct Wrap</i>	NAD	100% Non-Fibrous
22-05-02367-037A 13-2	Covering/Jacket	Silver Foil-Like; Black Tar-Like; Inhomogeneous <i>Red Mastic on Fiberglass HVAC Duct Wrap</i>	NAD	2% Cellulose 98% Non-Fibrous
22-05-02367-037B 13-2	Mastic	Red Brittle; Homogeneous <i>Red Mastic on Fiberglass HVAC Duct Wrap</i>	NAD	100% Non-Fibrous
22-05-02367-038 14-1		Red-Brown Brittle; Homogeneous <i>Brown Mastic on Fiberglass HVAC Duct Wrap</i>	NAD	100% Non-Fibrous
22-05-02367-039 15-1		Black Tar-Like; Homogeneous <i>Acoustical Sink Coating</i>	3% Chrysotile	97% Non-Fibrous

Total Asbestos: 3%

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-040 15-2		Acoustical Sink Coating	Did Not Analyze (Positive Stop)	
22-05-02367-041 16-1		White Brittle; Brown Fibrous; Inhomogeneous <i>Tectum Ceiling Tile</i>	NAD	80% Cellulose 20% Non-Fibrous
22-05-02367-042 16-2		White Brittle; Brown Fibrous; Inhomogeneous <i>Tectum Ceiling Tile</i>	NAD	80% Cellulose 20% Non-Fibrous
22-05-02367-043 16-3		White Brittle; Brown Fibrous; Inhomogeneous <i>Tectum Ceiling Tile</i>	NAD	80% Cellulose 20% Non-Fibrous
22-05-02367-044 17-1		Gray Powdery; Fibrous; Homogeneous <i>2" Diameter Mudded Elbow on Beige Wrap Pipe</i>	12% Chrysotile	25% Fibrous Glass 63% Non-Fibrous
			Total Asbestos: 12%	
22-05-02367-045 17-2		<i>2" Diameter Mudded Elbow on Beige Wrap Pipe</i>	Did Not Analyze (Positive Stop)	
22-05-02367-046 17-3		<i>2" Diameter Mudded Elbow on Beige Wrap Pipe</i>	Did Not Analyze (Positive Stop)	
22-05-02367-047 18-1		Gray Powdery; Fibrous; Homogeneous <i>8" Diameter Mudded Elbow on White Wrap Pipe</i>	18% Chrysotile	35% Fibrous Glass 47% Non-Fibrous
			Total Asbestos: 18%	

Environmental Hazards Services, L.L.C

Client Number: 200625

Report Number: 22-05-02367

Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-048 18-2		8" Diameter Mudded Elbow on White Wrap Pipe	Did Not Analyze (Positive Stop)	
22-05-02367-049 18-3		8" Diameter Mudded Elbow on White Wrap Pipe	Did Not Analyze (Positive Stop)	
22-05-02367-050 19-1		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Divot/Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-051 19-2		White Paint-Like; Gray Fibrous; Inhomogeneous <i>Divot/Pinhole Ceiling Tile</i>	NAD	55% Cellulose 35% Fibrous Glass 10% Non-Fibrous
22-05-02367-052A 20-1	Mastic	Off-White Brittle; Homogeneous <i>White Bridging Pipe Mastic</i>	NAD	2% Cellulose 5% Wollastonite 93% Non-Fibrous
22-05-02367-052B 20-1	Insulation	Yellow Fibrous; Homogeneous <i>White Bridging Pipe Mastic</i>	NAD	98% Fibrous Glass 2% Non-Fibrous
22-05-02367-053A 20-2	Mastic	Off-White Brittle; Homogeneous <i>White Bridging Pipe Mastic</i>	NAD	2% Cellulose 5% Wollastonite 93% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-053B 20-2	Covering/Jacket	Silver Foil-Like; Gray Adhesive-Like; Brown Fibrous; Inhomogeneous <i>White Bridging Pipe Mastic</i>	NAD	60% Cellulose 15% Fibrous Glass 25% Non-Fibrous
22-05-02367-053C 20-2	Insulation	Yellow Fibrous; Homogeneous <i>White Bridging Pipe Mastic</i>	NAD	98% Fibrous Glass 2% Non-Fibrous
22-05-02367-054A 21-1	Covering/Jacket	Green Pliable Paint-Like; White Fibrous; Inhomogeneous <i>Mudded Pipe Elbows</i>	NAD	55% Cellulose 45% Non-Fibrous
22-05-02367-054B 21-1	Insulation	Gray Powdery; Fibrous; Homogeneous <i>Mudded Pipe Elbows</i>	NAD	35% Fibrous Glass 65% Non-Fibrous
22-05-02367-055A 21-2	Covering/Jacket	Green Pliable Paint-Like; White Fibrous; Inhomogeneous <i>Mudded Pipe Elbows</i>	NAD	55% Cellulose 45% Non-Fibrous
22-05-02367-055B 21-2	Insulation	Gray Powdery; Fibrous; Homogeneous <i>Mudded Pipe Elbows</i>	NAD	35% Fibrous Glass 65% Non-Fibrous
22-05-02367-056A 21-3	Covering/Jacket	White Fibrous; Homogeneous <i>Mudded Pipe Elbows</i>	2% Chrysotile	96% Cellulose 2% Non-Fibrous

Total Asbestos: 2%

Possible contamination from insulation

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-056B 21-3	Insulation	Tan Powdery; Fibrous; Homogeneous <i>Mudded Pipe Elbows</i>	25% Chrysotile	25% Fibrous Glass 50% Non-Fibrous
Total Asbestos: 25%				
22-05-02367-057 22-1		Tan Paint-Like; Gray Cementitious; Inhomogeneous <i>Cementitious Peg Board</i>	20% Chrysotile	80% Non-Fibrous
Total Asbestos: 20%				
Chrysotile present throughout				
22-05-02367-058 22-2		<i>Cementitious Peg Board</i>	Did Not Analyze (Positive Stop)	
22-05-02367-059 23-1		Black Cementitious; Homogeneous <i>Lab Counter Top</i>	20% Chrysotile	80% Non-Fibrous
Total Asbestos: 20%				
22-05-02367-060 23-2		<i>Lab Counter Top</i>	Did Not Analyze (Positive Stop)	
22-05-02367-061 24-1		White Brittle; Brown Fibrous; Inhomogeneous <i>Tectum Acoustical Panels</i>	NAD	80% Cellulose 20% Non-Fibrous
22-05-02367-062 24-2		White Brittle; Brown Fibrous; Inhomogeneous <i>Tectum Acoustical Panels</i>	NAD	80% Cellulose 20% Non-Fibrous
22-05-02367-063 25-1		Black Tar-Like; Homogeneous <i>Roof Tar</i>	NAD	100% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-064 25-2		Black Tar-Like; Homogeneous <i>Roof Tar</i>	NAD	100% Non-Fibrous
22-05-02367-065A 26-1	Other *	Off-White Paint-Like; White Powdery; Gray Chalky; Inhomogeneous <i>Drywall and Joint Compound</i>	NAD	2% Cellulose 98% Non-Fibrous
*Joint Compound/Drywall				
22-05-02367-065B 26-1	Mastic	Yellow Adhesive-Like; Homogeneous <i>Drywall and Joint Compound</i>	NAD	2% Cellulose 98% Non-Fibrous
22-05-02367-066 26-2		Off-White Paint-Like; White Powdery; Brown Fibrous; Gray Chalky; Inhomogeneous <i>Drywall and Joint Compound</i>	NAD	15% Cellulose 85% Non-Fibrous
22-05-02367-067 27-1		Off-White/Yellow/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
			Total Asbestos: Trace <1%	
22-05-02367-068 27-2		Off-White/Yellow/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
			Total Asbestos: Trace <1%	
22-05-02367-069 27-3		Off-White/Blue/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
			Total Asbestos: Trace <1%	
22-05-02367-070 27-4		Off-White/Blue/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
Total Asbestos: Trace <1%				
22-05-02367-071 27-5		Off-White/Green/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
Total Asbestos: Trace <1%				
22-05-02367-072 27-6		Tan/Off-White/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
Total Asbestos: Trace <1%				
22-05-02367-073 27-7		Tan/Off-White/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
Total Asbestos: Trace <1%				
22-05-02367-074 27-8		Off-White/Gray Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	Trace <1% Chrysotile	100% Non-Fibrous
Total Asbestos: Trace <1%				
22-05-02367-075 27-9		Off-White/White Granular Paint-Like; Homogeneous <i>CMU Block Wall Filler Paint</i>	NAD	100% Non-Fibrous
22-05-02367-076A 25-1	Covering/Jacket	White Fibrous; Homogeneous	2% Chrysotile	96% Cellulose 2% Non-Fibrous
Total Asbestos: 2%				
Possible contamination from insulation				
22-05-02367-076B 25-1	Insulation	Tan Powdery; Fibrous; Homogeneous	25% Chrysotile	35% Fibrous Glass 40% Non-Fibrous
Total Asbestos: 25%				

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-02367-077A 25-2	Covering/J acket		Did Not Analyze (Positive Stop)	
22-05-02367-077B 25-2	Insulation		Did Not Analyze (Positive Stop)	
22-05-02367-078A 25-3	Covering/J acket		Did Not Analyze (Positive Stop)	
22-05-02367-078B 25-3	Insulation		Did Not Analyze (Positive Stop)	

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-02367

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
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QC Sample: 47-M22018-1, 48-M12017-2
QC Blank: SRM 1866 Fiberglass
Reporting Limit: 1% Asbestos
Method: EPA Method 600/R-93/116, EPA Method 600/M4-82-020
Analyst: Meredith Outlaw



Reviewed By Authorized Signatory:

Tasha Eaddy
QA/QC Clerk

The condition of the samples analyzed was acceptable upon receipt per laboratory protocol unless otherwise noted on this report. Each distinct component in an inhomogeneous sample was analyzed separately and reported as a composite. Results represent the analysis of samples submitted by the client. Sample location, description, area, volume, etc., was provided by the client. This report cannot be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without the written consent of the Environmental Hazards Service, L.L.C. California Certification #2319 NY ELAP #11714 NVLAP #101882-0 VELAP 460172. All information concerning sampling location, date, and time can be found on Chain-of-Custody. Environmental Hazards Services, L.L.C. does not perform any sample collection.

Environmental Hazards Services, L.L.C. recommends reanalysis by point count (for more accurate quantification) or Transmission Electron Microscopy (TEM), (for enhanced detection capabilities) for materials regulated by EPA NESHAP (National Emission Standards for Hazardous Air Pollutants) and found to contain less than ten percent (<10%) asbestos by polarized light microscopy (PLM). Both services are available for an additional fee.

400 Point Count Analysis, where noted, performed per EPA Method 600/R-93/116 with a Reporting Limit of 0.25%.

* All California samples analyzed by Polarized Light Microscopy, EPA Method 600/M4-82-020, Dec. 1982.

LEGEND: NAD = no asbestos detected

*Sample 13-3 not rec'd MO 5/13/22
 *Extra samples rec'd labeled 25-1-25-3 MO 5/13/22



Asbestos Chain-of-Custody

Environmental Hazards Services, LLC 7469 Whitepine Rd, Richmond, VA 23237 (800) 347-4010 www.leadlab.com

Company Name: ECS Mid-Atlantic, LLC Address: 2119 N. Hamilton St City/State/Zip: Richmond, VA 23230
 Phone: 804-353-6333 e-Mail: rcurran@ecslimited.com Acct No. _____
 Project Name: Colonial Heights High School City/State: Colonial Heights/Virginia
 Collected By: Rob Curran PO# 47:5541-C
 Positive Stop Analysis: Yes Date Collected: 5/10/2022

Turn Around Time: *If no TAT is specified, samples will be processed as 3-Day TAT*
 1-Day _____ 2-Day _____ 3-Day _____ Same Day _____ Analysis: PLM

No.	Client Sample ID	Sample Location
1-1	CMU Block Wall Filler Paint	Guidance Office Hallway
1-2	CMU Block Wall Filler Paint	Nurse Patient Room
1-3	CMU Block Wall Filler Paint	Room 1
1-4	CMU Block Wall Filler Paint	Room 4
1-5	CMU Block Wall Filler Paint	Boy's Dressing Room
1-6	CMU Block Wall Filler Paint	Band Room
1-7	CMU Block Wall Filler Paint	Kiln Room
2-1	Off-white Fissure Pinhole Ceiling Tile	Teacher's Work Room
2-2	Off-white Fissure Pinhole Ceiling Tile	Teacher's Work Room Conference Room
2-3	Off-white Fissure Pinhole Ceiling Tile	Nurse Hallway
2-4	Off-white Fissure Pinhole Ceiling Tile	Room 5
2-5	Off-white Fissure Pinhole Ceiling Tile	Room 61 F
3-1	White Fissure Pinhole Ceiling Tile	Room 4
3-2	White Fissure Pinhole Ceiling Tile	Room 5
4-1	4" Vinyl Cove Baseboard and Mastic	Teacher's Work Room Conference Room
4-2	4" Vinyl Cove Baseboard and Mastic	Teacher's Work Room
5-1	Roof Drain Insulation	Teacher's Work Room Conference Room
5-2	Roof Drain Insulation	Teacher's Work Room Conference Room
5-3	Roof Drain Insulation	Teacher's Work Room Conference Room
6-1	Pipe Hanger Saddle	Teacher's Work Room
6-2	Pipe Hanger Saddle	Main Hall @ Guidance Office
6-3	Pipe Hanger Saddle	Main Hall @ Guidance Office
7-1	Window Stool	Room 1
7-2	Window Stool	Room 4
8-1	6" Vinyl Cove Baseboard and Mastic	Guidance Hallway
8-2	6" Vinyl Cove Baseboard and Mastic	Nurse's Office by Fine Arts
9-1	Door Frame Caulk @ CMU Walls	Mr. Strickler's Office
9-2	Door Frame Caulk @ CMU Walls	Room 4
10-1	Inset 2'x2' Divot Pinhole Ceiling Tile	Guidance Office Lobby
10-2	Inset 2'x2' Divot Pinhole Ceiling Tile	Main Office Hallway
11-1	Pipe Wrap with Black Mastic	Nurse Office
11-2	Pipe Wrap with Black Mastic	Nurse Hallway
12-1	Terazzo Flooring	Nurse Patient Room
12-2	Terazzo Flooring	Teacher's Work Room
12-3	Terazzo Flooring	Nurse Office by Fine Arts
13-1	Red Mastic on Fiberglass HVAC Duct Wrap	Main Office Hallway
13-2	Red Mastic on Fiberglass HVAC Duct Wrap	Main Office Hallway
13-3	Red Mastic on Fiberglass HVAC Duct Wrap	Main Hallway
14-1	Brown Mastic on Fiberglass HVAC Duct Wrap	Main Office Hallway
15-1	Acoustical Sink Coating	Room 3
15-2	Acoustical Sink Coating	Room 4
16-1	Tectum Ceiling Tile	Main Hall
16-2	Tectum Ceiling Tile	Lobby
16-3	Tectum Ceiling Tile	Band Hallway
17-1	2" Diameter Mudded Elbow on Beige Wrap Pipe	Room 1
17-2	2" Diameter Mudded Elbow on Beige Wrap Pipe	Room 1
17-3	2" Diameter Mudded Elbow on Beige Wrap Pipe	Main Hall
18-1	8" Diameter Mudded Elbow on White Wrap Pipe	Room 1
18-2	8" Diameter Mudded Elbow on White Wrap Pipe	Room 1
18-3	8" Diameter Mudded Elbow on White Wrap Pipe	Main Hall
19-1	Divot/Pinhole Ceiling Tile	Nurse's Office by Fine Arts
19-2	Divot/Pinhole Ceiling Tile	Nurse's Office by Fine Arts

22-05-02367



Due Date:
05/16/2022
 (Monday)
 ER

MO 76 PM

T Ashaw 5/11/22 4:30

20-1	White Bridging Pipe Mastic	Main Hallway
20-2	White Bridging Pipe Mastic	Main Hallway
21-1	Mudded Pipe Elbows	Prop Room
21-2	Mudded Pipe Elbows	Prop Room
21-3	Mudded Pipe Elbows	Room 63 B
22-1	Cementitious Peg Board	Chorus Room
22-2	Cementitious Peg Board	Band Room
23-1	Lab Counter Top	Room 58
23-2	Lab Counter Top	Room 58
24-1	Tectum Acoustical Panels	Band Room
24-2	Tectum Acoustical Panels	Band Room
25-1	Roof Tar	Dripping From Roof Penetration in Main Hall
25-1	Roof Tar	Dripping From Roof Penetration in Lobby Hallway
26-1	Drywall and Joint Compound	Nurse's Office by Fine Arts
26-2	Drywall and Joint Compound	Nurse's Office by Fine Arts
27-1	CMU Block Wall Filler Paint	Cafeteria
27-2	CMU Block Wall Filler Paint	Cafeteria
27-3	CMU Block Wall Filler Paint	Cafeteria
27-4	CMU Block Wall Filler Paint	Cafeteria
27-5	CMU Block Wall Filler Paint	Cafeteria
27-6	CMU Block Wall Filler Paint	Cafeteria
27-7	CMU Block Wall Filler Paint	Cafeteria
27-8	CMU Block Wall Filler Paint	Cafeteria
27-9	CMU Block Wall Filler Paint	Cafeteria
		Please compisite group 26, please do not analyze concrete layer in CMU block wall filler paint samples
Released By:	Rob Curran 05-11-22 4:11 PM	Signature: <i>Robert Curran</i>
Received By:	<i>T. Shahan / Slutz 4.32</i>	



Environmental Hazards Services, L.L.C.
 7469 Whitepine Rd
 Richmond, VA 23237
 Telephone: 800.347.4010

Asbestos Bulk Analysis Report

Report Number: 22-05-04019

Client: ECS Mid-Atlantic - Richmond
 2119 D North Hamilton St
 Richmond, VA 23230

Received Date: 05/20/2022
Analyzed Date: 05/25/2022
Reported Date: 05/25/2022

Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Client Number:
 200625

Fax Number:
 804-353-9478

Laboratory Results

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-04019-001 28-1		Black Tar-like Fibrous; Homogeneous <i>Roof Field</i>	NAD	35% Cellulose 5% Fibrous Glass 60% Non-Fibrous
22-05-04019-002 28-2		Black Tar-like Fibrous; Homogeneous <i>Roof Field</i>	NAD	35% Cellulose 5% Fibrous Glass 60% Non-Fibrous
22-05-04019-003A 29-1	Other *	Tan Paint-like; Gray/White Pliable; Inhomogeneous <i>Roof Field</i>	NAD	100% Non-Fibrous
<i>*Pliable Material.</i>				
22-05-04019-003B 29-1	Other *	Black Brittle Fibrous; Homogeneous <i>Roof Field</i>	NAD	85% Cellulose 15% Non-Fibrous
<i>*Fibrous Material.</i>				
22-05-04019-003C 29-1	Other *	Yellow Foam-like; White Chalky; Inhomogeneous <i>Roof Field</i>	NAD	8% Cellulose 13% Fibrous Glass 79% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-04019

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
<i>*Foam/Chalky Material.</i>				
22-05-04019-004A 29-2	Other *	Tan Paint-like; Gray/White Pliable; Inhomogeneous <i>Roof Field</i>	NAD	100% Non-Fibrous
<i>*Pliable Material.</i>				
22-05-04019-004B 29-2	Other *	Black Brittle Fibrous; Homogeneous <i>Roof Field</i>	NAD	85% Cellulose 15% Non-Fibrous
<i>*Fibrous Material.</i>				
22-05-04019-004C 29-2	Other *	Yellow Foam-like; White Chalky; Inhomogeneous <i>Roof Field</i>	NAD	8% Cellulose 13% Fibrous Glass 79% Non-Fibrous
<i>*Foam/Chalky Material.</i>				
22-05-04019-005 30-1		White Granular; Homogeneous <i>Plaster Soffit</i>	NAD	100% Non-Fibrous
22-05-04019-006 30-2		White Granular; Homogeneous <i>Plaster Soffit</i>	NAD	100% Non-Fibrous
22-05-04019-007 30-3		White Granular; Homogeneous <i>Plaster Soffit</i>	NAD	100% Non-Fibrous
22-05-04019-008 31-1		White Pliable; Homogeneous <i>Wall Expansion Caulk</i>	NAD	100% Non-Fibrous
22-05-04019-009 31-2		White Pliable; Homogeneous <i>Wall Expansion Caulk</i>	NAD	100% Non-Fibrous

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-04019

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
22-05-04019-010 32-1		Black Pliable; Homogeneous <i>Door Frame Caulk</i>	NAD	100% Non-Fibrous
22-05-04019-011A 32-2	Other *	Black Pliable; Homogeneous <i>Door Frame Caulk</i>	NAD	100% Non-Fibrous
*Caulk I.				
22-05-04019-011B 32-2	Other *	White Pliable; Homogeneous <i>Door Frame Caulk</i>	NAD	100% Non-Fibrous
*Caulk II.				

Environmental Hazards Services, L.L.C

Client Number: 200625
Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia

Report Number: 22-05-04019

Lab Sample Number <i>Client Sample Number</i>	Layer Type	Lab Gross Description <i>Client Sample Description</i>	Asbestos	Other Materials
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QC Sample: 46-M12019-1
QC Blank: SRM 1866 Fiberglass
Reporting Limit: 1% Asbestos
Method: EPA Method 600/R-93/116, EPA Method 600/M4-82-020
Analyst: Sloane Cantrell



Reviewed By Authorized Signatory:

Tasha Eaddy
QA/QC Clerk

The condition of the samples analyzed was acceptable upon receipt per laboratory protocol unless otherwise noted on this report. Each distinct component in an inhomogeneous sample was analyzed separately and reported as a composite. Results represent the analysis of samples submitted by the client. Sample location, description, area, volume, etc., was provided by the client. This report cannot be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without the written consent of the Environmental Hazards Service, L.L.C. California Certification #2319 NY ELAP #11714 NVLAP #101882-0 VELAP 460172. All information concerning sampling location, date, and time can be found on Chain-of-Custody. Environmental Hazards Services, L.L.C. does not perform any sample collection.

Environmental Hazards Services, L.L.C. recommends reanalysis by point count (for more accurate quantification) or Transmission Electron Microscopy (TEM), (for enhanced detection capabilities) for materials regulated by EPA NESHAP (National Emission Standards for Hazardous Air Pollutants) and found to contain less than ten percent (<10%) asbestos by polarized light microscopy (PLM). Both services are available for an additional fee.

400 Point Count Analysis, where noted, performed per EPA Method 600/R-93/116 with a Reporting Limit of 0.25%.

* All California samples analyzed by Polarized Light Microscopy, EPA Method 600/M4-82-020, Dec. 1982.

LEGEND: NAD = no asbestos detected



Asbestos Chain-of-Custody

Environmental Hazards Services, LLC 7469 Whitepine Rd, Richmond, VA 23237 (800) 347-4010 www.leadlab.com

Company Name: ECS Mid-Atlantic, LLC Address: 2119 N. Hamilton St City/State/Zip: Richmond, VA 23230
 Phone: 804-239-3503 e-Mail: rcurran@ecslimited.com Acct No. _____
 Project Name: Colonial Heights High School City/State: Colonial Heights/Virginia
 Collected By: Rob Curran PO# 47:5541-C
 Positive Stop Analysis: Yes Date Collected: 5/18/2022

Turn Around Time: *If no TAT is specified, samples will be processed as 3-Day TAT*
 _____ 1-Day _____ 2-Day 3-Day _____ Same Day Analysis: PLM

No.	Client Sample ID	Sample Location
28-1	Roof Field	Connector Hall
28-2	Roof Field	2nd Floor
29-1	Roof Field	Room 59
29-2	Roof Field	Room 60
30-1	Plaster Soffit	Backstage Exit
30-2	Plaster Soffit	Backstage Exit
30-3	Plaster Soffit	Backstage Exit
31-1	Wall Expansion Caulk	Auditorium
31-2	Wall Expansion Caulk	Stone Ledge Above Backstage Exit
32-1	Door Frame Caulk	Backstage Exit
32-2	Door Frame Caulk	Backstage Exit
Released By:	Rob Curran 05-19-22 10:55 AM	Signature: <i>Rob Curran</i>
Received By:	<i>Th...</i> 5/20/22 9:...	

22-05-04019

 Due Date: 05/25/2022 (Wednesday) ER

11/21/22



Environmental Hazards Services, L.L.C.
 7469 Whitepine Rd
 Richmond, VA 23237
 Telephone: 800.347.4010

Asbestos 400 Point Count Analysis Report

Client: ECS Mid-Atlantic - Richmond
 2119 D North Hamilton St
 Richmond, VA 23230

Report Number: 22-05-03457
Received Date: 05/11/2022
Analyzed Date: 05/20/2022
Reported Date: 05/20/2022

Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia;
 EHS# 22-05-02367

Client Number:
 200625

Fax Number:
 804-353-9478

Laboratory Results

Lab Sample Number	Client Sample Number	Lab Gross Description	% Asbestos	Narrative ID
22-05-03457-001	1-5	Tan/Gray Granular Paint-Like	0.25 % Chrysotile	
22-05-03457-002	1-6	Tan/Blue/Gray Granular Paint-Like	0.25 % Chrysotile	
22-05-03457-003	1-7	Tan/Yellow/Gray Granular Paint-Like	0.25 % Chrysotile	
22-05-03457-004	9-1	Tan/Blue Paint-Like; Gray-Tan Soft	1.25 % Chrysotile	
22-05-03457-005	9-2	Tan/Blue Paint-Like; Gray-Tan Granular	1.75 % Chrysotile	

Reporting Limit: 0.25 % Asbestos

Method: EPA Method 600/R-93/116, EPA Method 600/M4-82-020

Analyst: Meredith Outlaw



Reviewed By Authorized Signatory:

Tasha Eaddy
 QA/QC Clerk

The condition of the samples analyzed was acceptable upon receipt per laboratory protocol unless otherwise noted on this report. Results represent the analysis of samples submitted by the client. Sample location, description, area, volume, etc., was provided by the client. This report cannot be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without the written consent of the Environmental Hazards Service, L.L.C. California Certification #2319 NY ELAP #11714 NVLAP #101882-0 VELAP 460172.

LEGEND NAD = No Asbestos Detected



22-05-03457



POINT COUNT REQUEST FORM

Environmental Hazards Services, L.L.C.
7469 Whitepine Rd
Richmond, VA 23237
Telephone: 800.347.4010

Due Date:
05/20/2022
(Friday)
ER

Received Date: 05/17/2022

Client #: 200625

Company Name: ECS Mid-Atlantic - Richmond

Project/Test Address: Colonial Heights High School; Colonial Heights, Virginia; EHS# 22-05-02367

Analysis Requested: 400 P+G

Client Sample #	EHS Sample #	Sample Location and/or Comments
1-5	5	
1-6	6	
1-7	7	
9-1	27	
9-2	28	

Date Samples Received	Received By	Original Analyst	Date Analyzed	Date Request Received	Received By
5/11/22	Tarig	Meredith	5/13-16/22	5/11/22	Tarig

From: Rob Curran <RCurran@ecslimited.com>
Sent: Tuesday, May 17, 2022 3:43 PM
To: customerservice@leadlab.com
Subject: 22-05-02367, 1-5, 1-6, 1-7, 9-1 and 9-2

Hello,

Can you please 400 point count the above reference samples from this report on a 3-day TAT? Thank you.

ROB CURRAN | Environmental Project Manager
T 804.353.6333 | D 804.353.6333 | C 804.246.3457
2119 North Hamilton Street | Richmond | VA | 23230

ECS MID-ATLANTIC, LLC

www.ecslimited.com

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Appendix IV: XRF Lead-Based Paint Readings



XRF LEAD-BASED PAINT RESULTS

Colonial Heights High School
Colonial Heights, VA
ECS Project No. 47:5541-C
Site Visit: May 18, 2022

Date	Reading	Room	Side	Color	Substrate	Component	Pb	Pb +/-	Lead Containing?	Lead Based?	
5/18/2022	669	Calibration						1.1	0.2	No	Yes
5/18/2022	670							1.1	0.2	No	Yes
5/18/2022	671							1.1	0.2	No	Yes
5/18/2022	672							1.1	0.2	No	Yes
5/18/2022	673	Room 1	B	Tan	CMU	Wall	0.1	0.3	Yes	No	
5/18/2022	674	Room 1	B	Tan	CMU	Wall	0.1	0.3	Yes	No	
5/18/2022	675	Room 1	B	Yellow	Ceramic	Wall	0.1	0.3	Yes	No	
5/18/2022	676	Room 1	A	Black	Wood	Wall Baseboard	0.1	0.3	Yes	No	
5/18/2022	677	Room 1	C	White	Metal	Door Jamb	0.4	0.3	Yes	No	
5/18/2022	678	Room 1	Ceiling	Red	Metal	Structure Lattice Beam	0.2	0.3	Yes	No	
5/18/2022	679	Room 3	Ceiling	Red	Metal	Structure Lattice Beam	0.1	0.3	Yes	No	
5/18/2022	680	Room 3	A	White	CMU	Wall	0.2	0.3	Yes	No	
5/18/2022	681	Room 3	D	Black	Wood	Wall Baseboard	0.2	0.3	Yes	No	
5/18/2022	682	Room 3	B	White	Metal	Door Jamb	0.7	0.2	Yes	No	
5/18/2022	683	Room 3	A	White	Metal	Door Jamb	0.3	0.3	Yes	No	
5/18/2022	684	Room 4	A	White	Metal	Door Jamb	0.5	0.3	Yes	No	
5/18/2022	685	Room 4	C	Yellow	Metal	Door Jamb	0.7	0.2	Yes	No	
5/18/2022	686	Room 4	D	Yellow	Metal	Door Jamb	0.3	0.3	Yes	No	
5/18/2022	687	Room 4	D	White	CMU	Wall	0.3	0.3	Yes	No	
5/18/2022	688	Room 4	B	Yellow	Ceramic	Wall	0.2	0.3	Yes	No	
5/18/2022	689	Work Room	B	Tan	CMU	Wall	0.2	0.3	Yes	No	
5/18/2022	690	Work Room	B	White	Wood	Bulletin Board	-0.1	0.3	No	No	
5/18/2022	691	Work Room	C	White	Metal	Door Jamb	0.7	0.2	Yes	No	
5/18/2022	692	Library Hall	Ceiling	Yellow	Metal	Structure I-Beam	0.2	0.3	Yes	No	

Notes: **Bold = Lead Based Paint**

Pb - Lead per mg/cm²



XRF LEAD-BASED PAINT RESULTS

Colonial Heights High School
Colonial Heights, VA
ECS Project No. 47:5541-C
Site Visit: May 18, 2022

Date	Reading	Room	Side	Color	Substrate	Component	Pb	Pb +/-	Lead Containing?	Lead Based?
5/18/2022	693	Library Hall	Ceiling	Red	Metal	Structure Lattice Beam	0	0.3	No	No
5/18/2022	694	Library Hall	B	Blue	Ceramic	Wall	0.3	0.3	Yes	No
5/18/2022	695	Library Hall	B	White	CMU	Wall	0.1	0.3	Yes	No
5/18/2022	696	Library Hall	C	Tan	Metal	Door Frame	0.3	0.3	Yes	No
5/18/2022	697	Library Hall	D	Red	Wood	Window Casing	-0.3	0.3	No	No
5/18/2022	698	Main Office	D	Tan	CMU	Wall	0.2	0.3	Yes	No
5/18/2022	699	Main Office	A	Blue	CMU	Wall	0.6	0.2	Yes	No
5/18/2022	700	Main Office	A	Cream	Metal	Structure Lattice Beam	0.1	0.3	Yes	No
5/18/2022	701	Main Office	A	Cream	Metal	Structure I-Beam	0.2	0.3	Yes	No
5/18/2022	702	Main Office	A	Gray	Metal	Door	0.1	0.3	Yes	No
5/18/2022	703	Main Office	A	Gray	Metal	Door Jamb	0.7	0.2	Yes	No
5/18/2022	704	Main Office Men"s	D	Tan	Metal	Door Jamb	0.5	0.3	Yes	No
5/18/2022	705	Main Office Men"s	D	White	CMU	Wall	0.1	0.3	Yes	No
5/18/2022	706	Main Office Men"s	D	Beige	Ceramic	Wall	0.2	0.3	Yes	No
5/18/2022	707	Main Office Men"s	Ceiling	White	Plaster	Ceiling	-0.1	0.3	No	No
5/18/2022	708	Main Office Men"s	C	Tan	CMU	Wall	0.1	0.3	Yes	No
5/18/2022	709	CDC	A	White	CMU	Wall	0.2	0.3	Yes	No
5/18/2022	710	CDC	A	Tan	Wood	Door Casing	0	0.3	No	No
5/18/2022	711	Guidamce Lobby	C	White	Metal	Door Casing	0.5	0.3	Yes	No
5/18/2022	712	Guidamce Lobby	C	White	Wood	Wall Baseboard	0.2	0.3	Yes	No
5/18/2022	713	Guidamce Lobby	A	Off-white	CMU	Wall	0.2	0.3	Yes	No

Notes: **Bold = Lead Based Paint**

Pb - Lead per mg/cm²



XRF LEAD-BASED PAINT RESULTS

Colonial Heights High School
Colonial Heights, VA
ECS Project No. 47:5541-C
Site Visit: May 18, 2022

Date	Reading	Room	Side	Color	Substrate	Component	Pb	Pb +/-	Lead Containing?	Lead Based?
5/18/2022	714	Guidamce Lobby	Ceiling	Off-white	Metal	Structure Lattice Beam	0.2	0.3	Yes	No
5/18/2022	715	Main Hall	Ceiling	Red	Metal	Structure Lattice Beam	0	0.3	No	No
5/18/2022	716	Main Hall	C	White	CMU	Wall	0.2	0.3	Yes	No
5/18/2022	717	Main Hall	C	Blue	Ceramic	Wall	0.4	0.3	Yes	No
5/18/2022	718	Chorus Room	D	White	CMU	Wall	0.2	0.3	Yes	No
5/18/2022	719	Chorus Room	D	White	Metal	Door Jamb	0.4	0.3	Yes	No
5/18/2022	720	Chorus Room	D	White	Transite	Wall Panel	0.3	0.3	Yes	No
5/18/2022	721	Chorus Room	D	White	Transite	Wall Panel	0.1	0.3	Yes	No
5/18/2022	722	Chorus Room	A	Yellow	Ceramic	Wall	0	0.3	No	No
5/18/2022	723	Chorus Room	Ceiling	Red	Metal	Structure Lattice Beam	0.1	0.3	Yes	No
5/18/2022	724	Chorus Room	Ceiling	Red	Metal	Structure Lattice Beam	-0.1	0.3	No	No
5/18/2022	725	Chorus Room	Ceiling	Yellow	Metal	Structure Lattice Beam	0.3	0.3	Yes	No
5/18/2022	726	Chorus Room	Ceiling	Yellow	Metal	Structure Lattice Beam	0.1	0.3	Yes	No
5/18/2022	727	Band Hallway	D	White	CMU	Wall	0	0.3	No	No
5/18/2022	728	Band Hallway	D	Blue	Ceramic	Wall	0.2	0.3	Yes	No
5/18/2022	729	Band Hallway	D	White	Metal	Door Jamb	0.8	0.2	Yes	No
5/18/2022	730	Band Hallway	A	White	Metal	Door Jamb	0.4	0.3	Yes	No
5/18/2022	731	Band Hallway	B	Silver	Metal	Stair Handrail	0.1	0.3	Yes	No
5/18/2022	732	Band Room	D	White	CMU	Wall	0.2	0.3	Yes	No
5/18/2022	733	Band Room	D	Cream	Concrete	Wall	0.4	0.3	Yes	No

Notes: **Bold = Lead Based Paint**

Pb - Lead per mg/cm²



XRF LEAD-BASED PAINT RESULTS

Colonial Heights High School
Colonial Heights, VA
ECS Project No. 47:5541-C
Site Visit: May 18, 2022

Date	Reading	Room	Side	Color	Substrate	Component	Pb	Pb +/-	Lead Containing?	Lead Based?
5/18/2022	734	Band Room	D	Black	Wood	Wall Baseboard	0	0.3	No	No
5/18/2022	735	Band Room	C	Maroon	Metal	Door Jamb	0.7	0.2	Yes	No
5/18/2022	736	Band Room	B	Yellow	Ceramic	Wall	0.2	0.3	Yes	No
5/18/2022	737	Room 58	B	White	CMU	Wall	0.2	0.3	Yes	No
5/18/2022	738	Room 58	B	Black	Wood	Wall Baseboard	0.1	0.3	Yes	No
5/18/2022	739	Room 58	B	White	Metal	Door Jamb	0.8	0.2	Yes	No
5/18/2022	740	Room 60	B	Beige	Wood	Cabinet Door	-0.1	0.3	No	No
5/18/2022	741	Fine Arts Hal	B	Dk. Brown	Metal	Door Frame	0.5	0.3	Yes	No
5/18/2022	742	Fine Arts Hal	A	White	Ceramic	Wall	0.3	0.3	Yes	No
5/18/2022	743	Fine Arts Ext		Green	Metal	Door	0.1	0.3	Yes	No
5/18/2022	744	Fine Arts Ext		Green	Metal	Door Jamb	0.4	0.3	Yes	No
5/18/2022	745	Fine Arts Ext		Green	Metal	Door Jamb	0.2	0.3	Yes	No
5/18/2022	746	Calibration					1.1	0.2	No	Yes
5/18/2022	747						1.1	0.2	No	Yes
5/18/2022	748						1.1	0.2	No	Yes

Notes: **Bold = Lead Based Paint**

Pb - Lead per mg/cm²

Appendix V: Certifications/ Licenses

DPOR License Lookup License Number 3303003809

License Details

Name	CURRAN, ROBERT WILLIAM
License Number	3303003809
License Description	Asbestos Inspector License
Rank	Asbestos Inspector
Address	MECHANICSVILLE, VA 23111
Initial Certification Date	2012-11-30
Expiration Date	2022-11-30

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DPOR License Lookup build 1,452 (built 2021-09-14 01:36:33).

DPOR License Lookup License Number 3356001027

License Details

Name	CURRAN, ROBERT WILLIAM
License Number	3356001027
License Description	Lead Risk Assessor License
Rank	Lead Abatement Risk Assessor
Address	MECHANICSVILLE, VA 23111
Initial Certification Date	2014-05-12
Expiration Date	2023-04-30

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DPOR License Lookup build 1,452 (built 2021-09-14 01:36:33).

**SECTION 011000
SUMMARY**

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Colonial Heights High School Renovation/Addition.
- B. Owner's Name: Colonial Heights Public Schools, Colonial Heights, Virginia.
- C. Architect's Name: Moseley Architects of Richmond, VA.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price (Fixed Sum) as described in the Bidding and Contractual Requirements (Division 00) included in this Project Manual.

1.03 PROFESSIONAL SEALS

- A. Use of Professional Seals on Bidding, Procurement, and Contract Documents: For the purposes of this paragraph, the term "Regulant" refers to the individual who signs and seals parts of the Contract Documents (e.g. the Drawings and Specifications). Certain information has been excerpted verbatim from a source or sources (e.g., UL Assemblies, SMACNA details, IBC code text) which was considered or used by Regulant in preparing parts of the Contract Documents, as follows:
 - 1. The excerpted information was neither prepared under the direct control nor personal supervision nor created by the Regulant, as it was prepared by the source and owner of the excerpted information.
 - 2. For purposes of bidding, procuring, and performance of the Work, and in any event of conflicts or ambiguities between the excerpted information in the Contract Documents and the requirements of applicable codes and standards, provide the better quality or greater quantity of Work which, at a minimum, complies with the requirements of the applicable codes and standards.
 - 3. Advise Architect immediately upon becoming aware of requirements of the Work which are not consistent with the requirements of the excerpted information.
 - 4. Attribution is acknowledged for information obtained and included herein verbatim from other source or sources.
 - 5. Regulant has taken into consideration and used certain excerpted information from other sources which are applicable to the Contract Documents, and the Regulant indicates by its seal that it is assuming responsibility for its services in use and application of the excerpted information to the requirements of Work, but not for the excerpted information itself which was prepared by others. Regulant does not indicate by its seal that it is responsible for use or application of other information in such source or sources which was not included herein.

1.04 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Owner intends to occupy the Project upon Substantial Completion.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.
 - 1. Maintain routes of egress and life safety systems for Owner and occupants at all times.

1.05 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Arrange use of site and premises to allow:
 - 1. Work by Others. Owner will have a HVAC Commissioning Contractor under a separate contract.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Existing building spaces may not be used for storage.
- E. Existing building shall be maintained weathertight. Do not modify elements of the existing building except as indicated on the Construction Documents. Repair damage to the existing building due to construction activity.
- F. Time Restrictions:
 - 1. Limit conduct of especially noisy, malodorous, and dusty work to the hours of 8 AM to 4 PM.
 - 2. Comply with local regulations for hours of work, noise ordinances, and similar requirements.
- G. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 - 3. Prevent accidental disruption of utility services to other facilities.
- H. Controlled Substances: The use of alcohol and drugs is not permitted on the Project site. Provide a designated outdoor smoking area for construction personnel that is at least 25 feet away from the building.

1.06 WORK SEQUENCE (PHASING)

- A. Construct Work in phases as indicated on Drawings.
- B. Coordinate construction schedule and operations with Owner.

1.07 SPECIFICATION SECTIONS APPLICABLE TO ALL WORK

- A. The provisions of the Owner/Contractor agreement, General Conditions of the Contract, Supplementary Conditions (if any), and all Division 01 sections shall apply to all sections of the Project Manual.

1.08 SECURITY PROVISIONS

- A. Background Check: The Owner requires that a background check be performed on all personnel working on the site. Comply with Owner's requirements for screening service to be used. Maintain a list of all accredited persons, submit a copy to Owner on request.
 - B. Identification Badges: Provide identification badges to each person authorized to enter premises. Badge shall include personal photograph, name, employer, expiration date, and an assigned number. Have personnel return badges to Contractor after completion of their portion of the Work.
-

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No.: 611565

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 011000

**SECTION 012000
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.

1.02 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, unless otherwise agreed to by Owner in writing.
- B. Forms filled out by hand will not be accepted.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- D. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application For Payment.
 - 1. When a Change Order includes multiple PCOs, break down the total Change Order to include each PCO as an individual line item.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Balance to Finish.
 - 9. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
 - 1. When a Change Order includes multiple PCOs, break down the total Change Order to include each PCO as an individual line item.

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No.: 611565

- I. Submit one electronic and three hard-copies of each Application for Payment.
- J. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 013000.
 - 2. Construction progress schedule, revised and current as specified in Section 013000.
 - 3. Partial release of liens from major subcontractors and vendors.
 - 4. Affidavits attesting to off-site stored products.

1.04 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor on AIA Document G710 "Architect's Supplemental Instructions."
- B. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days, unless otherwise indicated in Proposal Request.
- C. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation.
- D. For other required changes, Architect will issue a Construction Change Directive, on AIA Document G714, signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
- F. Substantiation of Costs: Provide full information required for evaluation.
 - 1. Provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

- G. Execution of Change Orders: Architect will issue Change Orders on AIA Document G701 for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

1.05 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 017000.
- C. Provide evidence and supporting data for the following, as attachments to the Application for Final Payment:
 - 1. AIA G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 2. AIA G707, "Consent of Surety to Final Payment."
 - 3. Settlement of all debts and claims, including liquidated damages, taxes, and fees.
 - 4. Utility meter readings, fuel levels, and similar measurements, as of the date of turn over to the Owner.
 - 5. Certificates for insured products.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 012000

**SECTION 012100
ALLOWANCES**

PART 1 GENERAL

1.01 SUBMITTALS

- A. Allowance Proposal: Submit initial proposal for purchase of products and materials, on Change Order form.
- B. Supporting Documentation:
 - 1. Products and Material: Provide invoices and other documents as required, for products and materials indicating quantities, prices, taxes, delivery fees, and other costs.
 - 2. Labor and Installation: Provide time sheets and other documents as required, indicating all on-site Subcontractor costs, including hours worked, quantity or amount of product/material installed, hourly wages, and Subcontractor overhead and profit.

1.02 LUMP-SUM AND QUANTITY ALLOWANCES

- A. Costs Included in Lump-Sum and Quantity Allowances: All Subcontractor's costs: Cost of products and materials, taxes, freight, delivery, receiving and handling, labor and installation, Subcontractor overhead and profit.
- B. Costs Not Included in Lump-Sum and Quantity Allowances: All General Contractor's costs: General coordination, GC's overhead and profit.
- C. Contractor Responsibilities:
 - 1. Assist Architect in selection of products.
 - 2. Obtain proposals from suppliers and installers and offer recommendations.
 - 3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
- D. Differences in costs will be adjusted by Change Order.

1.03 ALLOWANCES SCHEDULE

- A. Allowance No. 1: Lump Sum: Signage: Include the stipulated sum of \$20,000 for interior and exterior panel signage, as specified in Division 10 Section "Signage."
- B. Allowance No. 2: Lump Sum: Hazardous Materials Remediation: Include the stipulated sum of \$200,000 for hazardous materials remediation. Coordinate with Division 1 "Unit Prices" for unit price requirements to determine amounts for each material, and payment shall be made from the lump sum allowance for actual amount of material remediated.
- C. Allowance No. 3: Lump Sum: Building Controls: Include the stipulated sum of \$100,000 to provide building controls by Owner-designated subcontractor, to tie in to existing building controls system.
- D. Allowance No. 4: Lump Sum: Card Readers: Include the stipulated sum of \$10,000 to provide and install new Card Readers at designated doors by Owner designated subcontractor.

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PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 012100

SECTION 012110 – SITEWORK ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements regarding allowances associated with sitework.
- B. This Section includes the following unit price allowances:
1. Import and Place Angular VDOT #57 Stone
 2. Import and Place VDOT 21-A/21-B stone
 3. Import and place structural fill
 4. Additional Excavation and Stabilize on Site
 5. Additional Excavation with Offsite Disposal
 6. Additional Excavation in Trenches
 7. Concrete Sidewalk
 8. Mass Rock Excavation
 9. Rock Excavation in Trenches
 10. Additional Excavation of Unsuitable Material, Off-site Disposal of Unsuitable Material, and Replacement with VDOT 21-1 Stone

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICE ALLOWANCES

- A. Import and Place VDOT #57 Stone
1. Provide in the Base Bid an allowance of 50 c.y. additional VDOT #57 stone, where authorized or directed, below or in addition to the levels required for the Work. Placement of stone shall be in an approved location on-site. Compact per specifications. Credit or additions to the Contract Price for actual quantities imported shall be made per the Unit Prices contained in the Bid Form.
- B. Import and Place VDOT 21-A/21-B Stone
1. Provide in the Base Bid an allowance of 50 c.y. additional VDOT #21A/21B stone, where authorized or directed, below or in addition to the levels required for the Work. Placement of stone shall be in an approved location on-site. Compact per specifications. Credit or additions to the Contract Price for actual quantities imported shall be made per the Unit Prices contained in the Bid Form.

C. Import and Place Structural Fill

1. Provide in the Base Bid an allowance of 250 c.y. for import of material, where authorized or directed, below or in addition to the levels required for the Work. Placement of imported material shall be in an approved location on-site. Compact per specifications. Clean fill for the well shall be handled within this allowance category. Credit or additions to the Contract Price for actual quantities imported shall be made per the Unit Prices contained in the Bid Form. Include in the unit price the cost of quantity verification by a Surveyor Licensed in the Commonwealth of Virginia.

D. Additional Excavation and Stabilize on Site

1. Provide in the Base Bid an allowance of 250 c.y. for excavation of material, where authorized or directed, below or in addition to the levels required for the Work. Dispose of excavated material in an approved location on-site. Backfill with imported structural fill material compacted per specifications. Credit or additions to the Contract Price for actual quantities removed and replaced (based on volume of material cut) shall be made per the Unit Prices contained in the Bid Form. Include in the unit price the cost of quantity verification by a Surveyor Licensed in the Commonwealth of Virginia

E. Additional Excavation with Off-Site Disposal

1. Provide in the Base Bid an allowance of 250 c.y. for excavation of material, where authorized or directed, below or in addition to the levels required for the Work. Dispose of excavated material in an approved location off-site. Backfill with imported structural fill material compacted per specifications. Credit or additions to the Contract Price for actual quantities removed and replaced (based on volume of material cut) shall be made per the Unit Prices contained in the Bid Form. Include in the unit price the cost of quantity verification by a Surveyor Licensed in the Commonwealth of Virginia.

F. Additional Excavation in Trenches

1. Provide in the Base Bid an allowance of 10 c.y. for excavation of material in trenches and footings, where authorized or directed, below or in addition to the levels required for the Work. Dispose of excavated material in an approved location on-site. Backfill with stone compacted per specifications. Credit or additions to the Contract Price for actual quantities removed and replaced (based on volume of material cut) shall be made per the Unit Prices contained in the Bid Form. Include in the unit price the cost of quantity verification by a Surveyor Licensed in the Commonwealth of Virginia.

G. Concrete Sidewalk, in place

1. Provide in the Base Bid an allowance of 10 s.y. additional concrete sidewalk, where authorized or directed, below or in addition to the levels required for the Work. Placement of concrete sidewalk shall be in an approved location on-site. Install per specifications. Credit or additions to the Contract Price for actual quantities of additional installation shall be made per the Unit Prices contained in the Bid Form. Include in the unit price the cost of quantity verification by a Surveyor Licensed in the Commonwealth of Virginia.

H. Mass Rock Excavation

1. Provide in the Base Bid an allowance of 10 c.y. for excavation of rock. Dispose of excavated rock material in an approved location on-site. Backfill with imported fill

material compacted per specifications. Credit or additions to the Contract Price for actual quantities removed and replaced (per the pay limits established in the Specifications) shall be made per the Unit Prices contained in the Bid Form. Include in the unit price the cost of quantity verification by a Surveyor Licensed in the Commonwealth of Virginia.

I. Rock Excavation in Trenches

1. Provide in the Base Bid an allowance of 10 c.y. for excavation of rock in trenches. Dispose of excavated rock material in an approved location on-site. Backfill excavation with stone. Credit or additions to the Contract Price for actual quantities removed and replaced (per the pay limits established in the Specifications) shall be made per the Unit Prices contained in the Bid Form. Include in the unit price the cost of quantity verification by a Surveyor Licensed in the Commonwealth of Virginia.

J. Additional Excavation of Unsuitable Material, Disposal of Unsuitable Material, and Replacement with VDOT 21-A Stone

1. Provide in the Base Bid an allowance of 100 c.y. for excavation and disposal of unsuitable material, and replacement with 100 c.y. of VDOT 21-A Stone, where authorized or directed, below or in addition to the levels required for the Work. Dispose of unsuitable material offsite. Credit or additions to the Contract Price for actual quantities removed and replaced (based on volume of material cut) shall be made per the Unit Prices contained in the Bid Form. Include in the unit price the cost of quantity verification by a Surveyor Licensed in the Commonwealth of Virginia.

3.2 ADMINISTRATION OF SITEWORK UNIT PRICE ALLOWANCES

- A. Unit Prices for each allowance shall be given on the Bid Form.
 1. The Owner reserves the right to negotiate said Unit Prices prior to the award of Contract.
- B. Allowances required by this Section shall be included in the Base Bid amount.
- C. Allowances required by this Section shall be indicated on the Schedule of Values and shall be determined by multiplying the quantity indicated by the unit price given on the Bid Form.
- D. Submit invoices or surveyor's certificate, as required, with pay requests that involve the Unit Price Allowances.
- E. Credit unused amount of Unit Price Allowance (if any) to Owner by Change Order at Project Closeout.

3.3 ADMINISTRATION OF LUMP-SUM ALLOWANCES

- A. Conform to the requirements of the General Conditions.

END OF SECTION 012110

**SECTION 012200
UNIT PRICES**

PART 1 GENERAL

1.01 COSTS INCLUDED

- A. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.02 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.03 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated on the Drawings or in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the Drawings or individual specification section govern.
- B. Take all measurements and compute quantities. Measurements and quantities will be verified via mutual agreement, and by personnel authorized by Owner, if required.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.
- D. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.
- E. Contractor's Engineer Responsibilities: Sign surveyor's field notes or keep duplicate field notes, calculate and certify quantities for payment purposes.

1.04 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.
- B. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.
 - 4. Products placed beyond the lines and levels of the required Work.
 - 5. Products remaining on hand after completion of the Work.
 - 6. Loading, hauling, and disposing of rejected Products.

1.05 SCHEDULE OF UNIT PRICES

- A. Hazardous Materials Abatement: Provide unit costs for the proper removal and disposal of the following hazardous materials:
 - 1. Unit Price #1: Pipe insulation/elbows/fittings (various sizes - per fitting – glove bag)
 - 2. Unit Price #2: Pipe insulation/elbows/fittings (various sizes - per fitting –within negative pressure containment)
 - 3. Unit Price #3: CMU block wall filler paint (per square foot) demolition

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4. Unit Price #4: CMU block wall filler paint (per square foot) – using paint stripping
5. Unit Price #5: Water proofing/vapor barrier (per square foot)
6. Unit Price #6: Light heat shields (per heat shield)
7. Unit Price #7: Locker caulk (per linear foot)
8. Unit Price #8: Fire Doors

1.06 UNIT PRICE ALLOWANCES

- A. In addition to the Unit Price Allowances indicated in Section 012110 Sitework Allowances, provide the following Unit Price Allowances as indicated on the Bid Form:
- B. Unit Price Allowance 11: Moisture Vapor Treatment (MVT): Unit Price shall cover providing a surface-applied moisture vapor treatment, to be applied to concrete slabs prior to installation of floor finishes. Unit price shall be measured by the square foot (sq. ft.). This unit price shall be provided in coordination with Allowances Section 012100 for more information. Refer to Division 9 flooring sections for information on flooring types subject to this quantity allowance.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 012200

**SECTION 012300
ALTERNATES**

PART 1 GENERAL

1.01 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.02 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Music Instrument and Sheet Music Storage Casework.
 - 1. Base Bid: Do not include musical instrument casework or sheet music storage casework in Base Bid.
 - 2. Alternate: Provide all indicated musical instrument casework and sheet music storage casework, including furnishing, delivery, and complete installation.
- B. Alternate No. 2: Roof Screen above Part A of Building.
 - 1. Base Bid: Do not provide a roof screen at location indicated (above student collaboration rooms A120, A121, A122, in Part A of building).
 - 2. Alternate: Provide complete roof screen assembly, including metal wall panel screen, all associated structural components, penetrations through roof, roof repair, interior structural connections and bracing, fasteners and anchors, and finishes.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 012300

**SECTION 012500
SUBSTITUTION PROCEDURES**

PART 1 GENERAL

1.01 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control, such as unavailability, regulatory changes, or unobtainable warranty terms.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. A copy of the Substitution Request Form that shall be used is included at the end of this Section for informational purposes. Request a Word or editable PDF version of the form from the Architect and complete the form digitally; do not complete the form by hand.
 - 2. Contractor's Substitution Request documentation must include the following:
 - a. Substitution Request Information:
 - 1) Indication of whether the substitution is for cause or convenience.
 - 2) Issue date.
 - 3) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 4) Description of Substitution.
 - 5) Reason why the specified item cannot be provided.

- 6) Description of how proposed substitution affects other parts of work.
- b. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - 1) Physical characteristics.
 - 2) In-service performance.
 - 3) Expected durability.
 - 4) Visual effect.
 - 5) Sustainable design features.
 - 6) Warranties.
 - 7) Other salient features and requirements.
 - 8) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples.
 - (c) Certificates, test, reports or similar qualification data.
 - (d) Drawings, when required to show impact on adjacent construction elements.
- c. Impact of Substitution: Provide data indicating cost savings to Owner and change in Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Architect will consider requests for substitutions for convenience only within 30 days after date of Agreement.
 - 1. Substitutions for convenience submitted after this time period may or may not be considered, at the Architect's discretion.
- B. Submit request for Substitution for Cause immediately upon discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
 - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 - 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
 - b. Other unanticipated project considerations.
- D. Substitutions will not be considered under one or more of the following circumstances:
 - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.

3.03 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

3.04 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.05 CLOSEOUT ACTIVITIES

- A. See Section 017800 - Closeout Submittals, for closeout submittals.

END OF SECTION 012500

Substitution Request Form – After Receipt of Bids

All Substitution Requests shall be submitted by the Contractor only. Substitution Requests received from subcontractors, sub-subcontractors, manufacturers, vendors, etc., will be “rejected” without review.

General Information				
Project Name	Colonial Heights High School Renovation/Addition			
A/E Project Number	611565			
Specified Product/Item Information				
Specification Title				
Section				
Page				
Article / Paragraph				
Description				
Proposed Substitution Information				
Proposed Substitution				
Reason for not providing specified product/item				
Comparative Data	Attach a point-by-point comparative data list. Include all differences between the proposed substitution and the specified product/item. If not provided, this Request will be rejected.			
Manufacturer				
Manufacturer Address				
Manufacturer Phone				
Manufacturer Representative Email address				
Trade / Model Name				
Model Number				
Installer				
Installer Address				
Installer Phone				
History	<input type="checkbox"/> New product	<input type="checkbox"/> 2-5 years	<input type="checkbox"/> 5-10 yrs	<input type="checkbox"/> 10 yrs or longer
Proposed substitution affects other parts of the Work	<input type="checkbox"/> Yes		<input type="checkbox"/> No	
If yes, explain				
Savings to Owner for accepting proposed substitution	\$			
Proposed substitution affects Contract Time	<input type="checkbox"/> Yes		<input type="checkbox"/> No	

If yes	<input type="checkbox"/> Add	<input type="checkbox"/> Deduct
If yes, number of calendar days		
Proposed Substitution Similar Installation		
Have you (this Contractor) used this product/item on any other projects	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Project		
Project Address		
Architect/Engineer		
A/E Phone		
Owner		
Owner Phone		
Date installed		
Attached Supporting Data		
<input type="checkbox"/> Drawings	<input type="checkbox"/> Product Data/Specs	<input type="checkbox"/> Samples
<input type="checkbox"/> Tests	<input type="checkbox"/> Reports	<input type="checkbox"/>

Contractor certifies all of the following:

- Contractor shall provide specified product/item in the event this Substitution request is rejected.
- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to the specified product, except as may otherwise be specifically and clearly indicated herein.
- If applicable, proposed substitution shall not adversely affect LEED requirements nor shall it prevent achieving the relative number of applicable LEED point[s] the specified product would have received.
- Proposed substitution’s function, appearance, and quality are equal or superior in all respects to the specified product, except as may otherwise be specifically and clearly indicated herein.
- Same or superior warranty and/or guarantees shall be furnished for proposed substitution as is required for the specified product/item.
- Same maintenance service and source replacement parts, as applicable, are available; including local availability.
- Proposed substitution shall have no adverse effect on other trades.
- Cost data as stated herein is complete. Claims for additional costs related to the accepted proposed substitution which may subsequently become apparent shall be waived; including licenses, fees, and/or royalties.
- Proposed substitution shall not affect dimensions and functional clearances. If the proposed substitution does affect dimensions and/or functional clearances, Contractor shall adjust the Work as required and necessary to accommodate the proposed substitution at no additional cost to the Contract.
- Payment shall be made by the Contractor, via a deduct/credit Change Order, for changes to the building design, including A/E fees for the design and detailing, caused by the proposed substitution.
- Coordination, installation, and changes to the Work as necessary for the accepted proposed substitution shall be complete in all respects.

Contractor Information

Submitted by	
Signed By	
Date	
Email address of Signee above	
Company Name	
Address	
Phone	

Architect / Engineer Review and Action	
<p>Acceptance of this substitution request is an acceptance of only the manufacturer and product/item for general conformance with the design concept reflected in the Contract Documents. The A/E has made no attempt to verify specific performance data, or to check the details of the proposed substitution as to special features, capacities, physical dimensions, or code and/or regulatory compliance, all of which remain the responsibility of the Contractor.</p>	
<input type="checkbox"/>	Proposed Substitution is found to be acceptable for inclusion in Change Order, if approved by Owner – Provide submittals in accordance with Contract Document requirements.
<input type="checkbox"/>	Proposed Substitution is found to be acceptable as noted for inclusion in Change Order, if approved by Owner - Provide submittals in accordance with Contract Document requirements.
<input type="checkbox"/>	Proposed Substitution is rejected – Provide specified product/item.
<input type="checkbox"/>	Proposed Substitution submittal/form not in accordance with Contract Documents (not timely, incomplete)
Comments / Remarks	
Reviewed by	
Signed By	
Date	

END OF SUBSTITUTION REQUEST FORM

**SECTION 013000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 016000 - Product Requirements: General product requirements.

1.02 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 017000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Electronic File Distribution: Upon request, Contractor may be provided electronic files for use in coordination of the Work and preparation of submittals. Contractor shall submit a signed Request Form for Electronic Files, provided by the Architect.
 - 1. Electronic files do not contain all of the information of the Bid Documents or Contract Documents for construction of the Project, and the Architect shall not be responsible for differences between electronic files, Bid Documents, and Contract Documents.

1.03 SUBMITTALS

- A. General Contractor Personnel: As soon as practical after award of Contract, provide a summary of General Contractor's on site personnel. Identify each individual, beginning with project superintendent. List project responsibilities, cell phone number, and email address.
- B. Subcontractors: As soon as practical after award of Contract, provide a summary of all companies and individuals engaged as subcontractors for any part of the Project. Include a contact name, company address, phone number, and email address, and identify what part of the Work shall be completed by each subcontractor.
- C. Coordination Drawings: Submit completed Coordination Drawings for Architect's information.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 - 2. It is Contractor's responsibility to submit documents in allowable format.
 - 3. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 - 4. Paper document transmittals will not be reviewed unless previously approved; emailed electronic documents will not be reviewed.

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5. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: Coordinate method for exchanging files no later than the Preconstruction Meeting. The Architect's "Newforma InfoExchange" website and procedures can be used at no charge. If the Contractor chooses to use a different platform and methodology:
 1. The Architect may reject the methodology or platform proposed and:
 - a. use the Architect's Newforma InfoExchange website, or
 - b. the project team will revert to traditional hard-copy exchange;
 2. or the Contractor shall bear the cost of software, licensing, training, etc, for the project team to participate.
- C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive/record copies of files for Owner. If the Project Team uses an alternate platform preferred by the Contractor, the Contractor shall be responsible for distributing archive/record copies of files to Owner and Architect.

3.02 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
 1. Owner.
 2. Architect.
 3. Contractor.
 4. Major subcontractors, consultants, and others as necessary and appropriate.
- C. Agenda:
 1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties to Contract and Architect.
 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
 8. Site mobilization and utilization.
 9. Other project-specific items on pre-distributed agenda.
- D. Architect shall record minutes and distribute digital copies to Owner, Contractor, and other attendees. Contractor shall be responsible for distribution to subcontractors and other personnel affected by decisions made.

3.03 INDOOR AIR QUALITY (IAQ) MANAGEMENT PLAN DEVELOPMENT SESSION

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
 1. Owner.
 2. Architect.
 3. Mechanical engineer.
 4. Contractor.
 5. HVAC subcontractor.

6. Other major subcontractors, consultants, and others as necessary and appropriate.
- C. Agenda:
1. Protection of Materials: Discussion of how and where materials that could impact IAQ will be stored, including but not limited to, the following:
 - a. Insulation.
 - b. Gypsum board.
 - c. Flooring materials.
 - d. Ceiling panels.
 - e. Furnishings.
 - f. Odorous chemicals.
 2. Protection of HVAC: Discussion of how HVAC equipment will be stored installed, and operated during construction.
 3. Pathway Interruption: Discussion of how airflow between construction zones will be limited to prevent the spreading of pollutants from one part of the building to another.
 4. Housekeeping: Discussion of how the building will be kept clean and dry.
 5. Materials Installation Scheduling: Discussion of what wet (odor emitting) materials will be used on the project, in order to schedule their installation before fuzzy (odor absorbing) materials.

3.04 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section. Do not allow installation of affected work to proceed until preinstallation meeting can be held.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect and Owner in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 1. Review conditions of examination, preparation and installation procedures.
 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.05 PROGRESS MEETINGS

- A. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
 - B. Attendance Required:
 1. Owner.
 2. Architect.
 3. Contractor's superintendent.
 4. Other subcontractors or consultants as required for the specific parts of the Work to be discussed.
 - C. Agenda:
 1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
-

6. Review of RFIs log and status of responses.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period.
 10. Maintenance of quality and work standards.
 11. Effect of proposed changes on progress schedule and coordination.
 12. Other business relating to the work.
- D. Architect shall record minutes and distribute copies to the Owner, Contractor, and other consultants, Owner's representatives, or other third party attendees. The Contractor shall be responsible for distributing to any affected subcontractors and other personnel.

3.06 CLOSEOUT MEETING

- A. Schedule and administer closeout meeting no later than 30 days before the scheduled Date of Substantial Completion.
- B. Make arrangements for the meeting, prepare agenda with copies for participants, and preside at the meeting.
- C. Attendance Required:
1. Owner.
 2. Architect.
 3. Contractor's superintendent.
 4. Major subcontractors.
 5. Other subcontractors or consultants as required.
- D. Agenda:
1. Review closeout requirements and procedures in Division 1 Section "Execution and Closeout Requirements."
 2. Review startup, testing, and adjusting of all systems, including testing/adjusting/balancing,
 3. Coordination of inspections by local authorities having jurisdiction and third party Special Inspectors as required to obtain Certificate of Occupancy.
 4. Coordination of Owner's occupancy and changeover of utilities, insurance, and building keying/lock system.
 5. Procedures for Contractor's Correction Punch List, Architect's Substantial Completion inspection, and Final Correction Punch List.
 6. Delivery, turnover, and storage of maintenance materials, attic stock, special tools, and other non-installed materials.
 7. Coordination of closeout documentation, including demonstration and training materials and videos, as built/record documents, operation and maintenance binders, and warranty binders.
 8. Removal of temporary facilities, construction equipment, and tools.
 9. Final cleaning, touchup, restoration, and preventive maintenance.
 10. Coordination of final Applications for Payment.
- E. Record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.07 DAILY CONSTRUCTION REPORTS

- A. Include only factual information. Do not include personal remarks or opinions regarding operations and/or personnel.

- B. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
1. Date.
 2. High and low temperatures, and general weather conditions.
 3. List of subcontractors at Project site.
 4. Approximate count of personnel at Project site.
 5. Major equipment at Project site.
 6. Material deliveries.
 7. Safety, environmental, or industrial relations incidents.
 8. Meetings and significant decisions.
 9. Unusual events (submit a separate special report).
 10. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
 11. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
 12. Testing and/or inspections performed.
 13. Signature of Contractor's authorized representative.

3.08 COORDINATION DRAWINGS AND COORDINATION CONFERENCE

- A. Coordination Drawings: The Contractor shall prepare coordination drawings of all spaces where utilities, systems, and other components converge or intersect and efficient installation is required to accommodate all components.
1. Prepare coordination drawings of the following spaces, at minimum. Supplement with additional spaces as required by project-specific conditions.
 - a. Above ceilings.
 - b. Vertical chases, shafts, and wall cavities.
 - c. Mechanical and electrical rooms, fire pump room, and other major utility spaces.
 2. Provide accurate overall dimensions of components (for example, outside diameters of pipe and conduit, or overall ductwork dimensions including insulation and enclosure thickness).
 3. Include accessory components of systems that could cause potential conflicts, such as bracing, slotted channel framing, hangers, and other supports, valve handles, flanges, fittings, cable/wire management trays, and other similar components.
 4. Include sequence of installation of all components, materials, and systems.
 5. Include means of access to each component, material, or system, for maintenance and repairs.
 6. Provide additional coordination drawings as required by individual specification sections.
 7. Prepare Coordination Drawings using project-specific information. Do not use photocopies or reproductions of Contract Documents, and do not use standard details or data from manufacturers, suppliers, or other outside parties.
 8. Drawing Files: The Contractor may develop coordination drawings using 2D CAD software or with 3D BIM software with clash-detection functionality.
 - a. The Architect will furnish original 3D BIM model or 2D DWG files for Contractor's use upon receipt of Architect's "Request Form for Electronic Files". A copy of this form shall be provided to the Contractor upon request.
 - 1) The Architect makes no guarantee to the accuracy of components in electronic files. The Contractor shall coordinate electronic data with the Contract

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Documents in order to provide final Coordination Drawings.

- 2) If using 2D files, the Contractor shall prepare drawings in multiple views (for example, RCP and section) to fully represent 3D space, for example plenum heights, wall assembly thicknesses, etc.
 9. Submittal: Submit Coordination Drawings as a "Submittal for Information." Architect will not approve Coordination Drawings, but will keep on file for use in subsequent coordination and conflict resolution.
- B. Coordination Conference: Schedule and conduct a Coordination Conference prior to beginning construction or rough-in of affected work. Require attendance by all affected trades and installers.
1. Identify the Coordination Conference as a "milestone" date on the Construction Progress Schedule.
 2. Advise the Architect of all potential conflicts identified in the Coordination Drawings and at the Coordination Conference.
 3. Do not proceed with construction or installation of components, materials, or systems until potential conflicts have been resolved and affected parties have agreed to a remedy.
 4. Remedies to address conflicts not identified in the Coordination Drawings, at the Coordination Conference, or otherwise addressed prior to construction or installation of affected components, materials, and systems, or discovery of a non-workable situation not identified or addressed, will not be considered as a basis for delay, time extension, or additional cost to the Contract.

3.09 REQUESTS FOR INFORMATION (RFI)

- A. Definition: A request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 3. Prepare using software provided by the Electronic Document Submittal Service.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is not included.
1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 016000 - Product Requirements)

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- c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 - 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
 - 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect's, and Contractor's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date and requested reply date.
 - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. When the Architect provides a response to an RFI, that RFI shall be considered closed. If there is additional information required, or a question about the response itself, then another RFI shall be generated by the Contractor. At no time shall an RFI be "re-opened" or remain open after the Architect has formally responded.

2. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
3. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
4. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
5. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.10 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 1. Coordinate with Contractor's construction schedule and schedule of values.
 2. Format schedule to allow tracking of status of submittals throughout duration of construction.
 3. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 4. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.
 - b. Account for a reasonable duration of time to allow for final color selections, approvals, and preparation of final finish schedules (one finish schedule for interior color selections, and one for exterior color selections). This period shall begin upon receipt of all submittals requiring color selection.

3.11 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Design data.
 3. Shop drawings.
 4. Samples for selection.
 5. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. Color Selection: In individual specification sections, specific items are identified which require color/finish selections to be made by the Architect from color chart or sample submittals. The Submittal Schedule, prepared according to "Submittal Schedule" paragraph above, shall identify these required color/finish submittals.
 1. Submittals requiring color selection must be submitted by Contractor and approved by Architect for conformance with Contract Documents prior to the start of the color selection process. When the submittals have been approved for conformance with Contract Documents, the process for color selection, presentation of color concepts, Owner approval, and Color Schedule preparation will begin.

2. Interior Color Selections: The Architect will make coordinated selections of colors/finishes for the building interior, present the resulting color concepts to the Owner for approval, and prepare the actual Interior Color Schedule for the Work.
 3. Exterior Color Selections: The Architect will make coordinated selections of colors/finishes for the building exterior and prepare Exterior Color Schedule.
- E. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below.

3.12 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
1. Certificates.
 2. Test reports.
 3. Inspection reports.
 4. Manufacturer's instructions.
 5. Manufacturer's field reports.
 6. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.13 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 017800 - Closeout Submittals:
1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.

3.14 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Selection Samples: Submit one set of manufacturer's charts indicating full range of available colors, textures, patterns, and other aesthetic qualities.
- C. Verification Samples: Submit three sets of physical samples. Two sets will be retained by Architect, the third will be returned to the Contractor. Maintain approved sample at the Project site for use in comparing to installed Work.
1. Where a full-size assembly of multiple components is required as a sample (for example, railing section or full-size cabinet), only one sample is required for those items.

3.15 SUBMITTAL PROCEDURES

- A. General Requirements:
1. Use a single transmittal for all submittals required by each individual specification section, unless otherwise indicated.
 - a. Verification samples and large shop drawing submittals may be submitted under separate cover when approved by Architect.
 2. Transmit using AIA G810 or other approved form.
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3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 6. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
 7. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. Allow sufficient time for administrative processing, Architect's initial review, and potential resubmittals.
 - 1) Large submittals may require longer review durations. Large or multi-part submittals (such as structural steel or aluminum storefront and curtainwall) may be submitted by building area, building level, or otherwise subdivided "packages" with the approval of the Architect. Subdivided "packages" will be reviewed one at a time in the order received. If large submittals are submitted in their entirety as a single package, the Architect may elect to review and return portions of the submittal individually, and will coordinate the schedule for return of these partial reviews with the Contractor for sequencing in the Work.
 - b. Allow additional time for submittals requiring sequential reviews involving Architect's consultants, Owner, or another affected party.
 - c. Allow additional time for submittals requiring sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval.
 - d. No extensions to the project schedule shall be granted due to delays that can be attributed to submittal processing or failure to allow for sequential reviews or resubmittals.
 8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 9. When revised for resubmission, identify all changes made since previous submission.
 10. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 11. Incomplete submittals may not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 12. Submittals not requested will be recognized, and will be returned "Not Reviewed".
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Submit concurrently with related shop drawing submittal.
 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 2. Do not reproduce Contract Documents to create shop drawings.
-

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3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
 3. Selection Samples: Provide color charts that accurately relay color, pattern, and texture information. Photographs or photocopies of color charts are unacceptable and subject to rejection.
 4. Verification Samples: Provide physical samples of each color selected by Architect from Selection Samples. Verification samples shall be manufactured and prepared identically to the material that shall be used in the installed Work. Label each sample clearly with manufacturer, product name, and color, texture, and/or pattern name as applicable. Photographs of physical samples are unacceptable and subject to rejection.

3.16 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt, but will take no other action.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved as Noted":
 - 1) Where review notations indicate revisions are necessary, submit corrected item, with review notations acknowledged and incorporated.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit":
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - b. "Rejected/Resubmit":
 - 1) New submittal required, with item complying with requirements of Contract Documents.
 - c. "Color Selection Required":
 - 1) Color selections for the entire project, or portion thereof, will be provided after receipt of all color charts and samples required for the Project.
 - d. "Not Submitted":
 - 1) Additional submittal items are required that were not provided in the original submittal.
- E. Architect's actions on items submitted for information:
1. Items for which no action was taken:
 - a. "Not Reviewed": To notify the Contractor that the submittal has been received for record only.

END OF SECTION 013000

**SECTION 013216
CONSTRUCTION PROGRESS SCHEDULE**

PART 1 GENERAL

1.01 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit in PDF format.

1.02 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.

1.03 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify work of separate phases and other logically grouped activities.
- C. Identify all major milestone dates, including, but not limited to, Notice to Proceed and Substantial and Final Completion dates.
- D. Identify duration of each activity, in maximum 15 day intervals.
- E. Incorporate work restrictions indicated in Division 1 Section "Summary," if any.
- F. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- G. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.

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- H. Indicate procurement duration and delivery dates for long-lead time items.
- I. Coordinate submittal approval process with procurement and delivery requirements. Submittals requiring resubmission or revision for approval will not be allowed as a basis for schedule impacts.
- J. Indicate delivery dates for owner-furnished products.
- K. Indicate the time period for color selection activity and approval by Owner and Architect, as required per Division 1 Section "Administrative Requirements."
- L. Indicate date of changeover from temporary to permanent utilities.
- M. Indicate time periods for Commissioning activities, equipment startup, and testing and balancing.
- N. Provide a reasonable time period prior to the date of Substantial Completion for administrative activities and procedures.
- O. Provide legend for symbols and abbreviations used.

3.03 NETWORK ANALYSIS (CPM)

- A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.
- B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
 - 1. Preceding and following event numbers.
 - 2. Activity description.
 - 3. Estimated duration of activity, in maximum 15 day intervals.
 - 4. Earliest start date.
 - 5. Earliest finish date.
 - 6. Actual start date.
 - 7. Actual finish date.
 - 8. Latest start date.
 - 9. Latest finish date.
 - 10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
 - 11. Percentage of activity completed.
 - 12. Responsibility.
- D. Analysis Program: Capable of accepting revised completion dates, and recomputation of all dates and float.
- E. Required Reports: List activities in sorts or groups:
 - 1. By preceding work item or event number from lowest to highest.
 - 2. By amount of float, then in order of early start.
 - 3. In order of latest allowable finish dates.
 - 4. Listing of activities on the critical path.

3.04 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
 - B. Evaluate project status to determine work behind schedule and work ahead of schedule.
-

- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Schedule revisions shall not modify any Contract Dates or the Contract Sum, unless specifically approved and documented via Change Order.
- G. Submit reports required to support recommended changes.
- H. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.
- I. Recovery Schedule: If the Contractor is 14 or more days behind schedule, in the opinion of the Owner, the Contractor shall prepare a Recovery Schedule, incorporating a reasonable, mutually agreed upon length of time to return the Work to the approved Schedule. The Recovery Schedule shall be prepared to the same level of detail as the original construction progress schedule. Submit the recovery schedule for Owner review; do not proceed until the Owner has approved.
 - 1. At the end of the recovery period, Owner shall reevaluate construction progress and determine if the Recovery Schedule has been successfully completed. If completed, Owner shall direct the Contractor to proceed with the latest approved Construction Schedule.
 - a. If the Contractor is still behind schedule at the end of the recovery period, the Owner shall direct the Contractor to provide additional schedule revisions to complete the recovery, or may at its option pursue other means of resolution as provided for by the Contract Documents.
 - 2. Need for and preparation of a Recovery Plan shall not be the basis of additional cost to the Owner or extension of Project Schedule, unless the Contractor can demonstrate that the reason for being behind schedule is no fault of their own.

3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION 013216

**SECTION 014000
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 014200 - Definitions and Reference Standards.

1.02 DEFINITIONS

- A. Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
- B. Contractor's Professional Design Services/Delegated Design: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
 - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- C. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.03 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Temporary sheeting, shoring, or supports.
 - 2. Temporary scaffolding.
 - 3. Temporary bracing.
 - 4. Temporary falsework for support of spanning or arched structures.
 - 5. Temporary foundation underpinning.
 - 6. Temporary stairs or steps required for construction access only.
 - 7. Temporary hoist(s) and rigging.
 - 8. Investigation of soil conditions and design of temporary foundations to support construction equipment.
 - 9. Additional temporary controls as required.

1.04 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
 - 1. Submit a Request for Information to Architect if the criteria indicated are not sufficient to perform required design services.

- C. Scope of Design Services/Delegated Design: As required by individual specification sections.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.
1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
 - a. Full name.
 - b. Professional licensure information.
 - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
 2. Include required product data and shop drawings.
 3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- D. Test Reports: After each test/inspection, require testing agency to promptly distribute digital copy of report to Architect, Owner, Contractor, and others as required.
1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

G. Manufacturer's Field Reports:

1. Submit report promptly to Architect for information.
2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
2. Qualification Statement: Provide documentation showing testing laboratory is accredited under OSHA's Nationally Recognized Testing Laboratory (NRTL) program or through the National Institute of Standards and Technology's (NIST's) National Voluntary Laboratory Accreditation Program (NVLAP).

B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

C. Contractor's Quality Control (CQC) Plan:

1. Prior to start of work, submit a comprehensive plan describing how contract deliverables will be produced. Tailor CQC plan to specific requirements of the project. Include the following information:
 - a. Management Structure: Identify personnel responsible for quality. Include a chart showing lines of authority.
 - 1) Include qualifications (in resume form), duties, responsibilities of each person assigned to CQC function.
 - b. Management Approach: Define, describe, and include in the plan specific methodologies used in executing the work.
 - 1) Management and control of documents and records relating to quality.
 - 2) Communications.
 - 3) Coordination procedures.
 - 4) Resource management.
 - 5) Process control.
 - 6) Inspection and testing procedures and scheduling, including inspections by authorities having jurisdiction and special inspections.
 - 7) Control of noncomplying work.
 - 8) Tracking deficiencies from identification, through acceptable corrective action, and verification.
 - 9) Control of testing and measuring equipment.
 - 10) Project materials certification.
 - 11) Managerial continuity and flexibility.
 - c. Acceptance of the plan is required prior to start of construction activities not including mobilization work. Owner's acceptance of the plan will be conditional and predicated on continuing satisfactory adherence to the plan. Owner reserves the right to require Contractor to make changes to the plan and operations, including removal of personnel, as necessary, to obtain specified quality of work results.

1.07 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, comply with the higher quality or quantity, and provide documentation of the conflict to the Architect.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.08 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ and pay for services of an independent testing agency to perform Special Inspections and other specified testing indicated in individual specification sections.
- B. Where indicated in individual specification sections, Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. Contractor Employed Agency: Testing agency shall comply with requirements of ASTM E 329, and shall be certified through OSHA's Nationally Recognized Testing Laboratory (NRTL) program or through the National Institute of Standards and Technology's (NIST's) National Voluntary Laboratory Accreditation Program (NVLAP).
 - 1. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.

- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- E. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
 - 1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
 - 2. Make corrections as necessary until Architect's approval is issued.
- F. Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- G. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
 - B. Testing Agency Duties for Contractor-employed Testing and Inspection Agencies:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 6. Perform additional tests and inspections required by Architect.
 - 7. Attend preconstruction meetings and progress meetings.
 - 8. Submit reports of all tests/inspections specified.
 - C. Limits on Testing/Inspection Agency Authority:
-

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1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 7. Coordinate repairs where testing and inspection has damaged the Work.
- E. Re-testing and/or re-inspections required because of non-compliance with specified requirements shall be performed by the same agency. Do not proceed with construction activities that would conceal or cover work needing re-testing or re-inspection.
- F. Re-testing and/or re-inspections required because of non-compliance with specified requirements shall be paid for by Contractor.

3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, and field quality control requirements as applicable, and to initiate instructions when necessary.
- B. Provide a written report of observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions or Contract Documents. Obtain Owner's approval prior to proceeding with any modifications.

3.06 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. Contractor may request to restore defective Work or portions of the Work to comply with specified requirements in lieu of replacement. Obtain Owner's approval prior to proceeding with restoration.
- C. If, in the opinion of Owner, it is not practical to restore or remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION 014000

SECTION 014200
DEFINITIONS AND REFERENCE STANDARDS

PART 1 GENERAL

1.01 SUMMARY

- A. The definitions include in this section supplement, but do not replace, the definitions contained in the General Conditions. In the event of duplication, the General Conditions shall govern.
- B. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Provide: To furnish and install.
- E. Supply: Same as Furnish.
- F. Installer: A Contractor or other entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that specified requirements apply exclusively to tradespeople of the corresponding generic name.
- G. Experienced: When used with the term "Installer," this term means having successfully completed previous work similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with the requirements of local authorities having jurisdiction.
- H. Replace: Provide an acceptable like product or material in place of a missing or unacceptable (rejected) product or material. To "replace" an unacceptable product or material includes its removal and disposal.
- I. Punch List: A written list of unfinished Work and defective Work resulting from inspection and testing to determine whether Substantial Completion has been accomplished. The unfinished Work and defective Work must be finished and corrected to obtain Substantial or Final Completion, in accordance with the General Conditions.
- J. Written or Printed: When used in conjunction with manufacturer's product data or installation requirements, either of these terms may be used to require compliance with manufacturer's current printed and published information.

1.03 REFERENCE STANDARDS

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified, or are required by applicable codes or local authorities having jurisdiction.

- B. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- C. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 014200

SECTION 014520 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 SUMMARY

- A. This Section includes TAB to produce design objectives for the following:

- 1. Balancing Air Systems:

- a. Constant-volume air systems.
- b. Variable-air-volume systems.

- 2. Balancing Hydronic Piping Systems:

- a. Variable-flow systems.

- 3. Equipment

- a. Motors.
- b. Heat Transfer Coils.
- c. Rooftop units.
- d. Dedicated Outside air units.
- e. Verifying that automatic control devices are functioning properly.

1.3 DEFINITIONS

- A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.
- B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.
- C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.
- D. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.
- E. NC: Noise criteria.

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- F. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.
- G. RC: Room criteria.
- H. Report Forms: Test data sheets for recording test data in logical order.
- I. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.
- J. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.
- K. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- L. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- M. TAB: Testing, adjusting, and balancing.
- N. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- O. Test: A procedure to determine quantitative performance of systems or equipment.
- P. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.

1.4 SUBMITTALS

- A. Qualification Data: Within 30 days from Contractor's Notice to Proceed, submit 2 copies of evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 45 days from Contractor's Notice to Proceed, submit 2 copies of the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 60 days from Contractor's Notice to Proceed, submit 2 copies of TAB strategies and step-by-step procedures as specified in Part 3 "Preparation" Article. Include a complete set of report forms intended for use on this Project.
- D. Certified TAB Reports: Submit two copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.
- E. Sample Report Forms: Submit two sets of sample TAB report forms.
- F. Warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. TAB Firm Qualifications: Engage a TAB firm with field supervisor and technicians certified by AABC or NEBB.
- B. TAB Conference: Meet with Owner's and Architect's representatives on approval of TAB strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of TAB team members, equipment manufacturers' authorized service representatives, HVAC controls installers, and other support personnel. Provide seven days' advance notice of scheduled meeting time and location.
 - 1. Agenda Items: Include at least the following:
 - a. Submittal distribution requirements.
 - b. The Contract Documents examination report.
 - c. TAB plan.
 - d. Work schedule and Project-site access requirements.
 - e. Coordination and cooperation of trades and subcontractors.
 - f. Coordination of documentation and communication flow.
- C. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - 2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.
- D. TAB Report Forms: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
- E. Instrumentation Type, Quantity, and Accuracy: As described in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."
- F. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.
 - 1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

1.6 PROJECT CONDITIONS

- A. 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.

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1.7 COORDINATION

- A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.
- B. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
- C. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.8 WARRANTY

- A. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:
 - 1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
 - 2. Systems are balanced to optimum performance capabilities within design and installation limits.

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.
 - 1. Contract Documents are defined in the General and Supplementary Conditions of Contract.
 - 2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- B. Examine approved submittal data of HVAC systems and equipment.
- C. Examine Project Record Documents described in Division 01 Section "Project Record Documents."

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- 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. 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. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.
- F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.
- G. Examine system and equipment test reports.
- H. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- I. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- J. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- K. Examine terminal units, such as variable-air-volume boxes, to verify that they are accessible and their controls are connected and functioning.
- L. Examine strainers for clean screens and proper perforations.
- M. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.
- N. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- O. Examine system pumps to ensure absence of entrained air in the suction piping.
- P. Examine equipment for installation and for properly operating safety interlocks and controls.
- Q. Examine automatic temperature system components to verify the following:
 - 1. Dampers, valves, and other controlled devices are operated by the intended controller.
 - 2. Dampers and valves are in the position indicated by the controller.

3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in mixing boxes and variable-air-volume terminals.
 4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
 5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
 6. Sensors are located to sense only the intended conditions.
 7. Sequence of operation for control modes is according to the Contract Documents.
 8. Controller set points are set at indicated values.
 9. Interlocked systems are operating.
 10. Changeover from heating to cooling mode occurs according to indicated values.
- R. 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. Perform system readiness checks of HVAC systems and equipment to verify readiness for TAB work. Verify the following:
1. Airside:
 - a. Permanent electrical power wiring is complete.
 - b. Hydronic systems are filled, clean, and free of air.
 - c. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
 - d. Duct systems are complete with terminals installed.
 - e. Volume, smoke, and fire dampers are open and functional.
 - f. Clean filters are installed.
 - g. Fans are operating, free of vibration, and rotating in correct direction.
 - h. Variable-frequency controllers' startup is complete and safeties are verified.
 - i. Automatic temperature-control systems are operational.
 - j. Equipment and duct access doors are securely closed.
 - k. Isolating and balancing valves are open and control valves are operational.
 - l. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - m. 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 NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" or AABC's "National Standards for Total System Balance" and this Section.

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- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.
- C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, 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. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.
- E. Check airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling unit components.
- L. Verify that air duct systems are 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 fan static pressures to determine actual static pressure as follows:
 - a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.

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- 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 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.
2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
 - a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.
 3. Measure static pressures entering and leaving other devices such as sound traps, heat recovery equipment, and air washers, under final balanced conditions.
 4. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
 5. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to pulley sizes, motor sizes, and electrical connections to accommodate fan-speed changes.
 6. 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 modes 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 static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.
 - 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. 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 terminal 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 terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Adjust using 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.

3.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Compensating for Diversity: When the total airflow of all terminal units is more than the indicated airflow of the fan, place a selected number of terminal units at a maximum set-point airflow condition until the total airflow of the terminal units equals the indicated airflow of the fan. Select the reduced airflow terminal units so they are distributed evenly among the branch ducts.
- B. Pressure-Independent, Variable-Air-Volume Systems: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
 1. Set outside-air dampers at minimum, and return- and exhaust-air dampers at a position that simulates full-cooling load.
 2. Select the terminal unit that is most critical to the supply-fan airflow and static pressure. Measure static pressure. Adjust system static pressure so the entering static pressure for the critical terminal unit is not less than the sum of terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 3. Measure total system airflow. Adjust to within indicated airflow.
 4. Set terminal units at maximum airflow and adjust controller or regulator to deliver the designed maximum airflow. Use terminal-unit manufacturer's written instructions to make this adjustment. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
 5. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow as described for constant-volume air systems.
 - a. If air outlets are out of balance at minimum airflow, report the condition but leave outlets balanced for maximum airflow.
 6. Remeasure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.
 7. Measure static pressure at the most critical terminal unit and adjust the static-pressure controller at the main supply-air sensing station to ensure that adequate static pressure is maintained at the most critical unit.
 8. Record the final fan performance data.

3.7 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 1. Manufacturer, model, and serial numbers.

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.
8. Service factor and frame size.

- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass (if provided) for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.8 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record compressor data.

3.9 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Water Coils: Measure the following data for each coil:
1. Entering- and leaving-water temperature.
 2. Water flow rate.
 3. Water pressure drop for major (more than 10 gpm) equipment coils.
 4. Dry-bulb temperature of entering and leaving air.
 5. Wet-bulb temperature of entering and leaving air for cooling coils.
 6. Airflow.
 7. Air pressure drop.
- B. Electric-Heating Coils: Measure the following data for each coil:
1. Nameplate data.
 2. Airflow.
 3. Entering- and leaving-air temperature at full load.
 4. Voltage and amperage input of each phase at full load and at each incremental stage.
 5. Calculated kilowatt at full load.
 6. Fuse or circuit-breaker rating for overload protection.
- C. Refrigerant Coils: Measure the following data for each coil:
1. Dry-bulb temperature of entering and leaving air.
 2. Wet-bulb temperature of entering and leaving air.
 3. Airflow.
 4. Air pressure drop.

5. Refrigerant suction pressure and temperature.

3.10 PROCEDURES FOR TEMPERATURE MEASUREMENTS

- A. During TAB, report the need for adjustment in temperature regulation within the automatic temperature-control system.
- B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of two successive eight-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.
- C. Measure outside-air, wet- and dry-bulb temperatures.

3.11 TEMPERATURE-CONTROL VERIFICATION

- A. Verify that controllers are calibrated and commissioned.
- B. Check transmitter and controller locations and note conditions that would adversely affect control functions.
- C. Record controller settings and note variances between set points and actual measurements.
- D. Check the operation of limiting controllers (i.e., high- and low-temperature controllers).
- E. Check free travel and proper operation of control devices such as damper and valve operators.
- F. Check the sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water flow measurements. Note the speed of response to input changes.
- G. Check the interaction of electrically operated switch transducers.
- H. Check the interaction of interlock and lockout systems.
- I. Record voltages of power supply and controller output. Determine whether the system operates on a grounded or nongrounded power supply.
- J. Note operation of electric actuators using spring return for proper fail-safe operations.

3.12 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
 - 1. Supply, Return, Exhaust Fans and Equipment with Fans: 0 to plus 10 percent.
 - 2. Air Outlets and Inlets: Minus 5 to plus 10 percent.
 - 3. Return Inlets: Minus 5 to plus 10 percent.
 - 4. Exhaust Inlets: 0 to plus 10 percent.
 - 5. Heating-Water Flow Rate: 0 to minus 10 percent.

6. Cooling-Water Flow Rate: 0 to minus 5 percent.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.13 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: As Work progresses, prepare 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.

3.14 FINAL REPORT

A. General: Prepare a certified written report in three-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

1. Include a list of instruments used for procedures, along with proof of calibration.

C. 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, but do not include Shop Drawings and Product Data.

D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:

1. Title page.
2. Name and address of TAB firm.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.

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8. Report date.
 9. Signature of TAB firm 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, type size, and fittings.
 14. Notes to explain why certain final data in the body of reports varies from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outside-, 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. Settings for supply-air, static-pressure controller.
 - g. Other system operating conditions that affect performance.
- E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outside, supply, return, and exhaust airflows.
 2. Water flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.
- F. Air-Handling Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data: Include the following:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Sheave dimensions, center-to-center, and amount of adjustments in inches.
 - j. Number of belts, make, and size.

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- k. Number of filters, type, and size.
2. Motor Data:
 - a. 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. Sheave dimensions, center-to-center, and amount of adjustments in inches.
 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. Filter static-pressure differential in inches wg.
 - f. Preheat coil static-pressure differential in inches wg.
 - g. Cooling coil static-pressure differential in inches wg.
 - h. Heating coil static-pressure differential in inches wg.
 - i. Outside airflow in cfm.
 - j. Return airflow in cfm.
 - k. Outside-air damper position.
 - l. Return-air damper position.
- G. Apparatus-Coil Test Reports:
1. Coil Data:
 - a. System identification.
 - b. Location.
 - c. Coil type.
 - d. Number of rows.
 - e. Fin spacing in fins per inch o.c.
 - f. Make and model number.
 - g. Face area in sq. ft.
 - h. Tube size in NPS.
 - i. Tube and fin materials.
 - j. Circuiting arrangement.
 2. Test Data (Indicated and Actual Values):
 - a. Airflow rate in cfm.
 - b. Average face velocity in fpm.
 - c. Air pressure drop in inches wg.
 - d. Outside-air, wet- and dry-bulb temperatures in deg F.
 - e. Return-air, wet- and dry-bulb temperatures in deg F.
 - f. Entering-air, wet- and dry-bulb temperatures in deg F.
 - g. Leaving-air, wet- and dry-bulb temperatures in deg F.

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- h. Water flow rate in gpm.
 - i. Water pressure differential in feet of head or psig.
 - j. Entering-water temperature in deg F.
 - k. Leaving-water temperature in deg F.
 - l. Refrigerant expansion valve and refrigerant types.
 - m. Refrigerant suction pressure in psig.
 - n. Refrigerant suction temperature in deg F.
- H. Gas-Fired Heating 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 Btuh.
 - 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. Sheave dimensions, center-to-center, and amount of adjustments in inches.
 - 2. Test Data (Indicated and Actual Values):
 - a. Total airflow 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 Btuh.
 - i. High-fire fuel input in Btuh.
 - j. Manifold pressure in psig.
 - k. High-temperature-limit setting in deg F.
 - l. Operating set point in Btuh.
 - m. Motor voltage at each connection.
 - n. Motor amperage for each phase.
- I. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
- 1. Unit Data:

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- a. System identification.
 - b. Location.
 - c. Coil identification.
 - d. Capacity in Btuh.
 - e. Number of stages.
 - f. Connected volts, phase, and hertz.
 - g. Rated amperage.
 - h. Airflow rate in cfm.
 - i. Face area in sq. ft.
 - j. Minimum face velocity in fpm.
2. Test Data (Indicated and Actual Values):
 - a. Heat output in Btuh.
 - b. Airflow rate in cfm.
 - c. Air velocity in fpm.
 - d. Entering-air temperature in deg F.
 - e. Leaving-air temperature in deg F.
 - f. Voltage at each connection.
 - g. Amperage for each phase.
- J. 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. Sheave dimensions, center-to-center, and amount of adjustments in inches.
 2. Motor Data:
 - a. 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. Sheave dimensions, center-to-center, and amount of adjustments in inches.
 - g. Number of belts, make, and size.
 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.

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- e. Suction static pressure in inches wg.
- K. Round, Flat-Oval, 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 airflow rate in cfm.
 - h. Indicated velocity in fpm.
 - i. Actual airflow rate in cfm.
 - j. Actual average velocity in fpm.
 - k. Barometric pressure in psig.
- L. Air-Terminal-Device Reports:
- 1. Unit Data:
 - a. System and air-handling unit identification.
 - b. Location and zone.
 - c. Test apparatus used.
 - d. Area served.
 - e. Air-terminal-device make.
 - f. Air-terminal-device number from system diagram.
 - g. Air-terminal-device type and model number.
 - h. Air-terminal-device size.
 - i. Air-terminal-device effective area in sq. ft.
 - 2. Test Data (Indicated and Actual Values):
 - a. Airflow rate in cfm.
 - b. Air velocity in fpm.
 - c. Preliminary airflow rate as needed in cfm.
 - d. Preliminary velocity as needed in fpm.
 - e. Final airflow rate in cfm.
 - f. Final velocity in fpm.
 - g. Space temperature in deg F.
- M. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:
- 1. Unit Data:
 - a. System and air-handling unit identification.
 - b. Location and zone.
 - c. Room or riser served.

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- d. Coil make and size.
 - e. Flow meter type.
2. Test Data (Indicated and Actual Values):
- a. Airflow rate in cfm.
 - b. Entering-water temperature in deg F.
 - c. Leaving-water temperature in deg F.
 - d. Water pressure drop in feet of head or psig.
 - e. Entering-air temperature in deg F.
 - f. Leaving-air temperature in deg F.
- N. Compressor and Condenser Reports: For refrigerant side of unitary systems, stand-alone refrigerant compressors, air-cooled condensing units, or water-cooled condensing units, include the following:
1. Unit Data:
- a. Unit identification.
 - b. Location.
 - c. Unit make and model number.
 - d. Compressor make.
 - e. Compressor model and serial numbers.
 - f. Refrigerant weight in lb.
 - g. Low ambient temperature cutoff in deg F.
2. Test Data (Indicated and Actual Values):
- a. Inlet-duct static pressure in inches wg.
 - b. Outlet-duct static pressure in inches wg.
 - c. Entering-air, dry-bulb temperature in deg F.
 - d. Leaving-air, dry-bulb temperature in deg F.
 - e. Condenser entering-water temperature in deg F.
 - f. Condenser leaving-water temperature in deg F.
 - g. Condenser-water temperature differential in deg F.
 - h. Condenser entering-water pressure in feet of head or psig.
 - i. Condenser leaving-water pressure in feet of head or psig.
 - j. Condenser-water pressure differential in feet of head or psig.
 - k. Control settings.
 - l. Unloader set points.
 - m. Low-pressure-cutout set point in psig.
 - n. High-pressure-cutout set point in psig.
 - o. Suction pressure in psig.
 - p. Suction temperature in deg F.
 - q. Condenser refrigerant pressure in psig.
 - r. Condenser refrigerant temperature in deg F.
 - s. Oil pressure in psig.
 - t. Oil temperature in deg F.
 - u. Voltage at each connection.
 - v. Amperage for each phase.

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- w. Kilowatt input.
 - x. Crankcase heater kilowatt.
 - y. Number of fans.
 - z. Condenser fan rpm.
 - aa. Condenser fan airflow rate in cfm.
 - bb. Condenser fan motor make, frame size, rpm, and horsepower.
 - cc. Condenser fan motor voltage at each connection.
 - dd. Condenser fan motor amperage for each phase.
- O. Cooling Tower or Condenser Test Reports: For cooling towers or condensers, include the following:
- 1. Unit Data:
 - a. Unit identification.
 - b. Make and type.
 - c. Model and serial numbers.
 - d. Nominal cooling capacity in tons.
 - e. Refrigerant type and weight in lb.
 - f. Water-treatment system.
 - g. Number and type of fans.
 - h. Fan motor make, frame size, rpm, and horsepower.
 - i. Fan motor voltage at each connection.
 - j. Sheave make, size in inches, and bore.
 - k. Sheave dimensions, center-to-center, and amount of adjustments in inches.
 - l. Number of belts, make, and size.
 - m. Pump make and model number.
 - n. Pump manufacturer's serial number.
 - o. Pump motor make and frame size.
 - p. Pump motor horsepower and rpm.
 - 2. Pump Test Data (Indicated and Actual Values):
 - a. Voltage at each connection.
 - b. Amperage for each phase.
 - c. Water flow rate in gpm.
 - 3. Water Test Data (Indicated and Actual Values):
 - a. Entering-water temperature in deg F.
 - b. Leaving-water temperature in deg F.
 - c. Water temperature differential in deg F.
 - d. Entering-water pressure in feet of head or psig.
 - e. Leaving-water pressure in feet of head or psig.
 - f. Water pressure differential in feet of head or psig.
 - g. Water flow rate in gpm.
 - h. Bleed water flow rate in gpm.
 - 4. Air Data (Indicated and Actual Values):

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- a. Duct airflow rate in cfm.
 - b. Inlet-duct static pressure in inches wg.
 - c. Outlet-duct static pressure in inches wg.
 - d. Average entering-air, wet-bulb temperature in deg F.
 - e. Average leaving-air, wet-bulb temperature in deg F.
 - f. Ambient wet-bulb temperature in deg F.
- P. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:
1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Service.
 - d. Make and size.
 - e. Model and serial numbers.
 - f. Water flow rate in gpm.
 - g. Water pressure differential in feet of head or psig.
 - h. Required net positive suction head in feet of head or psig.
 - i. Pump rpm.
 - j. Impeller diameter in inches.
 - k. Motor make and frame size.
 - l. Motor horsepower and rpm.
 - m. Voltage at each connection.
 - n. Amperage for each phase.
 - o. Full-load amperage and service factor.
 - p. Seal type.
 2. Test Data (Indicated and Actual Values):
 - a. Static head in feet of head or psig.
 - b. Pump shutoff pressure in feet of head or psig.
 - c. Actual impeller size in inches.
 - d. Full-open flow rate in gpm.
 - e. Full-open pressure in feet of head or psig.
 - f. Final discharge pressure in feet of head or psig.
 - g. Final suction pressure in feet of head or psig.
 - h. Final total pressure in feet of head or psig.
 - i. Final water flow rate in gpm.
 - j. Voltage at each connection.
 - k. Amperage for each phase.
- Q. Boiler Test Reports:
1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Service.

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- d. Make and type.
 - e. Model and serial numbers.
 - f. Fuel type and input in Btuh.
 - g. Number of passes.
 - h. Ignition type.
 - i. Burner-control types.
 - j. Voltage at each connection.
 - k. Amperage for each phase.
2. Test Data (Indicated and Actual Values):
- a. Operating pressure in psig.
 - b. Operating temperature in deg F.
 - c. Entering-water temperature in deg F.
 - d. Leaving-water temperature in deg F.
 - e. Number of safety valves and sizes in NPS.
 - f. Safety valve settings in psig.
 - g. High-limit setting in psig.
 - h. Operating-control setting.
 - i. High-fire set point.
 - j. Low-fire set point.
 - k. Voltage at each connection.
 - l. Amperage for each phase.
 - m. Draft fan voltage at each connection.
 - n. Draft fan amperage for each phase.
 - o. Manifold pressure in psig.
- R. Air-to-Air Heat-Recovery Unit Reports:
1. Unit Data:
- a. Unit identification.
 - b. Location.
 - c. Service.
 - d. Make and type.
 - e. Model and serial numbers.
2. Motor Data:
- a. 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. Sheave dimensions, center-to-center, and amount of adjustments in inches.
3. If fans are an integral part of the unit, include the following for each fan:
- a. Make and type.
 - b. Arrangement and size.

- c. Sheave make, size in inches, and bore.
 - d. Sheave dimensions, center-to-center, and amount of adjustments in inches.
4. Test Data (Indicated and Actual Values):
- a. Total exhaust airflow rate in cfm.
 - b. Purge exhaust airflow rate in cfm.
 - c. Outside airflow rate in cfm.
 - d. Total exhaust fan static pressure in inches wg.
 - e. Total outside-air fan static pressure in inches wg.
 - f. Pressure drop on each side of recovery wheel in inches wg.
 - g. Exhaust air temperature entering in deg F.
 - h. Exhaust air temperature leaving in deg F.
 - i. Outside-air temperature entering in deg F.
 - j. Outside-air temperature leaving in deg F.
 - k. Calculate sensible and total heat capacity of each airstream in MBh.

S. Instrument Calibration Reports:

1. Report Data:

- a. Instrument type and make.
- b. Serial number.
- c. Application.
- d. Dates of use.
- e. Dates of calibration.

3.15 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. Randomly check the following for each system:
 - a. Measure airflow of at least 10 percent of air outlets.
 - b. Measure water flow of at least 10 percent of terminals.
 - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
 - d. Verify that balancing devices are marked with final balance position.
 - e. Note deviations to the Contract Documents in the Final Report.

B. Final Inspection:

- 1. After initial inspection is complete and evidence 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.

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2. TAB firm test and balance engineer shall conduct the inspection in the presence of Owner.
3. Architect shall randomly select measurements documented in the final report to be rechecked. The 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 the 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.
6. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.
7. Request a second final inspection. If the second final inspection also fails, Owner shall contract the services of another TAB firm to complete the testing and balancing in accordance with the Contract Documents and deduct the cost of the services from the final payment.

3.16 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional testing and balancing 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 testing, inspecting, and adjusting during near-peak summer and winter conditions.

END OF SECTION 014520

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).

1.02 DEWATERING

- A. Provide temporary means and methods for dewatering all temporary facilities and controls, in compliance with local authority having jurisdiction.
- B. Maintain temporary facilities in operable condition.

1.03 TEMPORARY UTILITIES

- A. Owner will provide the following:
 - 1. Electrical power, consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.
- B. The Contractor shall provide and pay for all lighting, heating and cooling, and ventilation required for construction purposes.
- C. The Contractor shall provide all connections to existing facilities, and shall provide and pay for supplemental electrical or water if required.
- D. New permanent facilities may be used only with prior Owner authorization.
 - 1. If authorized, the use of permanent facilities shall not impact specified warranties. Equipment shall be maintained during temporary usage.
- E. Temporary Lighting: Provide temporary lighting of type and producing lighting levels necessary for proper installation of the Work.
- F. Temporary Heating, Cooling, and Ventilation: Provide temporary measures and equipment as required for curing, drying, and humidity control. Comply with manufacturer's installation instructions for specific product requirements.
 - 1. Provide measures and equipment to meet warranty requirements of interior woodwork specified in Division 6 and/or Division 12 sections.
 - 2. Use of Permanent HVAC Facilities and Equipment: Use of HVAC equipment shall be subject to Owner approval.
 - a. Protect new and existing HVAC equipment from intrusion of dust, silica, dirt and debris during construction operations.
 - b. Cover all openings in new and existing inactive ductwork during construction operation with minimum 6 mil polyethylene sheet.
 - c. Where use of existing HVAC equipment is approved by Owner, provide temporary filters with a minimum MERV of 8. Change the filters every two weeks while construction is ongoing. Provide new filters at Substantial Completion; do not change out temporary filter until approved by Architect.
 - d. Do not perform testing and balancing of HVAC equipment until dust, silica, dirt and debris producing activities are complete.

- G. Temporary Sewer and Drainage: Comply with requirements of local authority having jurisdiction for connection of temporary sewer to public system.

1.04 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Telephone Service: Contractor shall ensure that all of its forces, including on-site managers/supervisors of each Subcontractor, have mobile devices and adequate voice and data coverage for on-site operations
 - 2. Internet Connections: Minimum of one; DSL modem or faster.
 - 3. Video Conferencing and Video Site Visit/Walkthrough Infrastructure: Maintain personal computer/laptop with large format display screen and video conferencing software in the common-use field office.
 - a. Maintain equipment in common-use field office for site visits and walkthroughs, including a portable, high quality digital video camera, audio headset with microphone for walkthrough commentary/narration, and accessories including connection cables and battery packs.

1.05 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
 - 1. Provide temporary unisex toilet units and all required disposable supplies.
 - 2. Provide handwash stations and hand sanitizer at each toilet unit.
 - 3. Provide regular servicing of portable facilities by professional servicing company; including draining, cleaning, and disinfecting.
- B. Maintain daily in clean and sanitary condition.

1.06 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building, and for emergency egress.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect vehicular traffic, stored materials, site, and structures from damage.

1.07 FENCING

- A. Barrier Mesh Fence: Provide minimum 6-foot height open-mesh polypropylene barrier fabric mounted on lumber or galvanized steel posts to isolate and define construction area and prevent accidental public access.
- B. Construction: Commercial grade chain link fence.
 - 1. Contractor may provide either fixed or portable fencing to suit conditions. For portable fencing, provide concrete or galvanized steel bases for supporting posts. Bases for portable fencing shall not obstruct sidewalks or other pathways used by pedestrians.
- C. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

- D. Unless otherwise indicated, provide barrier mesh fencing to enclose the approximate extent of the entire construction site. Chain link fencing shall be used to enclose Contractor's field office and laydown/storage areas, areas of the site actively in construction, and as deemed necessary by Contractor.

1.08 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.09 INTERIOR ENCLOSURES

- A. Provide temporary partitions to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces:
 - 1. Provide with acoustic batt insulation for a minimum STC rating of 35 in accordance with ASTM E90.
 - 2. Maximum flame spread rating of 75 in accordance with ASTM E84.

1.10 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
 - 1. Contractor shall repair damage to existing facilities caused by Construction operations.
- B. Coordinate with Owner's security program.
- C. Environmental Protection: Comply with EPA, OSHA and other regulatory requirements to prevent contamination of site, air, and public sewer/runoff.
 - 1. Provide additional work restrictions and protective measures as indicated on Civil/Site Drawings and as specified in Division 01 Section "Summary."

1.11 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Designated existing on-site roads may be used for construction traffic.
- F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.12 WASTE REMOVAL

- A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.
- B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- C. Provide containers with lids. Remove trash from site periodically.

- D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.13 PROJECT IDENTIFICATION

- A. Provide project identification sign of design and construction indicated on drawings.
 - 1. Obtain and pay for any permits required for temporary signage by local authority having jurisdiction.
- B. Erect on site at location(s) established by Architect.
- C. Provide temporary directional signage as directed to facilitate site access for visitors and other construction personnel.
- D. No other signs are allowed without Owner permission except those required by law.

1.14 FIELD OFFICES

- A. Field Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture and drawing display table.
 - 1. Provide space for Project meetings, with table and chairs to accommodate 10 persons.
 - 2. Provide drinking water/water cooler and a private bathroom.
 - 3. Maintain the following materials in the field office, available to Architect and Owner's representative at all times:
 - a. A complete, up-to-date set of all Contract Documents, including FCs, RFIs, PCOs, and COs.
 - b. A complete, up-to-date set of all reviewed final shop drawings.
 - c. The most recent, up-to-date version of Contractor's Progress Schedule.
- B. Locate offices a minimum distance of 30 feet from other structures.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove temporary underground installations.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.
- E. Restore new permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Rough Carpentry: 2x lumber, in length and depth required for floor to ceiling partitions. Partitions shall not be fastened to existing ceilings or flooring to remain. Provide additional bracing and concealed attachments to building structure.
- B. Gypsum Board: 1/2-inch gypsum wallboard; ASTM C 1396.
- C. Insulation: Mineral-wool fiber blankets; with maximum flame-spread and smoke-developed ratings of 25 and 50 when tested per ASTM E 84.

- D. Polyethylene Sheet: Minimum 10 mil reinforced sheeting; achieving a passing rating when tested per NFPA 701, and a maximum flame-spread rating of 15 when tested per ASTM E 84.
- E. Walk-Off Mats: Dust-, dirt- and silica-control walk-off mats at each entrance into the enclosed construction area and each entrance through temporary partitions.
- F. Hardware: Provide temporary hinges, latch, and lock at doors in temporary partitions. Where doors in temporary partitions are also indicated to serve as egress, provide ADA-compliant exit device and closer.

2.02 EQUIPMENT

- A. Fire Extinguishers: Provide portable UL rated extinguishers. Provide extinguisher types rated for potential classes of fire expected for construction work indicated.

PART 3 EXECUTION

3.01 ELEVATOR AND STAIR USAGE

- A. Use of existing elevator(s) is not permitted.
- B. Use of existing stairs is permitted. Cover existing finishes and maintain stairs without damage. Clean and restore stairs to Owner's approval at Substantial Completion.

3.02 PEST CONTROL

- A. Provide pest-control services at regular intervals, performed in compliance with regulations of state regulations, and by a pest-control firm licensed in the state where the project is located. Any chemicals and pesticides used shall be approved by EPA and local authority having jurisdiction. Contractor's pest control plan shall ensure the facility is free of termites, roaches, rodents, and other pests at time of Substantial Completion.
 - 1. Coordinate with Owner's Integrated Pest Management (IPM) plan where applicable.
 - 2. Provide Owner with a minimum 72 hours pre-notification for pest-control treatments.

3.03 TEMPORARY FIRE PROTECTION

- A. Comply with International Fire Code, Chapter 33 "Fire Safety During Construction and Demolition" for preventing damage to structures under construction.
 - 1. Comply with NFPA 241 "Standard for Safeguarding Construction, Alteration, and Demolition Operations" for additional provisions and conditions that are not covered by Chapter 33 of the International Fire Code.
- B. Provide a fire-prevention program, review with all personnel on site, and post fire-prevention information in clearly visible area. Coordinate fire-prevention program with local fire department.
- C. Provide clearly labeled portable fire extinguishers.
- D. Provide fire watch in compliance with OSHA requirements during and for a minimum of 30 minutes after use of all potential ignition sources, including but not limited to, welders, grinders, cutting torches, heating and electrical equipment, and lighting.
- E. Do not allow smoking in areas under construction.

3.04 MOISTURE CONTROL

- A. Prevent the absorption of moisture and humidity by:
 - 1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
 - 2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
 - 3. Provide sufficient ventilation for drying within reasonable time frame.

- B. Prior to building dry-in, store porous materials in a separate enclosed storage building. Keep all surfaces clear of standing water, and cover or otherwise protect all materials from water infiltration and damage. Do not enclose interior spaces until dry-in is complete and ventilation can remove excess moisture.
- C. After building dry-in, provide temporary mechanical ventilation for humidity and moisture control until the building HVAC system is operational. Do not store or install material in the building until ambient temperature and humidity is within manufacturer's acceptable range. Do not install wet materials, and ensure that substrates are fully dry prior to installing other materials over them.
- D. Provide continuous monitoring of installed materials. Remove gypsum board, wood products, and other mold-supporting products, if they become and remain wet for 48 hours. Remove and replace any materials showing visible signs of mold or mildew.

3.05 TEMPORARY FACILITY USAGE AND REMOVAL

- A. Maintenance and Usage: Keep temporary facilities clean and in well-maintained condition for the duration of the Project. Prevent misuse of or damage to facilities by construction personnel. Make repairs to temporary facilities or replace facilities as required to keep them in good operating condition and in compliance with applicable OSHA, local permitting, and other applicable regulations.
- B. Changeover: Coordinate changeover from temporary facilities to permanent facilities at Substantial Completion, unless an alternate arrangement for changeover has been agreed upon in writing by Owner.
 - 1. Contractor shall be responsible for repair, restoration, and cleaning of permanent facilities that are used for construction purposes after changeover.
- C. Removal: Unless otherwise indicated, temporary facilities and controls are the property of the Contractor, and shall be removed upon Architect's approval when Contractor can demonstrate that they are no longer needed.
 - 1. Comply with construction waste management and recycling requirements for temporary facilities and materials that are not able to be reused.
 - 2. After removal of temporary facilities and controls, complete all permanent construction that was not accessible due to the presence of temporary facilities.
 - 3. Remove materials that have become soiled or contaminated due to construction vehicle traffic, parking, temporary field offices, oil or other chemical spillage, and other temporary usage, and replace with clean material. Complete grading, landscaping, paving, and other site improvements, and repair or restore all damage to existing or previously completed site improvements.

END OF SECTION 015000

**SECTION 016000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Identification of Owner-supplied products.
- B. Section 012500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 014000 - Quality Requirements: Product quality monitoring.
- D. Section 017419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.02 DEFINITIONS

- A. Comparable Product: An unnamed product that is similar in quality and performance to named product(s).
- B. Basis-of-Design Product: A specific product selected by the Architect for use in the design process; based on certain performance characteristics, physical qualities or details, a specialized finish type, pattern, or color, or other indicated characteristics.

1.03 WARRANTIES

- A. Product warranties shall be provided in addition to and run concurrently to Contractor's general warranty/guarantee.
 - 1. Unless otherwise indicated, all warranty terms shall start on the date of Substantial Completion.
- B. Manufacturer's Warranty: A standard warranty issued by the product manufacturer, covering production and material defects.
- C. Special Warranties: Warranties in addition to standard manufacturer's warranty, covering fabrication, installation, or specific performance items such as weathertightness
- D. Warranty Form: Warranty shall be provided on either manufacturer's standard form or on specified form. When a sample warranty form is not included in the Project Manual, the warranty shall be on mutually agreed form.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 014000 - Quality Requirements, for additional source quality control requirements.

- C. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Containing lead, cadmium, or asbestos.

2.03 PRODUCT OPTIONS

- A. Products Specified with a Single Named Product: Where required by Owner due to facility standards, provide the named product; no options or substitutions allowed.
- B. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- C. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- D. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- E. Products Specified by Naming One or More Manufacturers with a Provision for Comparable Products: Unnamed comparable product may be submitted after award of Contract. Comply with requirements in "Comparable Products" article below.

2.04 BASIS-OF-DESIGN PRODUCTS

- A. Where a product is specified by naming a Basis-of-Design, comply with the following:
 - 1. Where a list of additional manufacturers is provided, provide the Basis-of-Design product or a comparable product by one of the listed manufacturers, in compliance with "Comparable Products" article below.
 - 2. Where a list of additional manufacturers is not provided, provide the Basis-of-Design product, or submit a substitution request in compliance with Section 012500 - Substitution Procedures.
 - 3. Basis-of-Design characteristics shall include requirements in the Specifications and on the Drawings.
 - 4. Where the Basis-of-Design lists a specific finish, manufacturers wishing to submit as a Comparable Product or as a substitution shall certify that they are able to provide an exact match to the specified finish, or that they will provide a custom finish to match.

2.05 COMPARABLE PRODUCTS

- A. Where a product is specified with a provision for comparable products, Contractors submitting a Comparable Product shall comply with the following:
 - 1. The submitted product shall not require changes to the Work, unless specifically approved by Architect. If changes are required, the Contractor shall resubmit the product as a substitution request, and the Contractor shall bear the cost of the changes, coordinate with other impacted contractors, and provide appropriate notations on record documents.
 - 2. Contractor shall provide, with the submittal, a detailed breakdown comparing the submitted product to at least one of the other listed products; list specified performance qualities, test results, dimensions, finish, and other critical properties.
 - 3. Contractor shall provide warranty data indicating that submitted Comparable Product complies with indicated warranty term(s).
- B. Comparable product submittals are subject to Architect's final approval. If a proposed product is found to be unacceptable, Contractor shall revert to one of the named products.

2.06 COLOR/FINISH OPTIONS

- A. Preselected Color/Finish: Where a specific manufacturer's premium or custom finish or color is indicated as the basis-of-design, other listed manufacturers shall certify that they can provide

an exact match, or that they will provide pricing under the assumption that a custom finish or color will be required.

- B. Color/Finish Selection: Unless specifically indicated to either be a custom color or to be selected from manufacturer's standard range, color and finish selections shall be made from manufacturer's full range of options, including premiums, metallics, wood grains, etc.

2.07 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to location designated by Owner; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 012500 - Substitution Procedures.

3.02 OWNER-SUPPLIED PRODUCTS

- A. See Section 011000 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with Contractor.
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 3. Handle, store, install and finish products.
 - 4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
 - B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
 - C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
 - D. Transport and handle products in accordance with manufacturer's instructions.
 - E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
 - F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
 - G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
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- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 017419.
 - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- G. For exterior storage of fabricated products, place on sloped supports above ground.
- H. Provide off-site storage and protection when site does not permit on-site storage or protection.
- I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- J. Comply with manufacturer's warranty conditions, if any.
- K. Do not store products directly on the ground.
- L. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- M. Prevent contact with material that may cause corrosion, discoloration, or staining.
- N. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- O. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION 016000

**SECTION 017000
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 015000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- C. Section 015000 - Temporary Facilities and Controls: Temporary interior partitions.
- D. Section 017900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- E. Section 078400 - Firestopping.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.03 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,
- B. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.04 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Perform dewatering activities, as required, for the duration of the project.
- E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Dust and Silica Control: Execute work by methods to minimize raising dust and silica from construction operations. Provide positive means to prevent air-borne dust and silica from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof enclosures to prevent entry of dust and silica that is generated outdoors.
 - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

- G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Minimize amount of bare soil exposed at one time.
 - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
 - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- H. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- I. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- J. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.
- K. Hazardous Materials: Do not use materials or products that contain hazardous substances, for permanently installed products and materials, installation materials, or for cleaning or other construction use.

1.05 COORDINATION

- A. See Section 011000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- G. Utilize recognized engineering survey practices.
- H. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.

- J. Periodically verify layouts by same means.
- K. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

- A. Fire Safety: Comply with provisions of 2018 International Fire Code, Chapter 33; "Fire Safety During Construction and Demolition" for preventing damage to structures under construction.
 - 1. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on drawings.
 - 2. Relocate items indicated on drawings.
 - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; prepare substrate per manufacturer's requirements for successful application of new finish.
 - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. See Section 011000 for other limitations on outages and required notifications.
 - c. Provide temporary connections as required to maintain existing systems in service.
 3. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
- J. Clean existing systems and equipment in all spaces impacted by alteration work.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.

3.06 CUTTING AND PATCHING

- A. Perform cutting and patching to:
1. Complete the work.
 2. Fit products together to integrate with other work.
 3. Provide openings for penetration of mechanical, electrical, and other services.
 4. Match work that has been cut to adjacent work.
 5. Repair areas adjacent to cuts to required condition.
 6. Repair new work damaged by subsequent work.
 7. Remove samples of installed work for testing when requested.
 8. Remove and replace defective and non-complying work.
- B. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to specified condition.
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- C. Employ skilled and experienced installer to perform cutting and patching.
- D. Restore work with new products in accordance with requirements of Contract Documents.
- E. Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material to maintain existing fire ratings, to full thickness of the penetrated element.
- G. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust and silica.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Prohibit traffic from landscaped areas.
- I. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP AND ADJUSTING

- A. Coordinate with requirements of Section 019113 - General Commissioning Requirements.
- B. Coordinate schedule for start-up of various equipment and systems.
- C. Notify Architect and Owner seven days prior to start-up of each item.

- D. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- E. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- F. Verify that wiring and support components for equipment are complete and tested.
- G. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- H. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- I. Adjust operating products and equipment to ensure smooth and unhindered operation.
- J. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

- A. See Section 017900 - Demonstration and Training.

3.11 FINAL CLEANING

- A. Execute final cleaning prior to Substantial Completion.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Replace filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.12 CLOSEOUT PROCEDURES

- A. Prior to Substantial Completion, complete the following:
 - 1. Provide startup, testing, and adjusting of all systems and equipment.
 - a. Demonstrate that air and water systems are balanced and that automatic temperature control system is in control of all equipment. This may require separate demonstrations if controls cannot be tested for applicable seasons of the year.
 - b. Submit written certification that testing/adjusting/balancing operations have been completed, and that systems are operation and under control in conformance with applicable specification section(s).
 - c. Submit written certification that all Building Commissioning has been completed.

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- d. Complete testing of the electronic security and detention systems and equipment, demonstrating security control.
 2. Provide all inspections required by local authorities having jurisdiction to obtain Certificate of Occupancy, and provide written certification of completion of Special Inspections.
 3. Provide preventive maintenance services for all equipment used prior to Substantial Completion, and provide initial maintenance servicing for all products and equipment that will be subject to ongoing maintenance/service contracts.
 4. Provide final cleaning of all products, materials, and equipment, and provide touch up and restoration of exposed materials and finishes.
 5. Provide fresh batteries in all battery-powered products and equipment.
 6. Provide demonstration and training for Owner's personnel on all required systems and equipment.
 7. Coordinate a walkthrough with the Owner and the local fire department and other emergency services.
 8. To the maximum extent possible, remove temporary facilities and controls, construction equipment and tools, and similar items that are not part of the finished Work.
 9. Coordinate changeover with the Owner of permanent utilities, insurance requirements, and building's permanent keying and lock system.
- B. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- C. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- D. Owner will occupy the building after Substantial Completion as specified in Section 011000.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Prior to final completion, complete the following:
1. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.
 2. Provide final pest and rodent control treatments and inspections.
 3. Remove any remaining construction equipment, tools, and materials; perform additional cleaning required due to construction activities following Substantial Completion, and leave the site prepared for Owner occupancy.
 4. Submit final demonstration and training materials and videos, as built/record documents, operation and maintenance binders, and warranty binders.
 5. Submit final application for payment.

3.13 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
1. Contractor's maintenance responsibility shall be through Substantial Completion, unless a longer term is required by individual specification section.

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- B. Maintenance service shall not be assigned or transferred to any agent or third party without prior written consent of the Owner.

END OF SECTION 017000

**SECTION 017419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- E. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
- F. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.
 - 1. Fire Safety: Comply with International Fire Code, Chapter 33 "Fire Safety During Construction and Demolition" and with NFPA 241 for provisions relating to accumulation and removal of combustible debris and waste.

1.02 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.

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- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
 - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
 - 2. Submit Report on a form acceptable to Owner.
 - 3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 4. Incinerator Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project delivered to incinerators.
 - c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - 5. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
 - 6. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.

- b. Amount, in tons or cubic yards.
- c. Include weight tickets as evidence of quantity.
- 7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 3 EXECUTION

2.01 WASTE MANAGEMENT PROCEDURES

- A. See Section 013000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 015000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 016000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 017000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to Contractor's site superintendent, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. Provide containers as required.
 - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION 017419

SECTION 017500 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Commissioning is a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meet defined objectives and criteria. The commissioning process includes specific tasks to be conducted during construction to verify that construction is performed in accordance with contract requirements, equipment installations provide adequate service access, systems perform in accordance with design intent, and training meets the Owner's requirements.
- B. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.

1.2 RELATED DOCUMENTS

- A. Provisions of the Contract and of the Contract Documents apply to this section.

1.3 COMMISSIONING TEAM

- A. Commissioning Team: The members of the commissioning team consist of:
 - 1. The Owner's representative (OR)
 - 2. The commissioning authority (CxA)
 - 3. The architect and design engineers (AE)
 - 4. The Contractor aka general contractor (GC)
 - 5. The mechanical/ plumbing contractor (MC)
 - 6. The testing and balancing contractor (TAB)
 - 7. The electrical contractor (EC)
 - 10. The Automatic Temperature Controls contractor (ATC)
 - 11. The Owner's facility operating and maintenance staff
 - 12. Other installing subcontractors
 - 13. Equipment suppliers and manufacturer's representatives
- B. The CxA directs and coordinates the project commissioning activities and reports to the Owner. All team members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents.

1.4 SCOPE

- A. This section provides the general requirements that apply to the implementation of the commissioning process. In general, the following components, assemblies, and systems shall be commissioned:
 - a. Air Handling units
 - b. Rooftop units
 - c. Dedicated outside air units

- d. VAV terminal units
- e. HVAC controls
- f. Ductless split-system units
- g. VRF System
- h. Fans
- i. Domestic Hot Water System
- j. Lighting Control System

1.5 COORDINATION

- A. Project Commissioning Team: The members of the project commissioning team shall consist of the commissioning authority and any support personnel, the Owner's facility staff, the Contractor, subcontractors and/or vendors as required, and the Architect/Engineer.
- B. Management: The CxA coordinates the commissioning activities through the Contractor. All members shall work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents.
- C. Scheduling: The CxA shall provide sufficient information to the Contractor for required commissioning activities. The Contractor shall integrate all commissioning activities into the overall project schedule. All parties shall address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

1.6 PROCESS

- A. The following is a brief overview of the typical commissioning tasks during and after construction and the general order in which they occur.
 - 1. Commissioning during construction begins with an initial commissioning meeting conducted by the CxA where the commissioning process is reviewed with the project commissioning team members.
 - 2. Additional meetings shall be required throughout construction, scheduled by the CxA, through the Owner and GC, with necessary parties attending to plan, scope, coordinate, schedule future activities and resolve problems.
 - 3. Equipment documentation is submitted to the CxA, through the Owner and GC, during normal submittals, including detailed startup procedures.
 - 4. The pre-functional checklists are to be completed by the Contractor and its subcontractors throughout the construction installation and during the startup process.
 - 5. Pre-functional checklists and equipment startup must be completed before systems performance verification. Additionally, testing and balancing and automation system trending must be completed before HVAC systems performance verification can occur.
 - 6. The Contractor ensures that the subcontractors' construction checklists are executed and documented, and that startup and initial checkout are performed. The CxA verifies that the Testing and Balancing (TAB), construction checklists and startup were completed according to Contract requirements.
 - 7. The CxA develops and implements equipment and system performance verification

procedures. The performance verification tests are executed by the Contractor under the direction of the CxA with participation of the facility staff.

8. Issues discerned during construction, start-up, or performance verification shall be documented by the CxA. Rectification of issues resides with the Contractor or AE.
 9. The CxA reviews the O&M documentation for completeness and pertinence; and participates in Contractor's instructions and training of Owner's operating and maintenance personnel.
- B. Other than deferred seasonal performance verification of HVAC systems, all equipment/systems commissioning, including all Owner training, shall be completed before Substantial Completion.

1.7 RESPONSIBILITIES

A. All Parties

1. Follow the Commissioning Plan.
2. Attend initial commissioning meeting and additional meetings, as necessary.

B. Owner's Representative (OR)

1. Facilitate the coordination of the commissioning work by the CxA, and, with the GC and CxA, ensure that commissioning activities are being scheduled into the master schedule.
2. Attend a commissioning scoping meeting and other commissioning team meetings.
3. Furnish a copy of all construction documents, addenda, and Change documents.
4. At Owner's option, review any performance test procedures submitted by the CxA.
5. At Owner's option, observe and witness startup and performance testing of selected equipment.
6. Review commissioning progress and deficiency reports. Work to resolve CxA-cited non-compliance issues and deficiencies.
7. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities and Contractor's instructions and training.
8. Assist the CxA as necessary in the seasonal or deferred performance verification and deficiency corrections required by the specifications.
9. Acknowledge completion of commissioning process.

C. Architect/Engineer (AE)

1. Architect: In addition to performing its contractual construction contract administration functions, Architect shall:
 - a. Attend initial commissioning meeting and selected commissioning team meetings.
 - b. Coordinate CxA review and approval of Contractor-submitted submittals and shop drawings related to commissioned equipment. Architect shall forward a set of relevant documents at time of receipt A/E shall coordinate receipt of CxA review documents within fourteen (14) days of receipt and shall incorporate any CxA comments into the submittals and shop drawings returned to the Contractor.
 - c. Provide any design documentation requested by the CxA.

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- d. Coordinate with OR to assure that the CxA is:
 - 1) Provided copies of approved shop drawings as they are returned to the Contractor.
 - 2) Notified of time, date, and place of all regularly scheduled progress meetings, and of any special meetings that may be called regarding commissioned systems.
 - 3) Copied on all correspondence pertinent to the commissioned systems including but not limited to minutes of progress meetings, responses to Contractor requests for information and Change documentation.
 - e. Coordinate resolution of cited deficiencies (as appropriate).
 - 2. Engineers: In addition to performing its contractual construction contract administration functions of submittals review, site visits, O&M manuals and As-Built documents review, engineers shall:
 - a. Attend initial commissioning meeting and other selected commissioning team meetings.
 - b. Provide any design narrative and sequences documentation requested by the CxA. Assist in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings, or equipment documentation is not sufficient for writing performance verification procedures.
 - c. Participate in the resolution of cited deficiencies (as appropriate).
- D. Contractors (GC)

General Contractor, subcontractors, and vendors shall assign representatives with expertise and authority to act on their behalf and schedule them to participate in and perform commissioning activities including, but not limited to, the following:

- 1. Provide the Commissioning Authority with a list of team members (including member's name, contract affiliation, title, responsibility, phone, email, and mailing address) who will represent the Installing Contractors in pre-functional checks and functional performance verification. Submit no later than at the Pre-Commissioning Meeting.
- 2. Assure that the Commissioning Authority is provided with all relevant correspondence, submittals, notifications, and assistance as may be required to satisfactorily complete the commissioning process using whatever personnel, time and resources that are required.
- 3. Facilitate the coordination of commissioning and incorporate commissioning milestones and activities into the project schedule. The Contractor shall coordinate with the Subcontractors to provide adequate time to accommodate all commissioning activities including the witnessing of milestone events, equipment start-ups, Owner training, Operating and Maintenance Manuals review and all other activities requiring scheduled participation of the Commissioning Authority as defined in the pre-functional checks and functional performance verification forms.
- 4. Provide detailed startup procedures for all commissioned equipment/systems.
- 5. Include in his Contract Sum the cost of furnishing the material requested and manpower necessary for the verification of proper system installation and operation as specified in this Section.
- 6. Attend initial commissioning meeting and other selected commissioning team meetings.

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7. Provide notification of an impending event to the Commissioning Authority at least 48 hours in advance, notification may be by telephone or email. The 48-hour notice is acceptable if the event is accurately scheduled on the most current Construction Schedule. Events not accurately identified in the Construction Schedule shall require one-week notice.
 8. Provide the training of Owner personnel prior to Substantial Completion. Training plan shall be submitted for approval at least four weeks prior to first training session. Approved O&M manuals must be employed in training.
 9. Provide equipment/systems performance verification under CxA direction, including for seasonal or deferred verification. The contractors shall provide all tools or the use of tools to start, check-out and test equipment and systems. Evaluate performance deficiencies and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 10. Additional Information
 - a. The Contractor may receive a written request from the Commissioning Authority requesting specific information needed about each piece of commissioned equipment or system.
 - b. Typically this request for specific information shall include: detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures; full details of any Owner-contracted tests; fan and pump curves; full factory testing reports, if any; and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, copies of the installation and checkout materials shipped with the equipment and the actual field checkout sheet forms used by the factory or field technicians shall be submitted to the Commissioning Authority.
 - c. The Commissioning Authority may request further documentation deemed necessary for the commissioning process. These data requests may be made prior to the normal submittal process.
 11. Contractor's responsibility to have no deviations in submittals from requirements of the Contract Documents is not relieved by the Commissioning Authority's review.
- E. Commissioning Authority (CxA)
1. Coordinates and directs the commissioning activities in a logical, sequential, and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
 2. Coordinate the commissioning work and, with the GC and OR, help integrate commissioning activities into the master schedule.
 3. Revise the Construction Phase Commissioning Plan, as necessary.
 4. Plan and conduct an initial commissioning meeting and other commissioning meetings as required.
 5. Request and review additional information from the Contractor required to perform commissioning tasks, including O&M materials, Contractor startup and checkout procedures.

6. Review AE approved Contractor submittals applicable to systems being commissioned for compliance with commissioning needs.
7. Write and distribute construction pre-functional checklists. Monitor execution of checklists during construction and provide approval when warranted.
8. Perform site visits, as necessary, to observe component and system installations. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving discrepancies.
9. Witness and document milestone events such as equipment start-ups.
10. Recommend approval of systems startup by reviewing startup reports and by selected site observation.
11. With necessary assistance and review from AE, Contractor, installing contractors, and vendors; write the performance verification procedures for equipment and systems. Analyze any performance trend logs and monitoring data to verify performance. Direct, coordinate, and/or witness equipment/systems performance verification and recommend approval. Coordinate retesting as necessary until satisfactory performance is achieved.
12. Maintain a master Issues Log. Provide the Owner with written progress reports and test results with recommended actions.
13. Witness performance testing of commissioned systems.
14. Witness and participate in the Contractor's training of the Owner's operating personnel.
15. Review/approve the O&M manuals.
16. Provide a final commissioning report that includes an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope, a general description of testing and verification methods and all required commissioning task deliverables.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

- 3.1 SEQUENCING AND SCHEDULING: Systems commissioning may be construed to be in three parts: installation verification, training and demonstrations, and performance verification.
 - A. Installation verification utilizes Pre-Functional Check Lists, documenting that equipment/systems are installed per Contract Documents, are serviceable, and are started in accordance with Contract requirements and/or manufacturers' recommendations.
 - B. Contractor's training of and demonstrations for Owner's operating and maintenance personnel occurs after Pre-Functional Checks are complete and all test and inspection reports and operation and maintenance manuals have been submitted and approved. Training and demonstrations usually precede Performance Verification; some training, such as use and operations of the automation system, occurs during and after performance verifications.
 - C. Performance verification employs Functional Performance Verification forms and occurs only after all work required in related Sections has been successfully completed. HVAC systems require functional performance verification in distinct heating and cooling seasons, i.e. a minimum of two sessions of performance verification.
- 3.2 MEETINGS:

- A. Initial Meeting. Within 120 days of contractor bid award, CxA shall schedule an initial commissioning meeting. All commissioning parties are required to attend. CxA shall issue an agenda and chair the meeting. General content of the meeting will be for the CxA to provide an overview of the commissioning process for the project and to establish lines of communications.
- B. Miscellaneous Meetings. Other meetings may be planned and conducted by the CxA as construction progresses to address coordination, deficiency resolution, and planning issues.

3.3 SUBMITTALS

- A. The CxA shall review the Contractor's submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of performance verification procedures and only secondarily to verify compliance with equipment specifications. The CxA shall notify the Owner, and/ AE of items missing or areas that are not in conformance with Contract Documents.
- B. The CxA may request additional submittal documentation to facilitate the commissioning work. These requests may entail manufacturer's printed installation and detailed startup procedures, full sequences of operation, O&M data, performance test procedures, control drawings and details of Owner contracted tests. All documentation requested by the CxA shall be included by the subcontractors in the O&M manuals.

3.4 CONSTRUCTION CHECKLISTS AND START-UP

- A. Pre-Functional checklists are employed to verify that the equipment and systems are fully connected and operational. Installation elements of the checklists for a given system must be successfully completed and approved prior to startup. Contractors assert completion of installations. CxA verifies contractors' assertions.
- B. Equipment startups are performed by responsible contractors and/or factory authorized technicians as required by pertinent specification sections. The primary role of the CxA in the start-up process is to ensure that there is written documentation that each of the specified start-up requirements or the manufacturer-recommended procedures has been completed. Successful start-ups shall be documented on the Pre-Functional Checklists.
- C. Execution of Pre-Functional Checklists and Startup
 1. The pre-functional checklists shall be provided by the CxA. The pre-functional checklists may be revised in response to approved submittals.
 2. The Contractor shall maintain on site the pre-functional checklists, organized by system and by subsystem. Entries shall be made on the checklists no less than weekly and/or as items are completed.
 3. The execution and approval of the pre-functional checklist and startup shall be directed and performed by the Contractor, subcontractor, or vendor. Signatures are required of the applicable subcontractors for verification of completion of their work.
 4. The Contractor/subcontractor responsible for the purchase of the equipment shall develop the full startup plan by combining the manufacturer's detailed startup and checkout procedures and the construction checklists and document the successful start-up. CxA shall witness startups and verify successful startup documentation.

5. The Contractor shall coordinate startup and checkout with the Owner, AE, and CxA. In general, startup of all major pieces of equipment shall be witnessed; a sampling strategy shall be used for witnessing startup of multiple similar pieces of equipment.

D. Issues, Non-Conformance, and Approval in Checklists and Startup (Issues Log).

1. During the commissioning process, the Commissioning Authority may identify issues that require corrective action. The Commissioning Authority has no authority to dictate ways and means of issues resolution other than enforcing the dictates of Contract Drawings and Specifications. Resolution of issues that require interpretations or modifications to the Contract Documents shall be the responsibility of the Architect and Owner.
2. Written responses shall be made to issues reported by the Commissioning Authority. The Commissioning Authority shall provide status reports and issues logs as deemed appropriate during the commissioning process with original provided to Owner and copies to the General Contractor, and Architect. The General Contractor and/or Architect shall provide the Owner with a written response to each issue cited by the Commissioning Authority as to corrective actions implemented. The written response shall be provided to the Owner within a minimum of two (2) weeks of the date of the Commissioning Authority's issues citing correspondence (or earlier as required by the project schedule); copies shall be provided to the Commissioning Authority, General Contractor, and Architect. Issues that have not been fully resolved within the two-week period shall be noted as such with explanation of intended resolution; and subsequent status reports of the continued issue resolution shall be made in writing at two week intervals until such time as the issue has been fully rectified. The Owner reserves the right to withhold partial payment for construction contract or professional services until satisfactory resolution of commissioning issues have been documented and verified.

3.5 COMMISSIONING REPORTS

- A. The Commissioning Authority shall document commissioning milestones with reports. The documents shall acknowledge acceptance at the milestone or separately list issues observed or discovered requiring correction. The document shall be distributed to Commissioning Team members.

3.6 OPERATIONS AND MAINTENANCE MANUALS

- A. The commissioning process requires detailed O&M documentation as identified in this section, Section 017823, and technical specifications.
- B. Operating and Maintenance Manuals shall be provided to the Architect/Engineer for review no later than the completion date of equipment placement or a minimum of eight (8) weeks before requesting inspection for substantial completion. AE shall provide the Operating and Maintenance Manuals to the Commissioning Authority after the AE's review. The Manuals with AE and Commissioning Authority's review comments shall be returned to the Contractor for preparation for use in training of Owner's operating and maintenance personnel. Return of the reviewed Manuals shall be approximately six weeks after Contractor submission.
- C. Manuals format and content shall be as specified in Section 017823.

3.7 DEMONSTRATIONS AND TRAINING

- A. The Contractor shall provide demonstrations and training in accordance with Section 017900 and technical specification sections.

- B. Demonstration and training plan shall be submitted to the Commissioning Authority at the time of submission of the Operation and Maintenance Manuals. Plan shall fully detail all demonstrations and training that is to be provided by the Contractor to the Owner's operating and maintenance personnel and include a time allocation schedule. Actual dates and times, if used, shall be understood as tentative and subject to change based upon actual construction progress. However, at a minimum, the Demonstration and Training schedule shall include time allocations (i.e. hours) for each piece of equipment or system for which demonstration and training are specified. Commissioning Authority review comments shall be provided when Operating and Maintenance Manuals are returned to the Contractor. The plan shall, as a minimum, cover the following elements:
1. Equipment/system
 2. Intended audience
 3. Location of training
 4. Subjects covered (description, duration of discussion, special methods, etc.)
 5. Methods of training (classroom lecture, manufacturer's quality video, site walk-through, actual operational demonstrations, written handouts, etc.).
- C. The approved O&M manuals shall be incorporated into all training sessions.
1. Use the printed installation, operation and maintenance instruction material included in the O&M manuals.
 2. Review the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include startup, operation in all modes possible, shutdown, seasonal change-over and any emergency procedures.
 3. Discussion of relevant health and safety issues and concerns.
 4. Discussion of warranties and guarantees.
 5. Common troubleshooting problems and solutions.
 6. Discussion of any peculiarities of equipment installation or operation.
- D. The majority of training and demonstrations shall precede Performance Verification; some training, such as use and operations of the automation system, occurs during and after performance verifications. All training shall occur before Substantial Completion.
- E. The CxA participation in demonstration and training is largely observational, verifying that training has given to the satisfaction of Owner's operating and maintenance personnel. The CxA may amplify the training sessions by explaining design concepts and systems interactions.

3.8 PERFORMANCE VERIFICATION

- A. Requirements: Performance verification shall demonstrate that each system is operating according to the design intent and Contract Documents. Performance verification facilitates bringing the systems from a state of individual substantial completion to full dynamic operation. All major systems, such as large air handling units, etc. shall have performances verified by the CxA. Systems involving multiple, repeated equipment, such as VAV terminals, fan coil units, room lighting control, shall be verified by sampling.
- B. Coordination and Scheduling: The Contractor shall provide sufficient notice, regarding their

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completion schedule for the pre-functional checklists and startup of all equipment and systems to allow the performance verification to be scheduled and conducted before Substantial Completion. The commissioning team shall oversee, witness, and document the performance all equipment and systems. The CxA in association with the Contractor/subcontractors and facility staff shall execute the verifications.

1. Performance verification shall be conducted after the pre-functional checklists and startup has been satisfactorily completed.
 2. Two weeks prior to scheduled start of functional performance verification, the Contractor shall provide the Commissioning Authority with a comprehensive report asserting that systems are ready for functional performance verification. The report shall include the following materials:
 - a. Detailed descriptions of any deviations from the Contract Documents (including but not limited to change orders, addenda, and field changes) organized by system and by subsystem.
 - b. Complete set of as-built drawings and documents, clearly identifying all deviations from the Contract Documents and organized by system and by subsystem.
 - c. Complete set of all required manufacturer's equipment tests organized by system and by subsystem.
 - d. Completed pre-functional checklists, organized by system and by subsystem.
 - e. Results of any failed tests and detailed description of corrective actions taken, organized by system and by subsystem.
 3. For HVAC systems, air balancing and water balancing shall be completed, and all systems shall be satisfactorily operating under automation system control programming (automatic control) prior to performance verification.
 4. Performance verification proceeds from components to sub-systems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems shall be verified.
- C. Procedures. CxA shall provide detailed performance verification procedures and forms after all submittals, including controls, have been approved. Equipment performance shall be tested or verified per the parameters and requirements of the pertinent technical specifications and/or manufacturers' recommendations. Systems performances shall be verified per procedures of pertinent technical specifications, including Testing and Balancing of Division 01, and as further amplified by the CxA.
1. Performance testing and verification may be achieved by manual testing or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. The CxA may substitute specified methods or require an additional method to be executed other than what was specified, with the approval of the AE and Owner. The CxA shall determine which method is most appropriate for tests that do not have a specified method.
 2. Performance verification and testing shall be performed under design conditions as closely as is practically possible. Simulation of design conditions may be employed to verify performance. When simulation is used, the actual results may also require re-verification under design load conditions.

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3. The Installing Contractor shall operate all equipment and systems in support of the commissioning work effort and shall provide all labor, equipment, and materials necessary to allow operational and performance verification of all commissioned equipment and systems.

D. Non-Conformance.

1. Corrections of minor deficiencies identified may be made during performance verification at the discretion of the CxA. In such cases the deficiency and resolution shall be documented on the procedure form or on an attached sheet.
2. As tests progress and a deficiency is identified that cannot be immediately rectified, the CxA shall discuss the issue with the commissioning team:
 - a. When there is no dispute on the issue and the Contractor accepts responsibility to correct it, the CxA shall document the issue in the Issues Log. After the Contractor acknowledges correction of the deficiency in writing in the Issues Log, the Contractor shall reschedule the test; and the test shall be repeated.
 - b. If there is a dispute about an issue, regarding whether it is a Contractor issue or a design issue:
 - 1) The apparent issue shall be documented in the Issues Log.
 - 2) The Owner shall determine the responsible party and the responsible party shall indicate the resolution on the Issues Log and the performance verification shall be repeated responsive to the resolution.
3. The Contractor shall acknowledge in writing the status of each outstanding issue identified in the Issues Log. A maximum two week time interval shall be allowed between the date of issuance of the Issues Log and the Contractor's resolution of deficiency and its response; however a faster Contractor correction and/or response shall be required as necessary to maintain the project schedule and not delay project completion. When deficiencies have not been rectified within the allotted two weeks, Contractor's response shall provide explanations.
4. Failure Due to Manufacturer Defect: If 10% (or three, whichever is greater) of identical pieces of equipment fail to perform in accordance with the Contract Documents (mechanically or substantively) due to a manufacturing defect, not allowing it to meet its submitted performance specification, all identical units may be considered unacceptable by the Owner, AE or CxA. In such case, the Contractor shall provide the Owner with the following:
 - a. The Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be signed and dated, written explanation of the problem, cause of failures, etc., and all proposed solutions.
 - b. The Owner shall determine whether a repair is acceptable or whether a replacement of all identical units is required.
 - c. Performance verification shall be repeated after all repairs/replacements have been completed.

E. Deferred Performance Verification

1. Unforeseen Deferred Tests. If any check or test cannot be completed due to the project completion level or required occupancy condition, execution of checklists and performance

verification may be delayed upon approval of the CxA and Owner. These tests shall be conducted in the same manner as originally required as soon as possible.

2. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as part of this contract. The CxA shall coordinate this activity through the Owner. Tests shall be executed, documented by the CxA and deficiencies should be corrected by the appropriate Contractor/subcontractors with the CxA witnessing. Any final adjustments to the O&M manuals and as-builts due to the testing shall be made by the Contractor.
- F. Costs for Re-Testing: Contractor is responsible for costs of performance verification. The cost of the work of the CxA is covered by the Owner. However, where re-testing of a system is required due to a deficiency having been cited and the re-test again fails due to un-rectified deficiencies, the costs of the CxA associated with all subsequent re-testing may be withheld from Owner's payment to the Contractor. Required retesting shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.
- 3.9 RECOMMENDED ACCEPTANCE: The CxA notes each satisfactorily demonstrated function on the performance verification forms. CxA provides all forms in final commissioning manual delivered to the Owner with an executive summary recommending acceptance of the installation as complete and operating in accordance with contract requirements. Recommendation of acceptance may be conditional where:
- A. The vast majority of the work was found to be installed and operating per Contract requirements, but some minor deficiencies remain. Final acceptance would be predicated upon the condition that all known issues have been corrected and accepted by the Owner.
 - B. The HVAC system may be conditionally accepted in the initial season of operation, with the condition that the operations in the opposite season must meet performance verification. Final acceptance of the HVAC system requires two-season (i.e. heating season and cooling season) performance verification.

END OF SECTION 017500

**SECTION 017800
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 013000 - Administrative Requirements: Submittal procedures, shop drawings, product data, and samples.
- B. Individual Product Sections: Specific requirements for operation and maintenance data.
- C. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect within 15 days after the date of Substantial Completion.
- B. Operation and Maintenance Data:
 - 1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within 15 days after acceptance.
 - 2. Submit one PDF draft copy of completed documents within 15 days after the Closeout Conference. This copy will be reviewed and returned, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 3. After revisions are complete, submit one bound hard copy and PDF electronic file of revised final documents in final form within 15 days after Substantial Completion.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 15 days after acceptance.
 - 2. Make other submittals within 15 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 15 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Addenda.
 - 3. Change Orders and other modifications to the Contract.
 - 4. Miscellaneous record submittals.
 - B. Ensure entries are complete and accurate, enabling future reference by Owner.
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1. Include revised Drawings reissued during Bidding and Construction.
- C. Store record documents separate from documents used for construction.
 1. Keep record documents in a location accessible to Architect for periodic review and reference.
 2. Maintain in legible condition. If record document set becomes damaged or excessively dirty, transfer comments to clean set prior to submittal to Architect.
- D. Record information concurrent with construction progress.
- E. Record Drawings: Legibly mark each item to record actual construction including:
 1. Measured depths of foundations in relation to finish first floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.
- F. Miscellaneous Record Submittals: Where other specification sections require completion certifications, or closeout or record submittals, submit in a single binder organized by specification section.

3.02 ASSEMBLY OF RECORD DOCUMENTS

- A. Submittal for Architect's Review:
 1. Submit PDF scanned copy of marked up prints.
 2. Architect shall review and provide comment on completeness
- B. Submittal for Distribution to Owner:
 1. After Architect has approved for content and completeness, submit PDF scanned copy of final marked up prints, and submit hard copy originals.
 2. Submit full set of Drawings, regardless of whether any modification or markings are on each sheet.

3.03 OPERATION AND MAINTENANCE DATA

- A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- C. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.04 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide

recommendations for inspections, maintenance, and repair.

- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.05 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.
- P. Additional Requirements: As specified in individual product specification sections.

3.06 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
 - B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
 - C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related
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consistent groupings.

- D. Cover: Identify each binder on front and spine with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Photocopies of warranties and bonds.

3.07 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 15 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Retain warranties and bonds until time specified for submittal.
- D. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- E. Cover: Identify each binder on front and spine with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- F. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- G. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

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- H. Provide photocopy of each warranty in operation and maintenance manuals; locate each warranty with applicable O&M data for product or equipment.

END OF SECTION 017800

**SECTION 017900
DEMONSTRATION AND TRAINING**

PART 1 GENERAL

1.01 SUMMARY

- A. Demonstration of products, systems, equipment, and other items where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance of products, systems, equipment, and as otherwise indicated in specific specification sections.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit not less than four weeks prior to start of training.
 - 2. Revise and resubmit until acceptable.
 - 3. Provide an overall schedule showing all training sessions.
 - 4. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:
 - 1. Identification of each training session, date, time, and duration.
 - 2. Sign-in sheet showing names and job titles of attendees.
 - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
- E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
 - 1. Format: DVD Disc.
 - 2. Label each disc and container with session identification and date.
 - 3. Where available, provide manufacturer's pre-produced training videos in conjunction with live demonstration and training video.

1.03 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Instructor shall be certified by the manufacturer or fabricator of system.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable, and if acceptable to Owner.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Complete demonstrations within two weeks after the date of Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Complete demonstrations within two weeks after the date of Substantial Completion.

3.02 TRAINING - GENERAL

- A. Conduct training on-site, utilizing installed products and equipment, unless otherwise indicated.
- B. Provide training in minimum two hour segments.
- C. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- D. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 - 2. Typical uses of the O&M manuals.
- E. Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.

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4. Discuss cleaning products and procedures, including recommended cleaning products and products that are detrimental to equipment operation or finishes.
 5. Provide hands-on training on all operational modes possible and preventive maintenance.
 6. Emphasize safe and proper operating requirements; discuss relevant health and safety issues, warning or error indications, and emergency procedures and shutdown.
 7. Discuss common troubleshooting problems and solutions. Include minor adjustments for resolving noise, vibration, and improving system efficiency.
 8. Discuss any peculiarities of equipment installation or operation.
 9. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage. Include discussion of continuing maintenance agreements and procedures.
 10. Review recommended tools and spare parts inventory suggestions of manufacturers.
 11. Review spare parts and tools required to be furnished by Contractor.
 12. Review spare parts suppliers and sources and procurement procedures.
- F. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION 017900

**SECTION 018119
INDOOR AIR QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SUMMARY

- A. Provide Indoor Air Quality (IAQ) Management Plan to remain in force during the construction period.
- B. Chapter 3 of the Sheet Metal and Air Conditioning National Contractors' Association (SMACNA) IAQ Guideline for Occupied Buildings Under Construction, 2nd Edition 2007, available from SMACNA (703-803-2980 or www.smacna.org).

1.02 SUBMITTAL

- A. Construction Indoor Air Quality Management Plan (CIAQM Plan).

PART 2 OBJECTIVES DURING CONSTRUCTION

2.01 PROTECTION

- A. Store all materials and equipment in a protected area (inside warehouse or storage trailer). Protect materials and equipment that are too large or heavy to store in a trailer from water and dirt/dust/debris.
 - 1. OPTION: When stored outside, provide two layers of minimum 8-mil poly on the ground and elevate equipment or material a minimum of 4 inches to allow water to run off. Secure top and sides with two layers of 8-mil poly to prevent water penetration and dust/dirt accumulation.
- B. Protect HVAC equipment from dust and odors. Do not store equipment in areas near painting, pressure washing, or excavation. Do not operate equipment during cutting or grinding of masonry or concrete.
 - 1. Refer to Division 23 for construction filter requirements for protection of mechanical duct systems during construction.
 - 2. Clean ductwork when installed. Cap ends with poly during construction to prevent contamination.
 - 3. Do not operate HVAC system until the exterior walls, roof, glass, doors and building filters are properly installed.
 - 4. If air handlers must be used during construction, provide filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 at each air-handling unit. Provide specified prefilters and final filters for operation during construction or install temporary 4-inch MERV 8 filters at each return air grille for operation during construction.
 - 5. Replace all filtration media immediately prior to Substantial Completion.
 - a. Filtration media installed in air-handling units shall have a Minimum Efficiency Reporting Value (MERV) of 8.
 - 6. Do not perform Testing and Balancing until dust or odor generating activities are completed.

2.02 SOURCE CONTROL

- A. Minimize IAQ contaminants introduced by construction materials.
- B. Store waste construction materials a minimum of 30 feet away from the building.
- C. Do not smoke within 30 feet of the exterior building perimeter.

2.03 PATHWAY INTERRUPTION

- A. Provide barriers to contain construction areas to allow a portion of the building to be cleaned and then operate the HVAC system in that cleaned area. Acceptable barriers include dust curtains and temporary walls.
 - 1. Protect areas of the building in which HVAC is operational by physical barriers from areas of the building not acceptable for operation of the HVAC system.
- B. Maintain areas within 30 feet of outdoor air intakes free of dust, dirt, debris, and volatile materials while the HVAC system is in operation.

2.04 HOUSEKEEPING

- A. As dust accumulates at the Site, it can become airborne when disturbed by nearby activity. Similarly, spills or excess applications of products containing solvents will increase odors at the Site. Leaving the Site wet or damp for more than a day could result in the growth of mold and bacteria. Therefore, Site cleanup and maintenance is important to maintaining good IAQ during construction.
- B. Perform the following to control contaminants at the Site:
 - 1. Suppress dust with wetting agents or sweeping compounds
 - 2. Provide an efficient dust collection method (e.g. a damp rag, wet mop, or vacuum equipped with a high efficiency particulate arrester (HEPA) filter or wet scrubber).
 - 3. Remove spills or excess applications of solvent-containing products immediately. Provide low-VOC emitting spot removers and cleaning agents near occupied areas.
 - 4. Remove accumulated water and keep work areas as dry as possible, including the use of dehumidification, if necessary.
 - 5. Once building is enclosed, vacuum with HEPA filtered vacuum cleaners to prevent settled dust from becoming airborne again.
 - 6. Protect porous materials from exposure to moisture. Replace items that remain damp for more than four hours.

END OF SECTION 018119

SECTION 018317
EXTERIOR BUILDING ENCLOSURE AIR BARRIER REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes administrative and procedural requirements for accomplishing an airtight building enclosure that controls infiltration or exfiltration of air, including but may not be limited to:
1. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness of the exterior building enclosure shall be "the air barrier system."
 2. Coordinate between trades, schedule and sequence the Work, and provide preconstruction meetings, inspections, tests, and related actions.
 3. Reports performed by Contractor, independent agencies, and governing authorities.
 4. Construct the building enclosure with a continuous air barrier system to control air leakage into (infiltration) and out of (exfiltration) conditioned spaces. The air barrier system shall have the following characteristics:
 - a. Continuous, with all joints sealed.
 - b. Structurally supported to withstand positive and negative air pressures applied to the building enclosure.
 - c. Connections between:
 - 1) Foundation and walls.
 - 2) Walls and windows and doors.
 - 3) Different wall systems.
 - 4) Wall and roof.
 - 5) Walls, floors, and roofs across construction joints, control joints and expansion joints.
 - 6) Walls, floors and roofs to utility, pipe and duct penetrations.
 5. Make all penetrations of the air barrier membrane or system and paths of air infiltration / exfiltration air-tight.

1.02 RESPONSIBILITIES

- A. Contractor responsibilities:
1. Coordinate affected trades and sequence construction to ensure continuity of the air barrier system, joints, junctures, and transitions between materials and assemblies of materials and products, from substructure to walls to roof.
 - a. Coordinate the sequence of activities to accommodate required services with a minimum of delay.
 - b. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
 2. Provide quality assurance procedures, testing and verification as required.
 - a. Schedule times for inspections, tests, taking samples, and similar activities.
 3. Facilitate inspections, tests, and other quality-control services required.
 - a. Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested.
 - b. Notify the agency sufficiently in advance of operations to permit assignment of personnel.
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- c. Services include, but are not limited to, the following:
 - 1) Provide access to the Work.
 - 2) Furnish incidental labor and facilities necessary to facilitate inspections and tests.
 - 3) Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
 - 4) Deliver samples to testing laboratories.
 - 5) Provide security and protection of samples and test equipment at the Project Site.
- 4. Organize pre-installation conference and preconstruction meetings between the trades involved in the whole building's air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.
- 5. Provide mockup of exterior wall assembly as required.
- 6. Coordinate the Work and trades to provide an airtight building enclosure.
 - a. Continuity of the air barrier materials and products with joints to provide assemblies.
 - b. Continuity of all exterior enclosure assemblies with joints and transition materials to provide an exterior enclosure air barrier system.
 - c. Specific quality-control requirements for individual construction activities are also indicated in other applicable sections of the specifications. Ensure each subcontractor is adequately and satisfactorily performing the quality assurance documentation, tests and procedures required by each such section.
 - d. Inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
 - e. Requirements to provide an airtight exterior building enclosure is not limited by quality-control services performed by Architect, Owner, or authorities having jurisdiction and are not limited by provisions of this section.

1.03 PERFORMANCE REQUIREMENTS

- A. Materials: Used for the air barrier system in the opaque envelope shall have an air permeance not to exceed 0.004 cfm/ft² under a pressure differential of 0.3 in. water (1.57psf) (0.02 L/s.m² @ 75 Pa) when tested in accordance with ASTM E 2178.
- B. Assemblies of materials and components: Shall have an air permeance not to exceed 0.04 cfm/ft² under a pressure differential of 0.3 in. water (1.57psf) (0.15 L/s.m² @ 75 Pa) when tested in accordance with ASTM E 2357.

1.04 SUBMITTALS

- A. Submit a written report of each inspection, test, or similar service performed by the air barrier manufacturer's technical representative, to the Owner, Architect, and Contractor.
 - 1. Report Data: Written reports of each inspection, test, or similar service shall include, but may not be limited to, the following:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.

- h. Complete inspection or test data.
- i. Test results and an interpretation of test results.
- j. Ambient conditions at the time of sample taking and testing.
- k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
- l. Name and signature of laboratory inspector.
- m. Recommendations on retesting.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protect the Work, regardless of the assignment of responsibility for inspection, testing, or similar services.

AIR BARRIER SYSTEM PRE-INSTALLATION CONFERENCE GUIDE

PURPOSE:

Few building construction components require the coordinated activities of more different trades on the construction, design, and management teams than an air barrier system. Once an air barrier has been covered, any remedies for problems with the components or installation can be costly and time-consuming.

Contractor and subcontractors must have a working knowledge of the air barrier installation, proper sequencing, and must work toward a common goal. Through the use of this Pre-Installation Conference Guide, gaining such knowledge should be enhanced.

Source: Much of this checklist utilizes content from Tremco's "Air Barrier Project Management – Pre-Construction Meeting Checklist" document.

Contractor may request an electronic version of this document for editing purposes and for your use.

Send a copy of this guide to the affected trades and/or attendees so they can attend the Conference prepared to discuss these topics and to fill in as much of this information as possible prior to the meeting, or be prepared to fill them in at the meeting.

CHECKLIST:

Submit and/or complete the following prior to conducting the Pre-Installation Conference. Confirm any additional submittal requirements with the relevant specification sections. Check those items below that you have completed or received "Approved" submittals from the Architect. Delete those that do not apply.

- | | | |
|---|---|--|
| <input type="checkbox"/> Product data | <input type="checkbox"/> Shop drawings | <input type="checkbox"/> Product Certificates |
| <input type="checkbox"/> Product test reports | <input type="checkbox"/> Installer qualifications | <input type="checkbox"/> Samples |
| <input type="checkbox"/> Compatibility docs | <input type="checkbox"/> Integrated mockup | <input type="checkbox"/> Quality Assurance Program |
| <input type="checkbox"/> ABAA certifications | <input type="checkbox"/> Warranty sample | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Air Barrier System Subcontractor reviewed submittals of other indicated/specified trade(s) | | |

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MANDATORY ATTENDEES:

Attendance by the following parties and affected trades is mandatory. Identify and ensure any other trades or parties involved or affected by the installation of the air barrier system components are also present. Check those below who actually attend the meeting. Delete those that do not apply.

- | | |
|--|--|
| <input type="checkbox"/> Owner and/or Owner's representative | <input type="checkbox"/> Architect |
| <input type="checkbox"/> Owner's Testing Agency (if hired to inspect ABS) | <input type="checkbox"/> Contractor |
| <input type="checkbox"/> Air barrier installer / subcontractor | <input type="checkbox"/> Masonry subcontractor |
| <input type="checkbox"/> Air barrier manufacturer's technical representative | <input type="checkbox"/> Roofing subcontractor |
| <input type="checkbox"/> Window opening subcontractor | <input type="checkbox"/> Sheathing subcontractor |
| <input type="checkbox"/> Exterior Insulation subcontractor | <input type="checkbox"/> Concrete subcontractor |
| <input type="checkbox"/> Exterior Metal Panel subcontractor | <input type="checkbox"/> CFSF-S subcontractor |
| <input type="checkbox"/> Steel frame (hollow metal) subcontractor | <input type="checkbox"/> Waterproofing subcontractor |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |
| <input type="checkbox"/> _____ | <input type="checkbox"/> _____ |

REVIEW OF RELEVANT PROJECT CONTRACT SPECIFICATION SECTIONS:

Review the Contract Specifications and identify and note any modifications that may be necessary, so all parties understand what is required of them. Submit any modifications via appropriate supplemental documents (FC or PCO). Edit specification sections below to match those of this Project.

SPEC SECTION	MODIFICATIONS (IF ANY)
018317	
072726	
072727	

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REVIEW OF PRODUCTS:

Review the type of air barrier system that will be provided on the Project and identify each component. Delete those that do not apply.

COMPONENT	ACTUAL PRODUCT TO BE PROVIDED FOR PROJECT
SPF INSULATION – FIELD OF WALL	
SPF INSULATION (WALL) – VOIDS / CRACKS / SHIMS	
SPF INSULATION – FIELD OF ROOF	
FLUID-APPLIED MEMBRANE – PERMEABLE - WALL	
FLUID-APPLIED MEMBRANE – IMPERMEABLE -WALL	
SELF-ADHERED MEMBRANE – PERMEABLE - WALL	
SELF-ADHERED MEMBRANE – IMPERMEABLE -WALL	
SELF-ADHERED MEMBRANE – PERMEABLE - ROOF	
SELF-ADHERED MEMBRANE – IMPERMEABLE -ROOF	
TRANSITION MEMBRANE – SELF- ADHERED	
PRIMER	
MASTIC / TERMINATION SEALANT	

CONSTRUCTION TIE-IN RESPONSIBILITY:

Air barrier systems are successful when a full building envelope/enclosure – without penetrations, voids, holes, gaps, and cracks – is complete. This is critical when numerous trades are involved in the tying-in of the air barrier system to all facets of the exterior building envelope. Utilize the table below to ensure everyone knows who is responsible for the indicated tie-in.

TIE-IN AREA	SUBCONTRACTOR RESPONSIBLE FOR TIE-IN
EXTERIOR FOOTING TO EXTERIOR FOUNDATION WALL	
EXTERIOR FOUNDATION TO EXTERIOR WALL	
SLAB-ON-GRADE TO WALL (EXTERIOR AND INTERIOR)	
SLAB-ON-GRADE JOINTS	
SLAB-ON-GRADE PENETRATIONS	
EXTERIOR WALL TO STEEL FRAME/HOLLOW METAL (E.G., DOORS AND WINDOWS)	
EXTERIOR WALLS TO ALUMINUM FRAMES (E.G., WINDOWS AND LOUVERS)	
DIFFERENT EXTERIOR WALL SYSTEMS (E.G., MASONRY TO METAL)	
EXTERIOR HEAD-OF-WALL TO SLOPING ROOF	
PARAPET WALLS TO ROOF	
EXTERIOR WALL JOINTS	
EXTERIOR SHELF ANGLES	
EXTERIOR STEEL LINTELS	
EXTERIOR WALL PENETRATIONS (E.G., PIPES, DUCTS)	
ROOF PENETRATIONS	
ROOF PERIMETER	

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COMPATIBILITY REVIEW:

Each trade/installer shall identify materials that may have potential compatibility issues. For example, some membranes may be subject to decomposing when placed in contact with other materials or components, especially sealants and primers; or may deteriorate if left exposed to the elements and are not protected. Delete those trades/installers that do not apply to this Project.

TRADE / INSTALLER	ISSUES / RESOLUTIONS
AIR BARRIER	
WINDOW	
STEEL FRAME (HOLLOW METAL)	
CFMF-S	
EXTERIOR METAL PANELS	
WATERPROOFING	
MASONRY	
ROOFING	
SHEATHING	
CONCRETE	
INSULATION	
FLEXIBLE FLASHING	
METAL FLASHING	
STRUCTURAL STEEL	

SUBSTRATE PRIMER CONSIDERATIONS:

Indicate whether the substrate for the air barrier material requires the use of a primer, and if so, identify the actual product to be used on the Project. Delete those that do not apply.

SUBSTRATE	YES	NO	PRODUCT
CMU			
SHEATHING			
CONCRETE			
PRECAST			
METAL PANELS			
ROOF SUBSTRATE BOARD			
FLEXIBLE FLASHING			
METAL FLASHING			
WATERPROOFING			
STEEL FRAME / HOLLOW METAL			
STRUCTURAL STEEL			

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SUBSTRATE PREPARATION CONSIDERATIONS:

Indicate whether the substrate for the air barrier material requires special treatment or preparation (e.g., flush joints in CMU), and if so, identify the method to be used on the Project. Delete those that do not apply.

SUBSTRATE	YES	NO	METHOD / PROCEDURE	SUBCONTRACTOR RESPONSIBLE
CMU				
SHEATHING				
CONCRETE				
PRECAST				
METAL PANELS				
ROOF SUBSTRATE BOARD				
WINDOW FRAMES				
FLEXIBLE FLASHING				
METAL FLASHING				
WATERPROOFING				
STEEL FRAME / HOLLOW METAL				
STRUCTURAL STEEL				

JOINT CONSIDERATIONS:

It is critical for all joints, gaps, voids, cracks, seams, etc. to be sealed/closed for the air barrier to function properly (based on air barrier manufacturer's instructions). If applicable, indicate the method to be used to close the joints and who is responsible. Delete those that do not apply.

TYPE OF JOINT	METHOD USED TO CLOSE JOINT	SUBCONTRACTOR RESPONSIBLE
CMU		
SHEATHING		
CONCRETE		
PRECAST		
METAL PANELS		
ROOF SUBSTRATE BOARD		
WINDOW FRAMES		
STEEL (HOLLOW METAL) FRAMES		
HEAD-OF-WALL		
OMITTED CMU BLOCK		

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INSTALLATION TEMPERATURES:

A major factor in contributing to a successful air barrier system installation is to monitor and install the components within the proper temperature ranges and weather conditions. Indicate below the proper temperature range for each component; the procedure for maintaining the proper temperature range; and the party responsible for maintaining the proper temperature range in accordance with the requirements. Delete those that do not apply.

COMPONENT	PROPER TEMPERATURE RANGE	PROCEDURE AND SUBCONTRACTOR RESPONSIBLE
SPF INSULATION – FIELD OF WALL		
SPF INSULATION (WALL) – VOIDS / CRACKS / SHIMS		
SPF INSULATION – FIELD OF ROOF		
FLUID-APPLIED MEMBRANE – PERMEABLE - WALL		
FLUID-APPLIED MEMBRANE – IMPERMEABLE -WALL		
SELF-ADHERED MEMBRANE – PERMEABLE - WALL		
SELF-ADHERED MEMBRANE – IMPERMEABLE -WALL		
SELF-ADHERED MEMBRANE – PERMEABLE - ROOF		
SELF-ADHERED MEMBRANE – IMPERMEABLE -ROOF		
TRANSITION MEMBRANE – SELF- ADHERED		
PRIMER		

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MASTIC / TERMINATION SEALANT		
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AIR BARRIER PROTECTION:

The air barrier system shall be protected during construction. Indicate below how the components will be protected (method used), by whom, and when. Delete those that do not apply.

COMPONENT	METHOD USED FOR PROTECTION	SUBCONTRACTOR	WHEN
SPF INSULATION – FIELD OF WALL			
SPF INSULATION (WALL) – VOIDS / CRACKS / SHIMS			
SPF INSULATION – FIELD OF ROOF			
FLUID-APPLIED MEMBRANE – PERMEABLE - WALL			
FLUID-APPLIED MEMBRANE – IMPERMEABLE -WALL			
SELF-ADHERED MEMBRANE – PERMEABLE - WALL			
SELF-ADHERED MEMBRANE – IMPERMEABLE -WALL			
SELF-ADHERED MEMBRANE – PERMEABLE - ROOF			
SELF-ADHERED MEMBRANE – IMPERMEABLE -ROOF			
TRANSITION MEMBRANE – SELF- ADHERED			
PRIMER			

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AIR BARRIER REPAIR:

Discuss how any damage, including but not limited to, accidental holes in the air barrier system, will be repaired – and by whom. Indicate the actual product to be used to perform any repairs in the air barrier components. Delete those that do not apply.

COMPONENT	PRODUCT TO BE USED FOR REPAIR	SUBCONTRACTOR RESPONSIBLE
SPF INSULATION – FIELD OF WALL		
SPF INSULATION (WALL) – VOIDS / CRACKS / SHIMS		
SPF INSULATION – FIELD OF ROOF		
FLUID-APPLIED MEMBRANE – PERMEABLE - WALL		
FLUID-APPLIED MEMBRANE – IMPERMEABLE -WALL		
SELF-ADHERED MEMBRANE – PERMEABLE - WALL		
SELF-ADHERED MEMBRANE – IMPERMEABLE -WALL		
SELF-ADHERED MEMBRANE – PERMEABLE - ROOF		
SELF-ADHERED MEMBRANE – IMPERMEABLE -ROOF		
TRANSITION MEMBRANE – SELF- ADHERED		
PRIMER		
MASTIC / TERMINATION SEALANT		

INSULATION SECURED TO OR OVER AIR BARRIER MATERIAL:

Address any concerns or issues of installing insulation over the air barrier material (foundation, walls, and roof), such as preparation, securing, or fastening methods. Delete those that do not apply.

INSULATION TYPE	METHOD FOR SECUREMENT	CONCERNS (IF ANY)
SPF		
XPS		
POLYISO		
EPS		
EPX		

CFSF-S LOCATIONS: DELETE IF THEY DO NOT APPLY.

Where CFSF-S is a component in the exterior wall assembly, the air barrier installer may need to mark the material itself to indicate where the framing is located. The insulation subcontractor, in turn (when the insulation is not the air barrier), may need to transfer those marks onto the insulation. If any of the above is required, discuss and identify below. Delete those that do not apply.

COMPONENT	SUBCONTRACTOR RESPONSIBLE FOR LOCATION MARKS, IF NECESSARY
SHEATHING	
AIR BARRIER	
INSULATION	

OTHER CONSIDERATIONS OR COMMENTS:

END OF AIR BARRIER SYSTEM PRE-INSTALLATION CONFERENCE GUIDE

END OF SECTION 018317

SECTION 020000 – EXISTING CONDITIONS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. These general site work requirements apply to all site work operations. Refer to Division 32 specification sections for specific general, product, and execution requirements.

1.2 QUALITY ASSURANCE

- A. Comply with all applicable local, state, and federal requirements regarding materials, methods of work, and disposal of excess and waste materials.
- B. Obtain and pay for all required inspections, permits and fees. Provide notices required by governmental authorities.

1.3 PROJECT CONDITIONS

- A. Locate and identify existing underground and overhead services and utilities within contract limit work areas. Provide adequate means of protection of utilities and services designated to remain. Repair utilities damaged during site work operations at Contractor's expense. Coordinate with utility providers as needed based on project scope.
- B. Arrange for disconnection, disconnect, and seal or cap all utilities and services designated to be removed before start of site work operations. Perform all work in accordance with the requirements of the applicable utility company or agency involved.
- C. When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the applicable utility company immediately to obtain procedure directions. Cooperate with the applicable utility company in maintaining active services in operation.
- D. Locate, protect, and maintain benchmarks, monuments, control points and project engineering reference points. Re-establish disturbed or destroyed items at Contractor's expense.
- E. Perform site work operations and the removal of debris and waste materials to assure minimum interference with streets, walks, and other adjacent facilities.
- F. Obtain governing authorities written permission when required to close or obstruct street, walks and adjacent facilities. Provide alternate routes around closed or obstructed traffic ways when required by governing authorities.
- G. Control dust caused by the work. Dampen surfaces as required. Comply with pollution control regulations of governing authorities.
- H. Protect existing buildings, paving, and other services or facilities on site and adjacent to the site from damage caused by site work operations. Cost of repair and restoration of damaged items at Contractor's expense. Maintain emergency egress routes as required by Life Safety and as coordinated with the Architect.

- I. Protect and maintain streetlights, utility poles and services, traffic signal control boxes, curb boxes, valves, and other services, except items designated for removal. Remove or coordinate the removal of traffic signs, parking meters and postal mailboxes with the applicable governmental agency. Provide for temporary relocation when required to maintain facilities and services in operation during construction work.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment: As selected by Contractor, except as indicated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine the areas and conditions under which site work is performed. Do not proceed with the work until unsatisfactory conditions are corrected.
- B. Consult the records and drawings of adjacent work and of existing services and utilities which may affect site work operations.

END OF SECTION 020000



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(757) 229-6677

ECS Project No. 47:14438
Date: June 13, 2022

SECTION 02080
ENGINEERING CONTROL OF ASBESTOS CONTAINING MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The GENERAL CONDITIONS (AIA DOCUMENT A201), SUPPLEMENTAL GENERAL CONDITIONS and DIVISION 1 GENERAL REQUIREMENTS, shall apply as fully as if included herein.

1.2 NOTES FOR DEMOLITION

- A. The Abatement Contractor shall coordinate with the General Contractor to ensure that all appropriate systems that will be impacted by demolition/abatement have been properly decommissioned prior to the start of any work.
- B. The Abatement Contractor shall coordinate with the General Contractor selected for this project to verify that the structure will support the planned activities and comply with local building codes and OSHA requirements.

1.3 WORK INCLUDED

- A. The work includes the furnishing of all labor, materials, equipment, insurance and services necessary for and reasonably incidental to the completion of asbestos removal and related work.

- B. Comply with all governing regulations, which the specifications supplement.
- C. Comply with DIVISION 1 GENERAL REQUIREMENT.
- D. All other work as herein specified. The Contractor will be responsible for obtaining any local, state, and federal permits, as appropriate for this project, prior to starting work. All permits, notifications, patent restrictions or requirements, whether specified in these specifications or not, are the sole responsibility of the Contractor performing the work described in these specifications. Note: If during the course of the contract, the Contractor is found to be not in compliance with the project specifications, the Contractor will stop all work until any deficiencies in his performance of this work are corrected. Standby time required to resolve any violations shall be at the Contractor's expense. Likewise the Contractor will pay for any project delay that his violation causes the Building Owner. The contractor will also be back-charged by the Building Owner for any additional IH/project monitor site visits and/or additional analytical (and collection) fees resulting from poor work practices during removal including failed final air samples.

1.4 REGULATIONS

- A. All work shall conform to the requirements of the U. S. Environmental Protection Agency (EPA), U. S. Department of Labor - Occupational Safety and Health Administration (OSHA) and applicable State regulations relating to asbestos.
- B. The EPA and OSHA regulations shall be posted at the job site for the duration of the work; posting shall be in a location clearly visible to employees and others in the area.

1.5 DEFINITIONS

- A. Accredited/Accreditation: When referring to a person, Contractor or laboratory, means that such person is accredited in accordance with Section 206 of Title II of the Toxic Substances Control Act (ASHERA Regulations).
- B. Aerosol: A system consisting of particles, solid or liquid, suspended in air.
- C. Aggressive Sampling: High-activity level air sampling which results in all settled asbestos remaining airborne and uniformly disturbed through the use of special entrainment and mixing techniques. This makes any settled asbestos fibers accessible to the sampling filters for subsequent detection. The technique is described in 40 C.F.R. 763.90, Appendix A to Subpart E; and Guidance for Controlling ACM in Buildings, Appendix M.

- D. Air Filtration Device (AFD): Air filtration device (AFD) is part of the pressure differential system in which the air is filtered. The AFD is to be equipped with HEPA filters.
- E. Air Monitoring: The process of measuring the fiber content of a specific volume of air. NIOSH Method 7400 or TEM Method in 40 C.F.R. 763, Subpart E, Appendix A, will be used for sampling and analysis.
- F. Amended Water: Water to which a surfactant has been added.
- G. Approve: Where used in conjunction with the QP's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, "approved" will be held to limitations of QP's responsibilities and duties and does not release the Contractor from responsibilities to fulfill requirements of the Contract Documents. Approved shall also mean consent by U.S. EPA of training programs and the like.
- H. Asbestos: The asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite (amosite), anthophyllite, and actinolite-tremolite. Both the asbestiform and non-asbestiform varieties of the above minerals and any of these materials that have been chemically treated and/or altered shall be considered to be asbestos.
- I. Asbestos-Containing Material (ACM): Any material containing more than 1% by weight of asbestos of any type or mixture of types.
- J. Asbestos-Containing Waste Material: Any material, which is or is suspected of being or any material contaminated with an asbestos-containing material, which is to be removed from a Work Area for disposal.
- K. Authorized Visitor: Personnel authorized by the Project Officer, testing lab personnel, or a representative of any Federal, State or local regulatory agency having authority over the project are considered authorized visitors.
- L. Barrier: Any surface that seals off the Work Area to inhibit the movement of fibers.
- M. Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
- N. Ceiling Concentration: The concentration of an airborne substance that shall not be exceeded.
- O. Certified Industrial Hygienist (C.I.H.): An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.

- P. Critical Barrier: Two layers of 6 mil polyethylene sheeting on wall or three layers on floor spray foam, or duct tape used to completely seal off the Work Area to prevent spread of fibers to surrounding areas.
- Q. Decontamination (Decon) Area: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower room and a clean room which is used for the decontamination of workers, materials and certain equipment contaminated with asbestos. This shall serve as the only entrance or exist to the Work Area.
- R. Demolition: The wrecking or taking out of any building component, system, finish or assembly of a facility together with any related handling operations.
- S. Disposal Bag: A 6-mil thick, leak-proof polyethylene bag used for transporting asbestos waste from the work area to the disposal site. Each is labeled in compliance with OSHA 1926.1101 as follows:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

And U.S. DOT ORM-E label for Asbestos-Hazardous Material (including Asbestos Waste Manifest) and statements as required.

- T. Encapsulant: A material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent release of fibers.
- U. Bridging Encapsulant: An encapsulant that forms a discrete layer on the surface of an in situ asbestos matrix.
- V. Penetrating Encapsulant: An encapsulant that is absorbed by the in situ asbestos matrix without leaving a discrete surface layer.
- W. Removal Encapsulant: A penetrating encapsulant specifically designed for removal of asbestos-containing materials rather than for in situ encapsulation.
- X. Encapsulation: Treatment of ACM with an encapsulant.
- Y. Enclosure: The construction of an airtight, impermeable, permanent barrier around asbestos-containing material to control the release of asbestos fibers into the air.
- Z. Filter: A media component used in respirators to remove solid or liquid particles from the respired air.

- AA. Friable Asbestos Material: Material that contains more than 1.0% asbestos by Polarized Light Microscopy (PLM) and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry. This includes previously non-friable material which becomes damaged to the extent that, when dry, may be crumbled, pulverized or reduced to powder by hand pressure.
- BB. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- CC. General Supervisor: Site Superintendent, Foreman: is the Contractor's representative at the work site. This person can be the Competent Person required by OSHA, 29 C.F.R. 1926.1101.
- DD. Glovebag: A sack (typically constructed to 6 mil transparent polyethylene) with two inward projecting long sleeve gloves, which are designed to enclose an object from which an asbestos-containing material is to be removed.
- EE. HEPA Filter: A high efficiency particular air (HEPA) filter that removes from air 99.97% or more of monodispersed dioctylphthalate (DOP) or dioctylsebacate (DOS) particles having a mean particle diameter of 0.3 microns.
- FF. HEPA Filter Vacuum Collection Equipment (or vacuum cleaner): HEPA filtered vacuum collection equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall be 99.97% efficiency for retaining fibers of 0.3 microns or larger.
- GG. Indicated: The term "Indicated" is a cross-reference for Notes or Schedules on Drawings, to other paragraphs or Schedules in the Specifications, and to similar means of recording requirements in Contract Documents.
- HH. Install: Unless defined in greater detail, "install" is used to describe operations at the project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working on dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
- II. Installer: The "installer" is defined as the entity (person or firm) engaged by the Contractor or Sub-Contractor to perform a particular trade at the work site, including installation, erection, application and similar required operations. Such entities (installers) shall be expert in operations they perform.
- JJ. Landfill Receipt: Document signed by a landfill operator acknowledging the receipt of ACM waste.

- KK. Manifest: A document detailing chain of custody for ACM waste hauled.
- LL. Negative Pressure Glovebag: A glovebag that is composed of flexible plastic that can be subjected to negative pressure without collapsing.
- MM. Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
- NN. Permissible Exposure Limit (PEL): The Contractor shall ensure that no employee is exposed to an airborne fiber concentration of asbestos in excess of the PEL expressed as an 8-hour TWA as determined by the OSHA Reference Method of 29 C.F.R. 1926.1101 (Current PEL for asbestos is 0.1 fibers/cc.).
- OO. Personal Sampling Monitoring: Air samples taken in the breathing zone of workers as required by OSHA 29 C.F.R. 1926.1101.
- PP. Pressure Differential: Air pressure lower than surrounding areas, caused by exhausting air from a sealed space (Work Area).
- QQ. Pressure Differential System: A local exhaust system, utilizing HEPA filtration, capable of maintaining a pressure differential inside the Work Area and a constant airflow from adjacent areas into the Work Area and exhausting that filtered air outside the Work Area.
- RR. Project Manager (Contractor): The asbestos Contractor's employee responsible for the total oversight of the project.
- SS. Project Officer: The State employee responsible for overall contract administration.
- TT. Plasticize: Means to cover floors and walls with polyethylene sheeting as herein specified and in accordance with the temporary Enclosure Section.
- UU. Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
- VV. Provide: Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
- WW. Qualified Person (QP): A Registered Architect, Professional Engineer, or Certified Industrial Hygienist who has successfully completed training and is therefore accredited under a legitimate State Model Accreditation Plan as described in 40 CFR 763 as a Building Inspector, Management Planner, Project Monitor, and Asbestos Project Designer. The QP must

be qualified to perform visual inspections as indicated in ASTM E 1368. The QP shall be appropriately licensed in the State of Virginia as a Project Monitor and Project Designer. For this project, the QP shall be Mr. Christopher Chapman, CIH of ECS in Richmond, Virginia. If the Owner chooses a different firm to monitor this project, that firm shall be designated as the QP.

- XX. Regulated ACM: Means friable ACM, non-friable ACM that has become friable, non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading or non-friable ACM that has a high probability of becoming or has become crumbled, pulverized or reduced to powder by the forces expected to act on the ACM during renovation or demolition.
- YY. Regulated Area: An area where asbestos removal operations are performed which is isolated by physical boundaries to prevent entry of unauthorized persons or the spread of asbestos dust, fibers or debris. Within this area, the airborne concentration of asbestos could reasonably be expected to exceed the PEL.
- ZZ. Removal: The taking out or stripping of all ACM from a damaged area or associated area or space.
- AAA. Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.
- BBB. Short-Term Exposure Limit (STEL): A "ceiling" concentration, identified in OSHA regulations, of an airborne substance that shall not be exceeded for a duration of any 30-minute period (Current STEL for asbestos is 1.0 fiber/cc.).
- CCC. Submittal: Items that is required to be presented to the Project Officer and/or the QP for review, consideration or decision.
- DDD. Surfacing Material: Material in a building that is sprayed-on, trowelled-on or otherwise applied to surfaces or structural members for acoustical, fireproofing or other purposes.
- EEE. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
- FFF. Testing Laboratory: The "testing laboratory" is an independent entity to perform specific air sampling and analysis at the work site and associated areas, to report and (if required) interpret results. Analysis shall be performed by a laboratory accredited by the American Industrial Hygiene Association (AIHA) and having demonstrated a proficient rating in AIHA's Proficiency Analytical Testing (PAT) Program. The laboratory shall be licensed by the Virginia Department of Commerce as an Asbestos Analytical Laboratory. The laboratory shall also be accredited by the

National Institute of Standards and Technology (NIST) through the National Voluntary Laboratory Accreditation Program (NVLAP) for bulk sample analysis and air sample analysis by TEM (TEM Method of 40 C.F.R. 763, Subpart E, Appendix A).

- GGG. Time Weighted Average (TWA): The average concentration of a contaminant in air during a specific time period.
- HHH. Visible Emissions: Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed water vapor.
- III. Waste Shipment Record: Means the original shipping document, originated and signed by the waste generator (Abatement Contractor) used to track and substantiate the disposal of ACM waste as described in 40 C.F.R. Part 61.
- JJJ. Waste Generator: Means the licensed Asbestos Abatement Contractor removing ACM waste from the property.
- KKK. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils that have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of as asbestos-containing waste.
- LLL. Work Area: The area where asbestos-related work or removal operations are performed; the Work Area is defined and/or isolated to prevent the spread of asbestos dust, fibers, or debris, and entry by unauthorized personnel. The Work Area is a Regulated Area as defined by 29 C.F.R. 1926.1101.
- MMM. Work Site: The term "work site" is defined as the space available to the Contractor for performance of the work either exclusively or in conjunction with others performing other work as part of the project. The extent of project site is shown on the Drawings, and may or may not be identical with the description of land upon which the project is to be built.
- NNN. Negative Pressure Enclosure: Pressure differential of a minimum of -0.02 column inches of water as related to outside pressure. Utilization of a manometer shall be use as evidence.

ABBREVIATIONS AND NAMES:

The following acronyms or abbreviations referenced in Contract Documents are defined to mean the associated names. Both names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up-to-date as of the date of the Contract Documents:

ACM Asbestos Containing Material

AIA	American Institute of Architects 1735 New York Avenue, N.W. Washington, DC. 20006 (202) 626-7474
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018 (212) 354-3300
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103 (215) 299-5400
	CFR Code of Federal Regulations Available from Government Printing Office Washington, DC. 20402 (Usually first Published in Federal Register)
EPA	Environmental Protection Agency 401 M Street, SW Washington, DC. 20460 (202) 382-3949
f/cc	fibers per cubic centimeter
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology (U.S. Department of Commerce) Gaithersburg, MD 20234 (301) 921-1000
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor) Government Printing Office Washington, DC. 20402
TEM	Transmission Electron Microscopy
VA DPOR	Virginia Department of Professional and Occupational Regulation 3600 West Broad Street

Richmond, Virginia 23230-4917
(804) 367-8500

UL Underwriters Laboratories
333 Pfinngsten Road
Northbrook, IL 60062

1.6 Pre-Work Submittals

A. Immediately upon award of the Contract, and before a notice to proceed is issued, Contractor shall submit for information of the Owner and Engineer the data listed below and shall be in quantity to allow the Owner to retain two copies and the Engineer to retain one copy. The data shall show compliance with the requirements of the Contract Documents and governing regulations.

- 1) Method and means of removal and encapsulation of asbestos-containing materials.
- 2) Containment and shrouding procedures, including any unusual conditions.
- 3) Air sampling plan.
- 4) Name of laboratory to be used in air sample analysis and copy of American Industrial Hygiene Association (AIHA) Accreditation.
- 5) Location of change and decontamination area.
- 6) Location of landfill for disposal of asbestos waste that has been approved by EPA.
- 7) Manufacturer's technical data sheets on proposed surfactant, encapsulant, mastic removers, etc.
- 8) Certificate of Insurance with notarized statement thereon that all requirements stated in paragraphs 13 (a) through 13 (d) are covered.
- 9) Copies of Asbestos Contractor, Worker's License and Asbestos Supervisors License.
- 10) Notifications to all appropriate state and federal agencies and local fire and police departments.

1.7 SCOPE OF WORK

A. The Scope of Work includes, but is not necessarily limited, to the following:

- 1) The Abatement Contractor shall be responsible for removal of all asbestos-containing materials impacted by this project. These materials include but are not limited to **interior metal frame door caulking at CMU walls, mudded roof drain elbows, mudded pipe elbows, mudded pipe hanger saddles, acoustical sink undercoating, cementitious peg board, lab countertop material, light fixture heat shields and CMU wall block filler paint which contains trace <1% asbestos.**
- 2) The Abatement Contractor has the responsibility for determining actual quantities of materials to be removed and reviewing the scope of work. The Contractor should allow under their base bid for the removal of all materials as described in the survey report and/or referenced in this specification as a base bid lump sum price unless otherwise specified under the unit cost section. No change orders will be allowed.
- 3) All mobilizations and permit notifications shall be the Abatement Contractors responsibility. The Contractor shall be required to coordinate all abatement work with the general contractors on-site and the owner.
- 4) This section includes all work necessary to reduce air concentrations of asbestos to the specified level and maintain the specified asbestos control limits during the life of the contract. It also contains removal, containment, and disposal of asbestos-containing materials. The work specified in this document consists of the provision of services for the removal and disposal of asbestos-containing building materials (ACBMs). Asbestos materials have been identified in the areas where work will be performed. For all removal the contractor shall assume final clearance sampling will be performed.
- 5) All asbestos abatement work will be performed by competent, licensed (by the Virginia Department of Professional and Occupational Regulation) persons trained, qualified, and knowledgeable in the techniques of abatement, handling, and disposal of ACBMs and materials contaminated by asbestos, in accordance with pertinent local, state, and federal regulations.
- 6) The Abatement Contractor shall remove the following materials:
 - a) All asbestos-containing interior metal frame door caulk located in all associated areas impacted by this project (approximately 1,890 linear feet, 54 doors). Please reference Moseley Architects Demolition Drawing A 1.2.1 and A1.2.2 for doors to be impacted. The Contractor shall remove these materials intact using wet methods within a negative pressure containment as described in Part 3.1 of this document...

- b) All light fixture heat shields assumed to be asbestos containing that will be impacted by renovation activities. For the purposes of this specification ECS will assume that there are approximately 3 light heat shields total for this project. The Contractor shall remove these materials fully intact using wet methods without the use of a negative pressure containment. The contractor will utilize a negative air machine (minimum 1,000 CFM) directly adjacent to the removal activities exhausting air from the regulated area if the material cannot be removed in conjunction with removal of other asbestos containing materials within existing negative pressure containments
- c) All asbestos-containing mudded roof drain fittings, pipe elbows, and pipe hanger saddles (various diameters – for purposes of this specification -all categories will be referred to as mudded fittings) - including materials located behind walls and above solid ceilings in all associated areas impacted by this project. ECS could not access all the asbestos containing mudded fittings in all of the renovation areas and therefore could not accurately quantify the precise # of fittings to be removed. For the purposes of this specification ECS will assume that there are approximately 250 of the various types of mudded fittings total for this project. Based on the actual number of mudded fittings that are removed there will be a credit or deduction based on the unit rates the abatement contractor provides with their bid. The contractor shall remove all mudded fittings within a negative pressure containment as described in Part 3.1 of this document or utilizing glove-bag methodology as described in Part 3.3 Alternative Methods For Pipe Insulation Removal, where feasible. The Contractor shall conduct pre and post cleaning in all areas where removal is to occur. Where glove-bag work occurs, the Contractor shall have a negative air machine in operation (minimum flow capacity of 1,000 CFM) directly adjacent to the removal activities exhausting air from the regulated area. Where pipe insulation goes through a wall, any portion not removed (assuming the material is not accessible) shall be sealed with an encapsulant/lagging mastic if it cannot be removed.
- d) All CMU block filler paint associated with wall demolition located in all associated areas impacted by this project (approximately 9,800 square feet). Please reference Moseley Architects Demolition Drawings A 1.2.1 and A1.2.2 for the walls that will be demolished. Any difference in the square footage contracted to be removed and actual square footage removed will be adjusted based on the unit rates provided by the abatement contractor with their bid package. The Contractor shall assume that the walls coated with this material will be demolished within a negative pressure

containment as described in Part 3.1 of this document. During demolition the contractor will leave the CMU blocks as intact as possible. The demolition debris will be disposed of in a poly lined disposal dumpster for disposal as construction debris containing trace <1% asbestos. The abatement contractor is responsible for informing the intended landfill for disposal in writing that the material contains trace <1% asbestos. The abatement contractor will provide confirmation in writing to the owner that the intended landfill can accept this type of waste and under no circumstances shall the waste be re-used or recycled and should be treated as Category I non-friable waste at the landfill.

- e) All CMU block filler paint associated with new wall opening or penetration locations in all associated areas impacted by this project (approximately 2,200 square feet) Please reference Moseley Architects Demolition Drawing A 1.2.1 and A1.2.2 for the wall locations where the CMU block filler paint will be removed for new wall openings or penetrations. Any difference in the square footage contracted to be removed and actual square footage removed will be adjusted based on the unit rates provided by the abatement contractor with their bid package. The contractor shall assume that this material will be removed within a negative pressure containment as described in Part 3.1 of this document using chemical stripping methods.
- f) All metal sinks with asbestos containing acoustical undercoating located in all associated areas impacted by this project (approximately, 12 sinks). The Contractor shall remove these materials fully intact using wet methods without the use of a negative pressure containment. The contractor will utilize a negative air machine (minimum 1,000 CFM) directly adjacent to the removal activities exhausting air from the regulated area if the material cannot be removed in conjunction with removal of other asbestos containing materials within existing negative pressure containments.
- g) All asbestos-containing cementitious peg board material located in all associated areas impacted by this project. (Approximately 650 square feet). The contractor shall remove all cementitious peg board and any associated mastics/adhesives within a negative pressure containment as described in Part 3.1 of this document.
- h) All asbestos containing laboratory tabletops in all associated areas impacted by this project (approximately 1 tabletop). The Contractor shall remove these materials fully intact using wet methods without the use of a negative pressure enclosure. The contractor will utilize a negative air machine (minimum 1,000 CFM) directly adjacent to the removal activities

exhausting air from the regulated area if the material cannot be removed in conjunction with removal of other asbestos containing materials within existing negative pressure containments.

- i) Over the course of this project, it is assumed that multiple penetrations will be required to be made in the CMU block wall throughout the renovation area for mechanical, electrical, plumbing penetrations, etc. **The abatement contractor shall assume as part of their base bid to coordinate with the general contractor to make all of these penetrations in the walls.** The general contractor will mark and direct the abatement contractor where to make these penetrations to allow these attachments to occur. Where materials are attached to walls and need to be removed, the asbestos abatement contractor shall perform this work also. **The abatement contractor shall assume multiple mobilizations to accomplish this work.** Means and methods to accomplish this work shall be approved in advance by the Owner's representative.
- j) Where block filler paint is removed or disturbed at any location, the Contractor shall leave/restore any remaining paint in good condition and intact.
- A. The asbestos contractor will be required under their base bid SOW to perform all necessary demolition where abatement is to occur (to include piping with mudded fittings) to allow for sampling by the QP. Under the base bid scope of work, **the Contractor shall coordinate with the QP, the general contractor, and all others to open any areas where the suspect materials maybe present before general demolition is to occur. Suspect material(s) identified will be sampled by the QP if requested by the Owner. Where ACM materials are identified, the Contractor shall be responsible for abating any ACMs discovered based upon the unit priced schedule submitted with the bid package.**

Additional abatement notes:

The contractor shall provide units costs for the removal of the following materials:

1. Pipe insulation/elbows/fittings (various sizes - per fitting – glove bag)
2. Pipe insulation/elbows/fittings (various sizes - per fitting –within negative pressure containment)
3. CMU block wall filler paint (per square foot) - demolition
4. CMU block wall filler paint (per square foot) – paint stripping

5. Chalk board/whiteboard/bulletin board and associated mastic (per square foot)
6. Sub-slab or wall waterproofing/vapor barrier (per square foot)
7. Light heat shields (per heat shield)
8. Locker caulk (per linear foot)
9. Fire doors (per door)

Note 1: For unit cost pricing the contractor shall assume that all mobilization, insurance, notification, profit etc. are to be included in the unit cost estimate. The contractor shall assume that the work will be performed during the scope of the contracted asbestos abatement work. Unit pricing if not provided by the contractor shall be considered non-responsive and the Owner may elect to use industry pricing to have this work performed or disqualify the bid.

Note 2: The quantities indicated are for informational purposes only. The contractor is responsible for verifying all quantities to be removed to complete the scope of work.

Note 3: During the performance of the project, the contractor will be subject to inspection by the owner's representative. If the contractor is found not in compliance with the project specifications, the contractor will stop all work immediately to resolve the violation. Standby time shall be at the contractor's expense.

Note 4: Following completion of work, the owner's representative shall visually verify that all ACMs scheduled for removal have been removed and that the containments are clean and ready for final aggressive air sampling. US EPA AHERA protocols will be followed for clearance criteria. Contractor will re-clean the containment areas at their own expense until containment passes both visual and aggressive final clearance air sampling. The contractor shall re-imburse the Owner for all expenses including lab and collection costs for failed final clearance samples.

Note 5: The Abatement Contractor shall coordinate with the Mechanical, Electrical, Plumbing, and General Contractors to ensure that all appropriate systems that will be impacted by renovation work have been properly decommissioned prior to the start of any work.

1.8 QUALITY CONTROLS

- A. The asbestos removal Contractor's superintendent shall be on the job each day during removal and he shall be knowledgeable, experienced and competent in this type of work. The Contractor shall coordinate all work with the Owner and the General Contractor. The Contractor shall assume that work will not be performed while the building is occupied, and that work will be performed on weekends dependent upon the Owners schedule.
- B. The asbestos removal Contractor shall be responsible for any damage to the building and its contents resulting from leakage or spillage of water.
- C. Authorities of the Commonwealth of Virginia shall be notified of the starting date of the asbestos removal project by the asbestos removal Contractor.
- D. The Owner reserves the right to halt the project work until hazardous or potentially hazardous conditions are corrected.
- E. The Owner reserves the right to independently perform such analysis and tests at any time as he deems necessary to ensure and protect safety of the project.

1.9 WORKER PROTECTION - ASBESTOS REMOVAL PROCEDURES & EQUIPMENT

- F. Comply with all EPA and OSHA Regulations, and follow EPA workplace guidelines.
- G. Provide and maintain negative air systems for all work areas, for the duration of asbestos removal work.
- H. Submit certificates signed by each employee indicating that the employee has received Virginia DPOR-approved training and is currently licensed in the Commonwealth of Virginia in the proper handling of materials that contain asbestos.
- I. All workers shall be instructed in and be knowledgeable of the following:
 - 1) The hazards of asbestos exposure.
 - 2) Use of respirators and protective clothing.
 - 3) Use of personal air monitoring equipment.
 - 4) Use of decontamination facilities and designated showers.
- J. Respiratory Equipment and Air Sampling Requirements

- 1) Provide workers with respiratory equipment in accordance with OSHA 1910.134, as suitable for the asbestos exposure in the work area.
 - 2) Provide sufficient filters for replacement of disposable type filters.
- K. Provide a copy of written respirator program on the job site at all times.
- L. Personnel breathing zone samples shall be made by the asbestos removal Contractor on a daily basis for determination of both 8-hour time weighted average (TWA) and ceiling concentrations of employee exposures.
- M. The sampling schedule shall be posted outside of the containment area showing sample frequency, duration of the sample, and pump flow rates.
- N. Results of all samples shall be posted within 24 hours of sampling outside of the containment area, and maintained there until the job has been concluded. This data shall include both the results of individual samples and the results of 8-hour TWA determinations. Posted results should include a synopsis of work activities of which the results are representative.

1.10 AIR MONITORING

- O. Provide air monitoring in the work areas throughout all asbestos stripping, removal and cleaning operations to ensure that the workers are adequately protected at all times. All personal air monitoring for OSHA compliance shall be the responsibility of the Contractor.
- P. Samples for air monitoring shall be collected by a competent person in accordance with methods prescribed in Chapter X of the Federal OSHA Industrial Hygiene Field Operations Manual or by equivalent procedures.
- Q. Air monitoring shall be in compliance with 1910.1001 (f) of the OSHA standards.
- R. Air samples must be analyzed by NIOSH method 7400 by a laboratory accredited by AIHA and State of Virginia.
- S. Air monitoring (protection of the Contractor's employees) shall be provided throughout the removal and cleaning operations. Air monitoring shall be conducted and evaluated by a testing laboratory employed by the asbestos removal Contractor to ensure that the Contractor is complying with applicable EPA and OSHA regulations.
- T. Environmental samples collected outside of containment and clearance sampling shall be performed by the QP (ECS Mid-Atlantic, LLC).

- U. Area samples shall be collected outside the containment in areas of highest risk of contamination.
- V. Samples shall be made on a daily basis outside the containment.
- W. All analytical results shall be presented as signed "Certificates of Analysis". Form shall state:
 - Date and time sampling began.
 - Flow rate of samples.
 - Sampling time elapsed.
 - Concentration of fibers.
 - Site/individual sampled.
 - Signature of Analyst.
- X. Two copies of analytical results shall be delivered in writing to the job site within 24 hours of sample collection (excluding non-working days).
- Y. Sampling schedules for area samples shall be posted outside the containment area showing sampling frequency, sample duration, and pump flow rates.
- Z. Results of area samples made outside the containment shall be posted within 24 hours and maintained in the area showing the fiber concentrations. Posted results should include a synopsis of the day's activities of which the samples are representative.
- AA. The Owner shall be informed immediately of any area samples outside the containment with results in excess of 0.01 fibers/cc.
- BB. Copies of the results of all samples made in areas where Owner's employees are or may be exposed shall be given to the Owner to assure maintenance of records in compliance with OSHA standard 1910.1001 (i) (1).
- CC. Operations shall be discontinued immediately at any time visible emissions are observed emanating from the containment.

PART 2 - PRODUCTS

2.1 PRODUCTS AND EQUIPMENT

- A. Protective plastic (polyethylene) sheeting of minimum 6-mil thickness and size to provide protection to all equipment, floors, walls, piping, ductwork, and all other exposed areas, with minimum frequency of joints.
- B. Seal tape shall be glass fiber or other type capable of sealing joints of adequate sheets of plastic for the attachment of plastic sheeting to finished or unfinished surfaces of dissimilar materials under either dry or wet conditions, including use of amended water.

- C. Disposal Containers: Bags and drums to be used for disposal of asbestos waste shall be suitable to receive and retain any asbestos-containing or contaminated materials until disposal at an EPA approved and certified waste disposal site. Bags shall be 6 mil thickness.
- D. Warning Labels: As required by OSHA Regulation 29 CFR 1910.1001 (g) (2).
- E. Surfactant (wetting agent for amended water): Acceptable surfactant.
- F. Encapsulant: Acceptable encapsulant.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Isolate the work areas for the duration of the work by completely sealing off all openings and fixtures in the work area with a minimum of one layer of 6-mil poly sheeting taped and glued securely.
- B. Contractor shall provide the Outside Clean Room, Shower Room, and Equipment Room prior to start of work within building work areas. Personnel lockers in the Clean Room and facilities for disposal of contaminated clothing in the Equipment Room shall be provided. Egress openings shall consist of two sheets of plastic taped across the opening head and down opposite jambs, one leaf shall be taped on one side of the jamb, the other on the opposite jamb.
- C. Containment partitions separating a contaminated area from a clean area shall be constructed of wood studs and two sheets of minimum 6-mil polyethylene plastic. The inner plastic barrier shall face the contaminated area, the outer barrier, and the clean area.
- D. Maintain enclosures in tidy conditions. Ensure that barriers and plastic linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately upon discovery. Visually inspect enclosures at the beginning and end of each work period. Use smoke methods to test effectiveness of barriers.
- E. Each unit of asbestos filtration systems shall consist of a blower filter system, equipped with HEPA inline filtration that, as a minimum, continuously traps asbestos fibers of all sizes to 0.3 microns at 99.97% efficiency. Each unit shall be equipped with the following minimum controls:
 - 1) A warning light and audible alarm to indicate reduced air flow due to dirty filters.

- 2) Automatic shut down, with warning light, to ensure against continued operation of units in event of clogged or damaged filters.
- F. The asbestos filtration system shall be in operation during all removal operations, until final clearance air samples are received. An adequate number of filtration units shall be used to assure maintenance of pressure differential of -0.02" w.c. In addition, filtration units shall be sized to provide a minimum of four air changes per hour in the containment area. Provide instrumentation to document pressure differential.
 - G. Post the EPA and OSHA regulations or any applicable state and local government regulations at the job site in locations clearly visible to employees and others. Attention is directed to all requirements of the Contract Documents concerning precautionary procedures mandated thereby and by OSHA and EPA for the protection of personnel, the public, and the environment from exposure to or possible contamination by asbestos fibers.
 - H. In addition to requirements for asbestos protection, comply with all other applicable requirements of 29 CFR 1910 and 1926.
 - I. Provide hard hats, eye protection, and foot protection in those areas where such protective measures are required by OSHA regulations.
 - J. Workers shall always wear a respirator properly fitted on the face while in the work area. Instruct and train workers to use respirators properly in accordance with the requirements of the American National Standards Practices for Respiratory Protection (ANSI Z88.2-1969). Ensure that workers wear the appropriate respirator at all times while in the work area. Each employee shall be tested for respirator fit in accordance with the cited ANSI standard.
 - K. Workers shall wear disposable full body coveralls and disposable head and foot coverings in the work area. If non-disposable footwear such as protective shoes are required and disposal foot coverings are not suitable, the non-disposable protective footwear shall be left in the work area at all times until disposal at job completion, then disposed of as asbestos contaminated waste.
 - L. The Contractor shall establish decontamination procedures for each work area. All persons without exception shall pass through these decontamination areas for any purpose. Procedures shall, as a minimum, consist of the following:
 - 1) Outside Clean room Area: In this room, the worker or individual shall remove normal street clothing and replace with clean work clothing, including disposable coveralls, respiratory protective equipment, and all other protective gear. No asbestos contaminated items shall enter this room with the exception of

reusable respirators, which are to be placed in a bin, or other suitable receptacle approved by the Contractor's technical representative. Provide suitable lockers or other secure storage areas for the employee's clothing.

- 2) Showers: A shower room or similar facility shall be provided for transit by cleanly dressed workers entering the work area from the outside clean room, or by workers headed for the showers after undressing in the contaminated equipment room or area. Except in cases of emergency, no person shall leave a contaminated area without first having taken a shower. Propose methods by which the personal hygiene of workers or other persons involved can be monitored. Water from the showers shall be passed through 5-micron water filters and then piped into the building floor drain or collected and disposed of by the Contractor. Provide water for the showers. Cold water supply from existing system may be tapped by use of garden hoses, clamps and control valves. The taps and extensions shall be provided by the Contractor. The change facility shall be equipped with adequate water heating capacity to provide for hot water showers. The decontamination facility shall be equipped with a thermostatically controlled heating system for the clean room and equipment room.
- 3) Equipment Room: Provide an area in which work equipment, footwear and contaminated work clothing can be placed in suitable receptacles for reuse or disposal prior to entry into the shower room and thence to the outside clean room.
- 4) Decontamination Procedures: Submit to the Owner, a protection program to ensure that workers and others follow an established decontamination sequence utilizing the aforementioned facilities. They shall ensure that gross contamination and debris is removed from protective clothing and equipment prior to egress from the work area. Respiratory protective equipment shall be removed last, during shower, to prevent inhalation of fibers during removal of contaminated clothing. The Contractor shall provide a plan for receipt, inspection, cleaning and storage of respiratory protective equipment in such a manner as to avoid contamination of clean areas.

3.2 METHOD OF REMOVAL FOR ENCLOSED WORK AREAS

- A. A low-pressure fine spray of amended water shall be applied to reduce fiber release preceding removal. The asbestos shall be saturated sufficiently to retard emission of airborne fibers. If the asbestos is thick and detaches in chunks having dry bottoms, amended water shall be sprayed over the material as it is loosened and removed.
- B. Following removal of asbestos-containing material, all plastic sheeting, tape, cleaning material, clothing and all other disposal materials or items

used in the work area shall be packed into sealable plastic bags (6 mil minimum), sealed and placed into metal or fiber containers or skips for transport. The containers or skips shall be labeled as prescribed by OSHA Specifications 29 CFR 1910.1001 (g).

- C. All containers shall be cleaned and thoroughly decontaminated before leaving the work area by being passed through the shower, or through the airlock and container cleaning assembly, as follows:
 - 1) Containers shall first be gross-cleaned by vacuuming and then damp-wiped, before being placed into shower container or cleaning airlock.
 - 2) If a container being transferred from the work area via a shower has dried, it shall be wet-wiped again before being transferred past the shower.
- D. Transport the sealed container or skips to an EPA approved and certified waste disposal site. The Contractor shall provide the Owner with a signed certificate listing the quantity of materials delivered to the disposal site, a description of the location of the site, and a statement attesting to the fact that the site is an EPA and State approved disposal location. The signatures of the asbestos removal Contractor, transporter, and site operator must appear on the certificate. The Contractor shall ensure that the operator leaves damaged bags in the delivery containers and that the entire contaminated container is buried, however, sealed plastic bags may be dumped from the containers into the burial site and uncontaminated containers may be reused. The Contractor shall certify that any reused containers have not contained damaged or broken bags of asbestos or other asbestos-contaminated material.
- E. Disposal of all asbestos waste shall be at a prearranged disposal site in accordance with regulations of the Virginia Department of Environmental Quality-Waste Division and OSHA Regulation 29 C.F.R. 1910.1001.

3.3 ALTERNATIVE METHODS FOR PIPE INSULATION REMOVAL

- A. Glove Bag Method:
 - 1) Glove bag abatement may be allowed on the project only if performed in critical barrier containment with 6-mil polyethylene drop sheeting to remove certain sections of pipe insulation.
 - 2) Glove bag abatement must be approved with the written permission of the Owner or Owner's representative.
 - 3) Glovebag removal requires the work to be performed by two properly licensed asbestos workers.
 - 4) Glovebag removal requires the use of wet methods in the form of a pump sprayer and negative pressure in the form of a HEPA vacuum. Both

these engineering controls will be installed and visually inspected by the Owner's QP prior to starting abatement.

- 5) The abatement contractor will be responsible for performing smoke testing of installed govebags which will be witnessed by the Owner's QP prior to starting removal
- B. Wrap and Cut Method:
- 1) Wrap and cut abatement may be allowed on the project only if performed in a critical barrier containment with 6-mil polyethylene drop sheeting to remove certain sections of pipe insulation following glove bag method. Pipe shall be wrapped prior to removal with at least two (2) layers of 6-mil polyethylene sheeting properly sealed with glue and tape, labeled in accordance with federal, state and local regulations, and then cut through the sections where pipe insulation had been removed using glove bag method.
 - 2) Fire doors may be wrapped prior to removal with at least two (2) layers of 6-mil polyethylene sheeting properly sealed with glue and tape and labeled in accordance with federal, state and local regulations.
- C. Do not allow eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics in the Work Area.
- D. Perform asbestos related work in accordance with 29 CFR 1926.1101, 40 CFR 61-SUBPART M, and as specified herein.
- E. Personnel of other trades not engaged in the removal and demolition of asbestos containing material shall not be exposed at any time to airborne concentrations of asbestos unless all the personal protection and training provisions of this specification are complied with by the trade personnel.
- F. Pre-clean all work areas of pre-existing contamination/debris to include asbestos containing material fragments that have been dislodged. Pre-abatement visual cleanliness will be determined by the PM.
- G. Wet Removal techniques shall be used. Dry removal will not be permitted.
- H. Coordinate abatement in a manner to minimize the number of work areas that will require final clearance air sampling.

3.4 DECONTAMINATION OF WORK AREA

- A. Replace pre-filter and the intermediate filter in the Air Filtration Device. Clean all surfaces of the Work Area, including the outside surface of critical barrier sheeting, tools, scaffolding and/or staging, by HEPA-filtered vacuuming, then damp cleaning and mopping. Do not dry-dust or dry-sweep. Continue cleaning until there is no visible dust, debris or residue on polyethylene sheeting and other surfaces.

- B. Perform a complete visual inspection of all Work Area surfaces and contents. If any debris or residue is found, repeat the first cleaning and continue decontamination procedure from that point.
- C. Allow sufficient time for the Work Area to completely dry while operating HEPA filtered fan units. Maintain operation of negative pressure differential system in operation during the drying period.
- D. The QP shall conduct a visual inspection of the Work Area when the abatement and decontamination is complete and when the Contractor's supervisor requests such inspection.
- E. After the visual inspection, an approved lock down encapsulant shall be applied to all the surfaces in the Work Area. The encapsulant used shall not impede reinsulation. After sufficient drying time, determined by the QP, the final clearance can take place.
- F. Additional cleaning required after the first final cleaning will be performed at the expense of the contractor. Additional hours required by the QP will also be an expense paid for by the Contractor, as well as necessary repeat final air clearance analyses.
- G. After final air samples are found to meet clearance criteria, remove critical barriers and completely dismantle and remove Decontamination Area.
- H. Seal HEPA filtered AFDs with 6-mil polyethylene sheeting and duct tape to form a tight seal at intake and before unit is moved from the Work Area.

3.5 FINAL INSPECTION AND TESTING.

- A. After cleaning and decontamination of the workspace has been conducted, and if a high degree of cleanliness has been achieved, notify the QP that the workspace is ready for inspection and final testing. The QP will visually inspect each Work Area where such activity was conducted to determine whether the clean up has been properly completed and to detect any visible asbestos dust or contamination. The QP shall conduct a visual inspection of the Work Area when the abatement and decontamination is complete and when the Contractor's supervisor requests such inspection. The visual inspection will be conducted in general accordance with ASTM E 1368-90, Standard Practice for Visual Inspection of Asbestos Abatement Projects.
- B. If the visual inspection does not reveal any dust or other signs of contamination, the final air monitoring will take place. Samples collected during abatement shall not exceed 0.01 f/cc or 70 structures per mm², depending on the method of clearance sampling used. If abatement areas (in aggregate in any one location) exceed 160 sq. ft. or 260 linear lin. ft. in one general area, the Contractor shall assume TEM clearance methods will be used for clearance as per AHERA. Where TEMs are used for

clearance, the Contractor should assume a minimum of a 2-day TAT for any air samples collected by the Owner's IH/QP. Any additional cleaning required after the final cleaning will be performed at the expense of the contractor. Additional hours and sample costs required by the QP will also be an expense paid for by the Contractor if the initial or subsequent final air samples fail.

- C. Final air clearance testing shall be conducted by the QP using aggressive air sampling techniques in the Work Area in accordance with EPA 40 C.F.R. Part 763.90(i), (2, i) and Appendix A. The Contractor shall assume that turn-around time for all clearance air sampling shall be a minimum of 48 hours.
- D. Phase contrast microscopy analysis will be performed in accordance with NIOSH Method 7400 or [AHERA \(40 CFR, Part 763, Subpart E, Appendix A\)](#). Final test results shall show contamination levels not to exceed 0.01 f/cc when using phase contrast microscopy or 70 structures per millimeter s/mm² when using TEM; Air samples shall have a minimum volume of 1,200 liters per sample but may vary depending on size of Work Area and other variables (for PCM analysis only).
- E. If elevated airborne fiber counts are detected on clearance samples, the Contractor will be responsible for re-cleaning of the sampled area(s) at no additional cost or schedule impact to Owner. Additional testing will be performed following the re-cleaning to document that acceptable levels have been achieved. The Contractor will be responsible for fees and expenses related to retesting the area after re-cleaning.

- End of Section -

**SECTION 024100
DEMOLITION**

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 011000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

1.02 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction Current Edition.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Photographic Documentation: Submit photographic record of the existing conditions, either as still photographs or as a video-recorded walkthrough. Contractor shall perform walkthrough of existing conditions with Owner's representative prior to site mobilization.
 - 1. Photographic documentation shall clearly show existing damage and wear on existing surfaces that may be interpreted as being caused by subsequent demolition and construction operations.
 - 2. For still photographs, submit marked-up plan(s) indicating locations where photographs were taken and direction photograph is facing. Include a written narrative to describe existing damage and other conditions as deemed necessary.
 - 3. For video recordings, include a spoken narrative to describe locations and existing conditions, or provide a supplementary written narrative.
 - 4. Submit all photographic documentation as digital photo / video files, and supplementary narratives and plans as PDF files. Submit as part of the initial submittal package required prior to release of the first request for payment.
- C. Site Plan: Showing:
 - 1. Areas for temporary construction and field offices.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.04 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
 - 1. Hazardous Materials: The demolition firm shall have all necessary certifications to perform hazardous materials abatement in addition to standard demolition work.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. All demolition work shall be considered unclassified. Barring discovery of hazardous materials or undocumented structural components, where elements are indicated to be demolished, the bid price shall be for complete demolition of the element, regardless of the individual component makeup of that element.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Fire Safety: Comply with applicable requirements of the International Fire Code; Chapter 33, and with NFPA 241.
 - a. Use of explosives is not permitted.
 - b. Hot Work: Remove all combustibles from areas where hot work is required, including use of cutting torches, welding, or heating equipment. Maintain fire watch for entire duration of hot work and for a minimum 30 minutes after completion of hot work.
 - 1) Keep portable fire extinguishers within 30 feet of locations where hot work is being performed for entire duration.
 - c. Maintain egress routes and emergency access routes at all times; do not allow demolished materials to accumulate and block routes.
 - d. Remove combustible demolished materials from the building by the end of each work day. Temporarily store combustible materials in noncombustible containers with self-closing lids until they can be removed from the building.
 - e. Do not burn demolished material on site.
 - 3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 4. Provide, erect, and maintain temporary barriers and security devices.
 - 5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 6. Do not close or obstruct roadways or sidewalks without permit.
 - 7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 8. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- C. Do not begin removal until receipt of notification to proceed from Owner.
- D. Do not begin removal until built elements to be salvaged or relocated have been removed.
- E. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.
- F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

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- G. Hazardous Materials: Hazardous materials are present in the existing facility. Comply with 29 CFR 1926 and state and local regulations. Do not remove or demolish hazardous-material containing items except under the methods and processes indicated in abatement specifications.
 - 1. Allowances and Unit Prices for Hazardous Materials Abatement: Abatement of individual materials and components shall be determined by actual measurement or quantity of material removed and unit price amounts indicated on the Bid Form, per requirements of 012200 - Unit Prices. Compensation shall be provided from lump sum allowance per Section 012100 - Allowances.
- H. Perform demolition in a manner that maximizes salvage and recycling of materials.
 - 1. Dismantle existing construction and separate materials.
 - 2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.02 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove items indicated on drawings.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 3. Verify that abandoned services serve only abandoned facilities before removal.
 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Floor Finishes: After removal of existing floor finishes including backings, underlayments, and thick set mortar beds, remove all residual adhesives and glue. Provide grinding, sanding, or shot-blasting of existing concrete floor slab to achieve the proper surface to receive new indicated floor finish. Coordinate slab surface preparations required for each new indicated floor finish with appropriate subcontractor.
1. Concrete and Terrazzo: Cut concrete and terrazzo neatly in straight lines with power-driven saw with diamond-tooth blade or other type specifically intended for concrete and masonry. Break up and remove carefully, avoiding damage to adjacent flooring that will remain exposed in the finished work.
 2. Terrazzo: Specific salvage procedures for existing terrazzo to be demolished: The Contractor shall salvage four pieces of terrazzo, two of each color (two colors). Each piece shall be approximately 8" x 8" square. Turn over salvaged pieces to Architect for use in color matching new terrazzo.
- G. Existing Surfaces to Receive Finishes: Remove miscellaneous hangers, exposed nails not serving as fasteners, and similar protrusions; remove adhesive residue and tape; fill anchorage holes; and otherwise patch and restore surface to be a uniform substrate suitable for applied finishes.
- H. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch as specified for patching new work.

3.04 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 024100

SECTION 024113 - SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes demolition and removal of the following:
 - 1. Demolition and removal of designated site elements.
 - 2. Salvage of existing items to be reused or recycled.
 - 3. Demolition and removal of roads, walks, curbs, and on-grade slabs outside buildings to remain and/or to be demolished.
 - 4. Disconnection and capping or removal of identified utilities and underground piping.
 - 5. Abandonment of existing residential well.
- B. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, and Division 01 Specifications, apply to this Section.
- C. Project record documents shall comply with record keeping procedures and/or documentation requirements as specified in Division 1.
 - 1. Accurately record actual locations of capped utilities, well, and subsurface obstructions and submit to the architect/engineer.

1.02 DEFINITIONS AND MATERIAL OWNERSHIP

- A. Unless otherwise indicated, demolition waste is the property of the Contractor and must be removed and disposed of legally off-site.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of the Owner. Carefully remove and salvage any such items in a manner to prevent damage and return to Owner.
- C. Remove: detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled. Remove and demolish are synonymous.
- D. Remove and Salvage: detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- E. Remove and Reinstall: detach items from existing construction, in a manner to prevent damage; store in a protected manner as dictated by the needs of the removed item; prepare for reuse; and reinstall where indicated.
- F. Existing to Remain: leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled. Items to remain shall be protected from damage due to construction activities.
- G. Dismantle: remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.03 REGULATORY REQUIREMENTS

- A. Conform to applicable code for demolition of structures, safety of adjacent structures, dust control, runoff control and disposal.
- B. Obtain required permits from authorities having jurisdiction. A land disturbance permit is required from City of Colonial Heights; registration for Construction General Permit and compliance with Virginia Stormwater Management Program requirements is required. Contractor shall maintain a Stormwater Pollution Prevention Plan and perform inspections as required by the CGP.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct roadways, sidewalks, or hydrants without permits or permission from authority having jurisdiction.
- E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.
- F. If buried tanks are found, test soils around them for contamination.

1.04 PERFORMANCE REQUIREMENTS

- A. Conduct a Pre-Demolition Conference at the project site with Owner, Architect/Engineer, CM/GC, and Demolition Contractor. Provide minimum 72 hours' notice for meeting.
- B. Comply with governing EPA notification regulations before beginning selective site demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Paint removal by open flame shall not be permitted. Where paint is removed by a heating process, a fire extinguisher must be available at the work site.
- D. Comply with the following:
 - 1. Authorities having jurisdiction, including hauling and disposal regulations.
 - 2. ASSE A10.6 Safety and Health Program Requirements for Demolition Operations
 - 3. NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operators

1.05 SEQUENCING, SCHEDULING AND SUBMITTALS

- A. Sequence work under the provisions of Section 01 3100 Project Management and Coordination.
- B. Coordinate schedule of Demolition Activities with Architect/Engineer and Owner.
 - 1. Submit detailed schedule of demolition activities, identify any utility interruptions and outage lengths. Ensure Owner's on-site and adjacent operations are considered and minimize disruptions. Provide a minimum of 10 days advance notice to Owner of activities that will affect their operations, including circulation and/or utilities.
 - 2. Owner may require times/periods during which interruptions are not allowed due to operational needs. Owner may set daily work hour limits.
 - 3. Submit pedestrian protection and detour plan, including signage. Submit maintenance of traffic plans for lane or road closures.
- C. Pre-demolition photographs or videos showing existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations shall be submitted before Work begins.
- D. Submit a list of items that have been removed and salvaged.

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

3.01 PREPARATION

- A. Provide, erect, and maintain temporary barriers and security devices. Provide protection to ensure safe passage around construction operations and to/from occupied portions of adjacent buildings and structures as necessary.
- B. Protect existing landscaping materials, appurtenances, utilities, and structures which are not to be demolished. Likewise, protect walls, windows, roofs, and other adjacent exterior improvements that are to remain and that are exposed to construction operations.
- C. Provide bracing and shoring as necessary to prevent movement or settlement of adjacent structures.
- D. Mark location of utilities.
- E. For removed and salvaged items, comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area, designated by Owner.
 - 5. Protect items from damage during transport and storage.

3.02 DEMOLITION REQUIREMENTS

- A. Conduct demolition to minimize interference with adjacent structures. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
- B. Paint removal: Paint removal by open flame shall not be permitted. Where paint is removed by a heating process, a fire extinguisher must be available at the work site.
- C. Cease operations immediately if adjacent structures appear to be in danger. Notify authority having jurisdiction, Owner, and Architect/Engineer. Do not resume operations until directed.
- D. Conduct operations with minimum interference to public or private accesses. Provide a code compliant fire egress plan for occupied buildings during demolition; occupants may require protected pathways through the construction site to an area of refuge or right-of-way during emergencies.
- E. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.
- F. Sprinkle Work with water to minimize dust. Provide hoses and water connections for this purpose.

- G. Collect runoff water from saw cutting asphalt or concrete and discharge to sanitary sewer; prevent runoff from saw cutting operations from reaching storm sewer system or downstream bodies of water.
- H. Saw cut concrete walks or curb at a control joint, even if that means extending limits of demolition beyond what is necessary to construct the improvements.
- I. Demolish masonry in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- J. Use of explosives is not permitted.

3.03 DEMOLITION

- A. Disconnect, remove, and cap, and identify designated utilities within demolition areas.
 - 1. All existing structures, utilities, and appurtenances of any kind shall be completely removed within the limits of excavation for the new buildings.
 - 2. Outside the limits of excavation for the new buildings, all abandoned utilities and utility structures greater than 8 inches in diameter located at least 4 feet below bottom of finished grade shall be sealed with concrete or brick masonry at the limit of excavation. All utilities shall be entirely removed within 4 feet of finished grade.
 - 3. Manholes and catch basins designated to be abandoned shall have all lines plugged with brick and mortar prior to filling with sand or gravel. The top 4 feet of these structures shall be removed, and the bottom slab broken up to permit drainage prior to filling.
 - 4. The Contractor shall remove frames, covers, and grates from manholes, catch basins and gate valves and satisfactorily store, and protect them until they are required for reuse in the work. Existing frames, covers, and grates determined by HG to be unsuitable for reuse shall be removed from the site.
- B. Remove foundation walls and footings to a minimum of two feet below finished grade within area of new construction.
- C. Remove concrete slabs on grade, including any geotextile fabric if found.
- D. If found, empty buried tanks located within demolition area. Remove buried tanks, components, and piping from site; notify owner.
- E. Remove materials to be re-installed or retained in manner to prevent damage. Store and protect items to be re-installed or retained off-site in location protected from weather and damage.
- F. Backfill areas of excavation, open pits and holes caused because of demolition, in accordance with Section 31 23 33 Trenching and Backfilling.
- G. Rough grade and compact areas affected by demolition to maintain site grades and contours, in accordance with Section 31 20 00 Earth Moving.
- H. Remove demolished materials and dispose of legally off-site.
- I. Do not burn or bury materials on site. Leave site in clean condition.
- J. Repair damage to adjacent construction caused by building or site demolition activities. Damage shall be assumed to be a result of demolition operations without pre-demolition photos or video proving otherwise.
- K. Remove temporary work.

3.04 RECYCLING DEMOLISHED MATERIALS

- A. Separate recyclable demolished materials from other demolished materials to the maximum extent possible. Separate recyclable materials by type.
- B. Provide containers or other storage method approved by Architect/Engineer for controlling recyclable materials until they are removed from project site. Provide proof of single stream construction waste recycling as an alternative.
- C. Transport recycled materials off site and dispose of them legally.

END OF SECTION 024113



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SECTION 028313

DISTURBANCE OF LEAD-BASED PAINT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2 (1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems

ANSI Z88.2 (1992) Respiratory Protection

CODE OF FEDERAL REGULATIONS (CFR)

CHHS ADMIN AND FINE ARTS RENOVATION – LEAD BASED PAINT WORK-PLAN

29 CFR 1926.21	Safety Training and Education
29 CFR 1926.33	Access to Employee Exposure and Medical Records
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead Exposure in Construction
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.103	Respiratory Protection
40 CFR 260	Hazardous Waste Management Systems: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 745	Lead; Requirements for Lead-Based Paint Activities
49 CFR 172	Hazardous Materials, Tables, and Hazardous Materials Communications Regulations
49 CFR 178	Shipping Container Specification

CHHS ADMIN AND FINE ARTS RENOVATION – LEAD BASED PAINT WORK-PLAN

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

HUD Guidelines (1995) Guidelines for the Evaluation and Control of Lead Based Paint Hazards in Housing

US EPA Lead Renovation, Repair, and Painting Rule 40 CFR 745

UNDERWRITERS LABORATORIES INC. (UL)

UL 586 (1996) High-Efficiency, Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period in an occupational/industrial environment.

1.2.2 Area Sampling

Sampling of lead concentrations within the lead control area and inside the physical boundaries that is representative of the airborne lead concentrations but is not collected in the breathing zone of personnel.

1.2.3 Competent Person (CP)

As used in this section, refers to a person employed by the Contractor who is trained in the recognition and control of lead hazards in accordance with current federal, State, and local regulations.

1.2.4 Contaminated Room

Room for removal of contaminated personal protective equipment (PPE).

1.2.5 Decontamination Shower Facility

CHHS ADMIN AND FINE ARTS RENOVATION – LEAD BASED PAINT WORK-PLAN

That facility that encompasses a clean clothing storage room, and a contaminated clothing storage and disposal rooms, with a shower facility in between.

1.2.6 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead to which an employee is exposed, averaged over an 8 hour workday as indicated in 29 CFR 1926.62.

1.2.7 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron or larger size particles.

1.2.8 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps.

1.2.9 Lead-Based Paint (LBP)

Paint or other surface coating that contains lead in excess of 1.0 milligram per centimeter squared or 0.5 percent by weight.

1.2.10 Lead-Based Paint Hazard (LBP Hazard)

Any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, lead-based paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects.

1.2.11 Lead-Containing Paint (LCP)

Lead-based paint or other similar surface coating containing any detectable level of lead or lead compound.

1.2.12 Lead Control Area

An enclosed area or structure, constructed as a temporary containment equipped with HEPA filtered local exhaust, which prevents the spread of lead dust, paint chips, or debris existing as a condition of lead-based paint removal operations. The lead control area is also isolated by physical boundaries to prevent unauthorized entry of personnel.

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1.2.13 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8 hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than eight hours in a workday, the PEL shall be determined by the following formula:

$$\text{PEL (micrograms/cubic meter of air)} = 400/\text{No. Hours worked per day}$$

1.2.14 Personal Sampling

Sampling of airborne lead concentrations within the breathing zone of an employee to determine the 8 hour time weighted average concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employees' work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and centered at the nose or mouth of an employee.

1.2.15 Physical Boundary

Area physically roped or partitioned off around an enclosed lead control area to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead control area but inside boundary."

1.3 LEAD HAZARD AWARENESS

1.3.1 Lead-Based Paint/Lead Coated Materials – Base Bid Scope of Work

All materials to be demolished and removed from the site shall become the property of the contractor. Disclosure requirements for all materials are the Contractor's responsibility.

The Contractor shall complete all renovation/demolition work in accordance with the requirements found in 29 CFR 1926.62. For purposes of compliance with the standard all painted surfaces shall be assumed to be either lead based or lead containing. Submit documentation of compliance with this standard to the Owner prior to start-up of work, including an air monitoring plan, dust control measures, housekeeping, etc. All compliance sampling and other control measures for potential lead dust shall be addressed within exposure control and monitoring plan prepared by the Contractor. Torch cutting, grinding (without HEPA controls on the grinder) or

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similar work practices are prohibited where there may be disturbance of LBP. All compliance sampling shall be performed by individuals working under the direction of the Contractor's Competent Person. Following completion of work, submit all monitoring documentation to the Contracting Officer. The Owner may elect to do independent sampling.

Under the base bid for this work, the contractor will be required to comply with all federal and state regulations regarding the incidental disturbance or removal of LBP/LCP as part of renovation/demolition activities outlined for this project.

Contractors disturbing any LBP/LCP will be required to comply with the OSHA Lead in Construction Regulation under 29 CFR 1926.62.

ECS performed X-Ray Fluorescence (XRF) testing using an XRF analyzer for the building associated with surfaces anticipated to be impacted in the renovation areas for the project on May 18, 2022. ECS Mid-Atlantic issued an asbestos and lead based paint survey report (*47:5541-C Colonial Heights High School – Asbestos Survey and Lead Based Paint Screening*) for the building for this project on June 3, 2021. This report is attached to this project specification for reference purposes.

Lead based painted components were not identified associated with the painted surfaces tested that are anticipated to be impacted during this project.

Lead containing painted or glazed components were identified in the building in the renovation areas for this project and includes the following components: All CMU block walls, all ceramic tile walls, all wood baseboards, all structural steel, all metal door jambs, all metal door casings, all cementitious peg boards, all metal stair handrails and all painted concrete walls.

1.4 PERSONNEL PROTECTION

1.4.1 Equipment

The Contractor shall provide adequate personal protective equipment (PPE) to any employees working on lead coated surfaces if there is a potential for generation of airborne lead dust or fume (e.g., through grinding, cutting, sanding, etc.) above the Permissible Exposure Limit (29 CFR 1926.62). Note: The standard does not reference a specific level of lead in paint at which a hazard exists. Rather, OSHA defines airborne concentrations, and references specific types of work practices and operations from

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which a lead hazard may be generated (29 CFR 1926.62, paragraph d).

1.4.2 Exposure Monitoring

The Contractor should make allowances in the bid price for the cost of environmental and personnel monitoring, along with costs for provision of all other related services, such as training and/or equipment needed to comply with requirements found within 29 CFR 1926.62. The Contractor shall be required to conduct personnel air monitoring to establish personal exposure levels. This monitoring information will be used by the Contractor to determine the levels of personnel protection and environmental controls (if necessary) required to be used by the Contractor for this contract. Monitoring shall be performed under the direction of the Competent Person. The costs for PPE, monitoring, decontamination facilities, etc. shall be borne by the Contractor. The Contractor shall also be required to conduct air monitoring during the course of the project, to document airborne lead levels.

1.5 WASTE DISPOSAL

All materials, whether hazardous or non-hazardous shall be disposed in accordance with all laws and provisions and all federal, State or local regulations. Ensure all waste is properly characterized.

Based on the laboratory results of a toxicity characteristic leaching procedure (TCLP) analysis performed for the buildings materials/debris expected to be generated during the demolition activities, all materials leaving the site may be disposed of as regular waste as it pertains to lead.

PART 2 PRODUCTS

Section not used.

PART 3 EXECUTION

Section not used.

-- End Of Section --

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the Contract documents apply to this Section.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with fly ash or ground granulated blast-furnace slag, subject to compliance with requirements.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
- E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Architect.
- F. Floor Slab Protection: Refer to Section 033543 "Polished Concrete Floor Finishing."

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer, testing agency.
- B. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.
 - 5. Fiber reinforcement.
 - 6. Waterstops.
 - 7. Curing compounds.
 - 8. Bonding agents.
 - 9. Adhesives.
 - 10. Vapor barriers.
 - 11. Joint-filler strips.
 - 12. Repair materials.

- C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:
 - 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- E. Field quality-control reports.
- F. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete".
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- G. Preinstallation Conference: Conduct conference at Project site.
 - 1. After submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Special inspector..
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.

- e. Concrete floor polishing subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, slab joints, joint-filler strips, forms and form removal limitations, vapor-barrier installation, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.
 - H. Slab Finishing: Arrange for slab polishing subcontractor to be present at the first floor slab pour to coordinate with concrete finishing subcontractor regarding level of trowel finish.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
 - B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Material for self-consolidating concrete formwork shall be approved by architect prior to installation.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- E. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- F. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.
4. Ties shall not be used for walls poured with Self Consolidating Concrete.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706, deformed (weldable).
- C. Plain-Steel Wire: ASTM A 82, galvanized.
- D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire or plastic according to CRSI's "Manual of Standard Practice," as follows:
 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 2. Concrete bricks are not permitted for support of reinforcing bars or welded wire fabric.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 1. Portland Cement: ASTM C 150, Type I, II or I/II. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class F.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 1. Maximum Coarse-Aggregate Size: 1 inch nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94 and potable.

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 1. Water-Reducing Admixture: ASTM C 494, Type A.
 2. Retarding Admixture: ASTM C 494, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
6. Self-Consolidating, High Range: ASTM C494, Type A and Type F.
7. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.
8. Shrinkage reducing and compensating admixture: ASTM C494, Type S

2.6 FIBER REINFORCEMENT

- A. Carbon-Steel Fiber: ASTM A820, Type 2, cut sheet, deformed, minimum of 1.5 inches long.
 1. Dosage Rate: As indicated.

2.7 WATERSTOPS

- A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
- B. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

2.8 VAPOR BARRIERS

- A. Sheet Vapor Barrier: ASTM E 1745, Class A, with max perm rating of 0.008. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. W. R. Meadows, Inc.; Perminator 15 mil.
 - b. Reef Industries, Inc.; Griffolyn 15 mil Green.
 - c. Stego Industries, LLC; Stego Wrap 15 mil.
 - d. Viper "Vipercheck II" 15 mil

2.9 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.10 RELATED MATERIALS

- A. Construction Joint: Preformed, galvanized steel keyed joint with removable polystyrene cap.

- B. Isolation Joint-Filler Strip: ASTM D 1751, pre-formed asphalt-saturated cellulosic fiber with scored top strip to facilitate installation of sealant. Thickness shall be ½ inch unless otherwise indicated.
- C. Expansion Joint Filler Strip: Pre-formed closed cell polyethylene foam with pressure sensitive adhesive with scored top strip to facilitate installation of sealant. Thickness shall be 1/2" unless otherwise indicated.
- D. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- E. Reglets: Fabricate reglets of not less than 0.022-inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

2.11 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109.

2.12 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Limit percentage by weight of cementitious materials, other than portland cement, in concrete as follows:
 - 1. Fly Ash: 20 percent.
 - 2. Ground Granulated Blast-Furnace Slag: 20 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, and concrete with a water-cementitious materials ratio below 0.50.
- E. Air Content: Exposed exterior concrete shall have air-entraining admixture added at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 6% within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
- F. Do not air entrain normal weight concrete for trowel-finished interior floor slabs, and do not allow entrapped air content to exceed 3 percent.

2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: As indicated.
 - 2. Slump Limit: If pumped, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 3. Maximum water/cement ratio: 0.54.
- B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: As indicated.
 - 2. Slump Limit: 5 inches, plus or minus 1 inch.
 - 3. Maximum water/cement ratio: 0.50.
 - 4. Steel Fiber: Uniformly dispersed in concrete mixture at manufacturer's recommended rate, but not less than 35 lb/cu. yd.
- C. Suspended Slabs on Non-composite Steel Form Deck: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: As indicated.
 - 2. Slump Limit: 5 inches, plus or minus 1 inch.
 - 3. Maximum water/cement ratio: 0.50.

2.14 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 1. Install keyways, reglets, recesses, and the like, for easy removal.
 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
 1. Leave formwork for beam soffits, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR BARRIERS

- A. Sheet Vapor Barriers: Place, protect, and repair sheet vapor barrier according to ASTM E 1643 and manufacturer's written instructions.
 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
 2. Seal to all penetrations and vertical surfaces.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 1. Do not cut or puncture vapor barrier. Repair damage and reseal vapor barrier before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Space vertical joints as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3.7 WATERSTOPS

- A. Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Protect exposed waterstops during progress of the Work.

3.8 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-

half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
 - 1. Apply scratch finish to surfaces to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 30; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 20; for slabs-on-grade.
 - b. Specified overall values of flatness, F(F) 40; with minimum local values of flatness, F(F) 25; for unshored slabs on deck.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
 1. Coordinate sizes and locations of concrete bases with actual equipment provided
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.12 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less

than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
- a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions, and as indicated.
 1. Defer joint filling until concrete has aged at least six month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching

- mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Verification of use of required design mixture.
 - 3. Concrete placement, including conveying and depositing.
 - 4. Curing procedures and maintenance of curing temperature.
 - 5. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd, plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143; one test at point of placement for each composite sample. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample.
 - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C 31.
 - a. Cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimen at 7 days and one set of two specimens at 28 days. Hold one specimen in reserve for 56 day test.
 - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 - 7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements

have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

- G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- H. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- I. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION 033000

SECTION 033543 - POLISHED CONCRETE FLOOR FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 REFERENCES

- A. American Society for Testing and Materials:
 - 1. ASTM C779, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
 - 2. ASTM G23, Ultraviolet Light & Water Spray.
 - 3. ASTM C805, Impact Strength.
- B. American Concrete Institute: ACI 302. 1R-89, Guide for Concrete Floor and Slab Construction
- C. Slip-Resistance: National Floor Safety Institute (NFSI), NFSI 101-A, Voices of Safety International (VOSI) V41.21, or other standard recognized by officials having jurisdiction.

1.3 SUBMITTALS

- A. Submit the following in accordance with Division 1, Section "Submittal Procedures."
- B. Product Data:
 - 1. Submit special concrete finish manufacturer's specifications, test data and other data required for each type of manufactured material and product indicated.
 - 2. Submit special concrete finish describing product to be provided, giving manufacturer's name and product name for the specified material proposed to be provided under this Section.
 - 3. Submit special concrete finish manufacturer's recommended installation procedures which, when reviewed by the Architect, may become the basis for accepting or rejecting actual installation procedures used on the work.
 - 4. Submit special concrete finish technical data sheet giving descriptive data, curing time, and application requirements.
 - 5. Submit special concrete finish manufacturer's Material Safety Data Sheet (MSDS) and other safety requirements.
- C. Test Reports: Provide certified test reports, prepared by an independent testing laboratory, confirming compliance with specified performance criteria.
- D. Samples for initial selection, approximately 12-inches x 12-inches x 2-inches, to illustrate finished surfaces of polished concrete.
- E. Manufacturer's Certification: Provide letter of certification from concrete finish manufacturer stating that installer is certified applicator of special concrete finishes and is familiar with proper procedures and installation requirements required by the manufacturer.
- F. Installer Qualifications.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Use a certified installer and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft. Company has successfully completed five projects similar in design, products, and extent to scope of this project; with a record of successful in-service performance; and with sufficient production capability, facilities and personnel to produce specified work.
2. The special concrete finish manufacturer shall certify installer. The installer shall have an on-site supervisor who is currently certified as Craftsman Level 1 or higher by CPAA, CPC craftsman or equivalent.
3. Installer shall be familiar with the specified requirements and the methods needed for proper performance of work of this Section.

B. Mockups:

1. Apply mock-ups of each type finish, to demonstrate typical joints, surface finish, color variation and standard of workmanship.
2. Build mock-ups approximately 10 ft x 10 ft in the location indicated or if not indicated, as directed by the Architect.
3. Notify Architect seven days in advance of dates and times when mock-ups will be constructed, when practical.
4. Obtain approval of mock-ups from the Architect before starting actual work.
5. If the Architect determines the mock-ups do not meet requirements, demolish and remove them from the site and cast others until mock-ups are approved.
6. Maintain approved mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
7. Approved mock-ups may become part of the completed work if undisturbed at time of Substantial Completion.

C. Protection:

1. No satisfactory chemical or cleaning procedure is available to remove petroleum and rust stains from the concrete surface. Prevention is therefore essential.
2. All hydraulic powered equipment shall be diapered to avoid staining of the concrete.
3. No trade is allowed to park vehicles on the interior floor slab. If vehicles must be driven on interior slabs, drop cloths shall be placed under vehicles at all times.
4. No pipe cutting machine may be used or set up on the interior floor slab.
5. Steel, cans, steel containers, shall not be placed on interior slab to avoid rust staining.
6. All equipment must be equipped with non-marking tires and diapered.
7. Slabs subject to masonry construction, mortar spoils, pallet movers, forklifts, and scaffolding shall be protected with a breathable product and plywood or OSB until all masonry operations are complete
8. Prohibit use of markers, spray paint and soap stone.
9. Protect from painting activities over interior floor slab.

D. Pre-Installation Conference: Conduct conference at project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1. Consult General Contractor, Structural Engineer, Architect, Concrete Producer, Finisher and Polisher prior to installation of concrete slab to ensure complete understanding of substrate preparation, reinforcement, penetrations, mix design, placing and finishing requirements, etc.
2. Verify that the concrete slab will meet the minimum compressive strength and have a minimum flatness rating required by concrete finishing material manufacturer and as specified in Division 3 Section "Cast-In-Place Concrete," and "Project Conditions" article below.
3. Confirm that the General Contractor through coordination with other trades will be responsible for the protection of the slab during construction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage, mixing with other components, and application.
- B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.
- C. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

PART 2 - PRODUCTS

2.1 MATERIALS AND MANUFACTURERS

- A. Penetrating Liquid Floor Treatment (Densifier and Stain Resistance): Clear, chemically reactive, waterborne solution of inorganic silicate materials and proprietary components; odorless; colorless; that penetrates and densifies concrete surfaces and provides additional stain resistance. Breathable treatment which permits moisture transmission through concrete.
 1. Available Products: Subject to compliance, available products include, but are not limited to, the following:
 - a. Bomanite Corporation; Stabilizer Pro.
 - b. Laticrete International; L&M FGS Hardener Plus.
 - c. L. M. Scofield Co.; Formula One Lithium Densifier.
 2. Use sealers that have a VOC content of not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Related Materials:
 1. Neutralizing Agent: Tri-sodium Phosphate or Baking Soda.
 2. Water: Potable.

PART 3 - EXECUTION

3.1 COORDINATION

- A. Coordinate substrate work of Division 3 Section "Cast-in-Place Concrete" for polished concrete slab finishes, including aggregates, admixtures, and requirements in order to obtain specified finish.

3.2 EXAMINATION

- A. Examine substrate, with installer present, for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify that base slab meets finish and surface profile requirements in Division 3 Section "Cast-In-Place Concrete," and "Project Conditions" above.

3.3 APPLICATION

- A. Floor to be prepared for hardener-sealer application with specified diamond grinding steps, followed by the application of hardener-sealer and final polishing steps.
- B. Machine grind floor surfaces to receive polished finishes level and smooth, and to depth required to reveal aggregate to a Class B - Fine Aggregate exposure per Concrete Polishing Council aggregate exposure guidelines, and to match approved mockup.
 - 1. Class B: 85-95% fine aggregate; 5-15% Blend of cement fines and coarse aggregate
- C. Polish interior slabs to Level 3-Polished per Concrete Polishing Council appearance guidelines, and to match approved mockup.
 - 1. Image Clarity: Image clarity value of 40-69% measured in accordance with ASTM D5767 prior to application of sealer.
 - 2. Haze Index: Haze index average less than 10 measured in accordance with ASTM D4039 prior to application of sealer.
- D. Sealing, Hardening and Polishing of Concrete Surface:
 - 1. Concrete must be in place a minimum of 28 days or as directed by the manufacturer before application can begin.
 - 2. Only a certified applicator shall apply hardener-sealer. Applicable procedures shall be followed as recommended by the product manufacturer and as required to match approved test sample.
 - 3. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.
 - 4. Achieve waterproofing, hardening, dust-proofing and abrasion resistance of the surface without changing the natural appearance of the concrete, except for the sheen.
 - 5. Finish to within 1/2-inch of vertical surfaces.
 - 6. Properly dispose of collected dry dust from polishing.

3.4 WORKMANSHIP AND CLEANING

- A. Maintain polished concrete clean and free of stains and debris at all times.
- B. Remove spatter from adjoining surfaces.
- C. Repair damages to adjacent surfaces caused by cleaning operations.
- D. Dispose of materials in accordance with local regulations.

3.5 PROTECTION:

- A. Protect finished work until fully cured in accordance with manufacturer's recommendations.

B. Final Protection of Polished Concrete:

1. Following completion of the final polishing, surface shall be covered to protect from other trades. Cover with breathable product, such as Kraft paper or thin curing blanket. Do not cover with Masonite, plywood, or polyethylene.

END OF SECTION 033543

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SECTION 035216 - LIGHTWEIGHT CELLULAR CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Cast-in-place cellular foam lightweight concrete.

B. Related Requirements:

- 1. Section 033000 "Cast-in-Place Concrete" for requirements for normal-weight and structural lightweight concrete, including concrete materials and mixes.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For lightweight cellular concrete.

- 1. Include plans, sections, and details showing roof slopes, and thicknesses.
- 2. Indicate locations of penetrations, perimeter terminations and curbs, control and expansion joints, and drains.

C. Design Mixtures: For each cellular concrete mixture.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, manufacturer, testing agency.

B. Product Certificates: For the following:

- 1. Cementitious materials.
- 2. Lightweight aggregates.
- 3. Foaming agents.
- 4. Admixtures.

C. Evaluation Reports: For lightweight cellular concrete, from ICC-ES.

- D. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. NRDCA Installer Qualifications: A firm that has been evaluated by UL and found to comply with requirements of NRDCA's Lightweight Insulating Concrete Roof Deck Contractors Accreditation Program.
- C. Testing Agency Qualifications: Qualified according to ASTM C1077 and ASTM E329 for testing indicated.

1.6 FIELD CONDITIONS

- A. Do not place lightweight cellular concrete unless ambient temperature is at least 32 deg F (0 deg C) and rising.
 - 1. When air temperature has fallen or is expected to fall below 40 deg F (4.4 deg C), heat water to a maximum 120 deg F (49 deg C) before mixing so lightweight cellular concrete, at point of placement, reaches a temperature of 50 deg F (10 deg C) minimum and 80 deg F (27 deg C) maximum.
- B. Do not place lightweight cellular concrete during rain or snow or on surfaces covered with standing water, snow, or ice.

PART 2 - PRODUCTS

2.1 LIGHTWEIGHT CELLULAR CONCRETE

- A. Produce lightweight cellular concrete with the following minimum physical properties using cementitious materials, air-producing liquid-foaming agents complying with ASTM C869/C869M, and the minimum amount of water necessary to produce a workable mix:
 - 1. As-Cast Unit Weight: 28 to 32 lb/cu. ft. at point of placement, when tested according to ASTM C138/C138M.
 - 2. Compressive Strength: Minimum 70 psi, when tested according to ASTM C495.

2.2 MATERIALS

- 1. Cementitious Material: Portland cement ASTM C 150, Type I, II or I/II. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class F.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

- B. Water: ASTM C 94 and potable.
- C. Joint Filler: ASTM C612, Class 2, glass-fiber type; compressing to one-half thickness under a load of 25 psi.

2.3 DESIGN MIXTURES

- A. Prepare design mixtures for each type and strength of lightweight cellular concrete by laboratory trial batch method or by field-test data method. For trial batch method, use a qualified independent testing agency for preparing and reporting proposed mixture designs.
 - 1. Limit use of fly ash to not exceed 25 percent of portland cement by weight.
- B. Limit water-soluble chloride ions to the maximum percentage by weight of cement or cementitious material permitted by ACI 301 (ACI 301M).

PART 3 - EXECUTION

3.1 MIXING AND PLACING

- A. Mix and place lightweight cellular concrete according to manufacturer's written instructions, using equipment and procedures to avoid segregation of mixture and loss of air content.
- B. Deposit and screed lightweight cellular concrete in a continuous operation until an entire panel or section of roof area is completed. Do not vibrate or work mix except for screeding or floating. Place to depths and slopes indicated.
- C. Finish top surface smooth, free of ridges and depressions, and maintain surface in condition to receive subsequent roofing system.
- D. Begin curing operations immediately after placement, and air cure for not less than three days, according to manufacturer's written instructions.
- E. If ambient temperature falls below 32 deg F, protect lightweight cellular concrete from freezing and maintain temperature recommended by manufacturer for 72 hours after placement.

3.2 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing of samples of lightweight cellular concrete obtained according to ASTM C172/C172M, except as modified by ASTM C495, shall be performed according to the following requirements:
 - 1. Determine as-cast unit weight during each hour of placement, according to ASTM C138/C138M.

2. Determine oven-dry unit weight and compressive strength according to ASTM C495. Make a set of at least six molds for each day's placement, but not less than one set of molds for each 5000 sq. ft. of roof area.
 3. Perform additional tests when test results indicate that as-cast unit weight, compressive strength, or other requirements have not been met.
 - a. Retest cast-in-place lightweight insulating concrete for compressive strength.
- C. Prepare test and inspection reports.

END OF SECTION 035216

**SECTION 042000
UNIT MASONRY**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2022.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- E. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement 2016, with Editorial Revision (2018).
- F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- G. ASTM C55 - Standard Specification for Concrete Building Brick 2017.
- H. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale) 2017.
- I. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2021.
- J. ASTM C91/C91M - Standard Specification for Masonry Cement 2018.
- K. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units 2022a.
- L. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.
- M. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale) 2021.
- N. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
- O. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- P. ASTM C476 - Standard Specification for Grout for Masonry 2020.
- Q. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2020.
- R. ASTM C887 - Standard Specification for Packaged, Dry, Combined Materials for Surface Bonding Mortar 2020.
- S. ASTM C1019 - Standard Test Method for Sampling and Testing Grout for Masonry 2020.
- T. ASTM D1227/D1227M - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing 2013, with Editorial Revision (2019).
- U. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.
- V. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls 2017.
- W. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls 2005.
- X. BIA Technical Notes No. 46 - Maintenance of Brick Masonry 2017.
- Y. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2016.

1.02 ADMINISTRATIVE REQUIREMENTS

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

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
- D. Samples: Face brick and mortar selections will be verified in mock-up panel. Provide samples of exposed accessories and trim requiring color selection.
- E. Material Certificates and Test Reports: Provide manufacturer's certificates and test reports for the following:
 - 1. Masonry Units:
 - a. Brick: Size data including fabrication tolerances.
 - b. Brick: Efflorescence test, per ASTM C 67.
 - c. Masonry Units: Compressive strength test data.
 - d. Concrete Masonry: Data indicating aggregates comply with ASTM C 33 (normal weight), ASTM C 331 (lightweight), and ASTM C 618 (fly ash).
 - 2. Mortar and Grout Mixes: Provide description and proportion of materials for each type of mortar and grout.
 - 3. Provide material certificates for each type of metal accessory, including reinforcing bars, joint reinforcement, veneer ties and anchors, and other indicated accessories, indicating compliance with requirements.

1.04 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530.1/ASCE 6/TMS 402/602, except where exceeded by requirements of Contract Documents.
- B. Fire Rated Assemblies: Provide products that comply with fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent testing thickness, or by means acceptable to authorities having jurisdiction.
- C. Aggregate for Concrete Masonry Units: If bottom ash is used as aggregate in the CMU, the Source for the bottom ash shall be a power station that has a minimum of ten (10) years continuous experience as a supplier of quality material as verified by independent certified laboratory testing and no defects in the marketplace.
- D. Pre-Construction Testing: Owner shall engage an independent testing agency to perform field quality control tests, in accordance with Section 014000 - Quality Requirements.
 - 1. Concrete Masonry Unit Tests: Testing agency shall test each variety of concrete unit masonry in accordance with ASTM C140/C140M compressive strength requirements.

1.05 MOCK-UPS

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Sample Panel: Build a sample panel approximately 48 inches long by 32 inches high. Include each type of masonry veneer and mortar. Include a sealant filled control joint. Construct sample panel next to existing wall to verify masonry veneer and mortar provide an acceptable match to existing.

1.06 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.
 - 2. Special Shapes: Provide nonstandard blocks configured for corners.
 - a. Provide bullnose units for outside corners.
 - 3. Concrete Masonry Units: ASTM C90, lightweight.
 - a. Exposed Faces: Manufacturer's standard color and texture.
 - b. Aggregates:
 - 1) Lightweight Aggregates: Lightweight aggregate shall strictly comply with ASTM C 331, ASTM C 151, and ASTM C 641. Drying shrinkage of aggregate shall not exceed 0.10% at 100 days.
 - 2) Waste concrete, scoria, and aglite shall not be permitted.
- B. Concrete Brick:
 - 1. Actual Size: 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.
 - 2. Concrete Building Brick: ASTM C55; lightweight, solid, for interior or concealed use.

2.02 BRICK UNITS

- A. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
 - 1. Color and texture: Basis-of-Design is Taylor Brick; 301 White Modular Wirecut.
 - a. Final approval of brick and mortar color shall be based on sample panel erected adjacent to existing wall.
 - 2. Actual Size: 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long (modular).
 - 3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
- B. Building (Common) Brick: ASTM C62, Grade SW, except MW may be used in locations indicated acceptable in reference standard; solid units.
 - 1. Actual size: Match face brick.
 - 2. Locations: May be used in concealed locations in lieu of face brick.

2.03 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M.
 - 1. Colored Mortar: Premixed cement as required to match Architect's color sample.
 - 2. Available Products:
 - a. Argos USA; Magnolia Masonry Cement.
 - b. Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
 - c. Lehigh Hanson; flamingo Colored Cement.
 - d. Roanoke Cement; a division of Titan America; Colored Masonry Cement.
 - e. York Building Products, a Stewart Company; Workrite Colored Masonry Cement.
- B. Surface Bonding Mortar (Parge Coat): ASTM C887.

- C. Mortar Aggregate: ASTM C144.
- D. Grout Aggregate: ASTM C404.
- E. Water: Clean and potable.

2.04 DAMPPROOFING

- A. General: Dampproofing may be provided as a Contractor option to parge coat, applied to exterior face of below grade CMU back up wall (prior to insulation or grouting).
- B. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
 - 1. Emulsified Asphalt Coating (Brush or Spray Applied): ASTM D1227/D1227M, Type II, Class 1 - Mineral colloid emulsifying agents with non-asbestos fibers or Type III, Class 1 - Mineral colloid emulsifying agents without fibrous reinforcement.
 - 2. Accessory Materials: Provide asphaltic primer, glass fiber reinforcement, and compatible patching compounds as required and as recommended by manufacturer.
 - 3. Manufacturers:
 - a. Henry Company.
 - b. Karnak Corporation.
 - c. Mar-Flex Systems, Inc.
 - d. W. R. Meadows, Inc.
 - e. Substitutions: See Section 016000 - Product Requirements.

2.05 REINFORCEMENT AND ANCHORAGE

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; uncoated.
- B. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Ladder.
 - 2. Material: Mill-galvanized steel for interior walls, hot-dip galvanized steel for exterior walls.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- C. Multiple Wythe Joint Reinforcement: ASTM A951/A951M. Provide at composite walls and subgrade walls.
 - 1. Type: Ladder.
 - 2. Material: Mill-galvanized steel for interior walls, hot-dip galvanized steel for exterior walls.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
 - a. Provide two side rods for each wythe that is nominal 6" depth or greater, and one side rod for each wythe that is nominal 4" depth.
- D. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M. Provide at cavity walls/masonry veneer walls.
 - 1. Type: Ladder, with adjustable ties or tabs spaced at 16 in on center.
 - 2. Material: Hot-dip galvanized carbon steel.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire, width of components as required to provide not less than 5/8 inch of mortar coverage from each masonry face.
 - 4. Vertical adjustment: Not more than 1 1/4 inches.

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- E. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.
- F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.
- G. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B. Provide at masonry veneer walls with metal framing backup. At cavity walls with CMU backup and masonry veneer, masonry veneer anchors may be used in conjunction with standard horizontal joint reinforcing, at Contractor's option, in lieu of adjustable multiple wythe joint reinforcement.
 - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 - 2. Wire ties: Manufacturer's standard shape, 0.1875 inch thick.
 - 3. Vertical adjustment: Not less than 3-1/2 inches.

2.06 FLASHINGS

- A. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
 - 1. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.
 - a. Manufacturers:
 - 1) Hohmann & Barnard, Inc; Mighty-Flash Stainless Flashing.
 - 2) Prosoco; R-Guard SS ThruWall.
 - 3) STS Coatings; Wall Guardian Stainless Steel TWF.
 - 4) York Manufacturing, Inc; Multi-Flash SS.
- B. Factory-Fabricated Flashing Corners and End Dams: Stainless steel.
- C. Termination Bars: One-inch wide, fabricated of 0.125-inch PVC, 0.090-inch extruded aluminum, or 0.075-inch stainless steel; compatible with membrane and adhesives.
- D. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.
- E. Flashing Sealant/Adhesive/Liquid Seam Tape: Polyether-based, 100% solids, moisture-curing elastomeric products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates; and that are compatible with asphalt-free flashing materials and air barrier materials. Traditional mastic is not acceptable.
 - 1. Available Products:
 - a. Master Builders Solutions; MasterSeal NP150.
 - b. STS Coatings; GreatSeal LT-100 Liquid Tape.
 - c. York; UniverSeal US-100 Liquid Tape.

2.07 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
 - 1. Provide nominal 2.5-inch "standard" and "tee" configurations to suit application unless indicated otherwise.
 - B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
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- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations. Provide in depth matching cavity depth without gap at front or back of mesh. Fabricate approximately 10 inches high with minimum 6 inch high dovetail shape projections.
 - a. Available Products:
 - 1) Advanced Building Products, Inc; Mortar Break DT.
 - 2) Heckmann Building Products; WallDefender.
 - 3) Hohmann & Barnard, Inc.; Mortar Trap.
 - 4) Mortar Net Solutions; MortarNet.
 - 5) Wire-Bond; Cavity Net DT (3611D).
 - b. At cavities with depth greater than 2 inches, provide companion drainage product by one of the manufacturers above; nominal 1/2-inch thickness by 20 inches wide, to be field inserted into cavity in a "U" configuration. Basis-of-Design is "Mortar Catch 352" by Advanced Building Products, Inc.
- D. Weeps/Cavity Vents:
 - 1. Cellular Type: Extruded propylene with honeycomb design.
 - a. Color(s): As selected by Architect from manufacturer's full range.
 - b. Available Products:
 - 1) Advanced Building Products, Inc.; Mortar Break weep mesh.
 - 2) Blok-Lok Limited; Cell-Vent.
 - 3) CavClear/Archovations, Inc.; CavClear Weep Vent.
 - 4) Heckmann Building Products Inc.; No. 85 Cell Vent.
 - 5) Hohmann & Barnard, Inc.; Quadro-Vent.
 - 6) Mortar Net Solutions; WeepVent.
 - 7) Wire-Bond; Cell Vent.
- E. Reinforcing Positioners: Provide wire positioners in bed joints to keep steel reinforcing bars centered in cells, fabricated of 0.1483-inch hot-dip galvanized steel wire.
 - 1. Available Products:
 - a. Heckmann Building Products, Inc.; No. 376 Rebar Positioner.
 - b. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - c. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.
- F. Protection Board: ASTM D 6506, semi-rigid sheets of fiberglass or mineral-reinforced asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
 - 1. Thickness: 1/8-inch, nominal.
 - 2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for type of protection board.
- G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.08 LINTELS

- A. Masonry Lintels: Fabricated of bond beam CMUs, with texture matching adjacent standard CMU. Provide reinforcing bars and grout in accordance with structural requirements. Provide temporary supports until cured.
 - B. Precast Concrete Lintels: Comply with structural requirements for concrete strength and reinforcing. Precast U-lintels fabricated in accordance with performance standards of PCI
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MNL-116 with 3500 psi concrete for standard lintels and 6000 psi concrete for prestressed lintels as manufactured by Cast-Crete are acceptable in lieu of rectangular section lintels.

- C. Steel Lintels: Refer to Division 5 "Metal Fabrications."

2.09 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
1. Masonry below grade and in contact with earth: Type S.
 2. Reinforced masonry: Type S.
 3. Mortar parge coats: Type S.
 4. Exterior, loadbearing and non-loadbearing, and interior, loadbearing and non-loadbearing: Type N, except as indicated above.
 - a. Interior, non-loadbearing masonry may use Type O at Contractor's option.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

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

3.04 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
1. CMU Coursing: One unit and one mortar joint equal 8 inches.
 2. Brick Coursing: Either two or three units with accompanying mortar joints shall equal 8 inches, based on basis-of-design brick size(s) indicated above.
- C. Provide running bond for all masonry units unless otherwise indicated.
- D. Tool all mortar joints slightly concave where they will be exposed, unless otherwise indicated.
1. Provide flush joints where they will be concealed by surface-applied treatments or finishes including but not limited to tile, wall coverings, fluid-applied or SPF air barriers, or

membranes.

3.05 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- F. Cut mortar joints flush where surface-applied treatment or finish (other than paint) is scheduled, where wall tile is scheduled, cement parging is required, resilient base is scheduled, or bitumen dampproofing is applied.

3.06 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally on top of through-wall flashing above shelf angles and lintels and at bottom of walls.

3.07 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. At parapets and below-grade/foundations, provide joint reinforcement at 8 inches o.c. vertically.
- E. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- F. Lap joint reinforcement ends minimum 6 inches.
- G. Do not extend reinforcement across control, expansion, and other building movement joints.
- H. Reinforce corners and intersections with prefabricated T- or L-shaped reinforcing.
- I. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Masonry and/or Metal Framing Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on

center.

3.10 REINFORCEMENT AND ANCHORAGES - COMPOSITE UNIT MASONRY

- A. Install continuous horizontal joint reinforcement at 16 inches o.c. vertically, except at below grade foundation walls install at 8 inches o.c. vertically.
- B. Where concrete foundations are indicated, tie below-grade masonry to concrete with rigid anchors spaced at maximum 8 inches o.c. vertically.
- C. Coordinate with parging/dampproofing and with installation of insulation, where indicated.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 2. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
 - 1. Anchor vertical leg of flashing into backing with a termination bar and sealant.
- C. Extend metal flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
 - 1. Notch and hem exterior corners of drip edges to eliminate sharp, exposed cut metal edges at locations below 6'-0" above grade .
- D. Support flexible flashings across gaps and openings.
- E. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.12 LINTELS

- A. Install loose steel or precast lintels over openings, where indicated.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 - 1. Comply with requirements on Structural Drawings for type of lintel at each opening, additional lintel sizing, reinforcement, and installation requirements.
 - 2. Allow masonry lintels to attain specified strength before removing temporary supports.
- C. Maintain minimum 8 inch bearing on each side of opening.

3.13 GROUTED COMPONENTS

- A. Lap splices minimum 24 bar diameters.
- B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- C. Place and consolidate grout fill without displacing reinforcing.

3.14 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Provide control and expansion joints at locations indicated on Drawings, and as follows:
 - 1. At changes in wall height.
 - 2. At changes in wall thickness

3. At change in support (eg: transition from foundation support to floor slab support).
4. Adjacent to corners of walls within a distance equal to no more than half the maximum control joint spacing.
5. Wall intersections.
6. Do not place control joints closer than 16 inches to edge of wall openings (doors, windows, louvers, ducts).
7. Distance between joints shall not exceed a length to height ratio of 1.5:1.
8. Distance between joints shall not exceed 25 feet where no openings occur between joints.
9. Distance between joints shall not exceed 20 feet where openings occur between joints.

3.15 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames, anchor bolts, and plates and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.
 1. Mix mortar (or grout) to a 4-inch maximum slump consistency and hand trowel into place in accordance with Steel Door Institute (SDI-100).
 2. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.16 TOLERANCES

- A. Install masonry within the site tolerances found in TMS 402/602.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.17 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, and other penetrations. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.18 PARGING

- A. Dampen masonry walls prior to parging.
- B. Parge cavity side of CMU below grade back-up wythe with a single coat of surface-bonding mortar to a total thickness of 1/4 inch.
 1. In lieu of parging, Contractor may at its option apply bituminous dampproofing, at a minimum rate of 1.25 gal per 100 sq. ft. Apply primer if required by manufacturer and comply with manufacturer's installation requirements.
- C. Steel trowel surface smooth and flat with a maximum surface variation of 1/8 inch per foot.
- D. Strike top edge of parging at 45 degrees.

3.19 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. Concrete Masonry Unit Tests: Testing agency shall test concrete unit masonry, of each load-bearing size indicated, in accordance with ASTM C140/C140M for compliance with requirements of this specification.
- C. Mortar Tests: Testing agency shall test each type of mortar in accordance with ASTM C780. Mortar shall be tested on each of the first 3 days. Alert testing agency if mortar mix is altered during construction to allow for retesting.
- D. Grout Test: Testing agency shall test each type of grout in accordance with ASTM C1019. Grout shall be tested on each of the first 3 days. Alert testing agency if grout mix is altered during construction to allow for retesting.

3.20 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.21 PROTECTION

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

END OF SECTION 042000

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 - 5. For structural-steel moment connections and diagonal brace connections, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Professional Engineer shall be licensed in the Commonwealth of Virginia.
- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint.
 - 1. Power source (constant current or constant voltage).
 - 2. Electrode manufacturer and trade name, for demand critical welds.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installer, fabricator, testing agency.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Mill test reports for structural steel, including chemical and physical properties.
- E. Product Test Reports for the following:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.
 - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 4. Shop primers.
 - 5. Nonshrink grout.

F. Source quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- A. Fabricator Qualifications: Fabricator shall participate in the AISC Quality Certification Program and be designated an AISC-Certified Plant **OR** shall employ an approved independent inspection or quality control agency to conduct periodic, in plant inspections at the fabricator's plant at a frequency that will assure the fabricator's conformance to the requirements of the inspection agency's approved quality control program as required by the Building Code.
- B. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 341 and AISC 341s1.
 - 3. AISC 360.
 - 4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.7 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 anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, templates, and directions for installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.
 - 1. Select and complete connections using schematic details indicated and AISC 360.
 - 2. Use Allowable Stress Design; data are given at service-load level.
- B. Moment Connections: Type FR, fully restrained.
- C. Construction: Combined system of braced frame, moment frame and shear walls.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992, Grade 50
- B. Channels, Angles, M -Shapes: ASTM A 36
- C. Plate and Bar: ASTM A 36
- D. Cold-Formed Hollow Structural Sections (HSS): ASTM A 500, Grade B structural tubing.
- E. Steel Pipe: ASTM A 53, Type E or S, Grade B.
 - 1. Weight Class: Standard
 - 2. Finish: Black except where indicated to be galvanized
- F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
 - 1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.
- B. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex or round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
 - 1. Finish: Plain
- C. Unheaded Anchor Rods: ASTM F 1554, Grade 36
 - 1. Configuration: Straight.
 - 2. Nuts: ASTM A 563 heavy-hex carbon steel.
 - 3. Plate Washers: ASTM A 36 carbon steel.
 - 4. Washers: ASTM F 436, Type 1, hardened carbon steel.
 - 5. Finish: Plain.
- D. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.
 - 1. Nuts: ASTM A 563 heavy-hex carbon steel.
 - 2. Plate Washers: ASTM A 36 carbon steel.
 - 3. Washers: ASTM F 436, Type 1, hardened carbon steel.
 - 4. Finish: Plain.

E. Threaded Rods: ASTM A 36.

1. Nuts: ASTM A 563 heavy-hex carbon steel.
2. Washers: ASTM A 36 carbon steel.
3. Finish: Plain.

2.4 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanizing Repair Paint: ASTM A 780/A 780M.

2.5 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
1. Camber structural-steel members where indicated.
 2. Fabricate beams with rolling camber up.
 3. Identify high-strength structural steel according to ASTM A 6 and maintain markings until structural steel has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning ."
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate Holes: Cut, drill, or punch holes perpendicular to steel surfaces.
 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.
- G. Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel identified as architecturally exposed structural steel.

2.7 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened, unless otherwise noted.
- B. Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.8 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 - 2. Surfaces to be field welded.
 - 3. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 2, "Hand Tool Cleaning" or SP 3, "Power Tool Cleaning" (Concealed Steel)
 - 2. SSPC-SP 6, "Commercial Blast Cleaning" (Exposed Steel – Exterior and Interior)
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.
 - 1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
 - 2. Galvanize lintels, shelf angles, and welded door frames attached to structural-steel frame and located in exterior walls.

2.10 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner's independent testing and inspecting agency may perform shop tests and inspections and prepare test reports.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections may be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.
- E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedment's for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
 - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base, Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened, UNO.
- B. Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
 - 1. The independent testing and inspecting agency will provide a certified welding inspector (CWI) to perform field inspections and tests, and to report whether tested Work complies with or deviates from requirements.
- C. Bolted Connections: Inspect bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
 - 1. In addition to visual inspection, test and inspect field welds according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.

- b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION 051200

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SECTION 052100 - STEEL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Provisions of the Contract and of the Contract Documents apply to this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. K-series open web steel joists.
 - 2. KCS-type, K-series open web steel joists.
 - 3. Joist accessories.

1.3 DEFINITIONS

- A. Special Joists: Joists requiring modification by the manufacturer to support nonuniform, unequal, or special loading conditions that invalidate SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders."

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads within limits and under conditions indicated.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product indicated.
- B. Shop Drawings: Show layout, mark, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, accessories; splice and connection locations and details; and attachments to other construction.
 - 1. Indicate locations and details of anchorage devices and bearing plates to be embedded in other construction.

1.6 INFORMATIONAL SUBMITTALS

- A. Welding Certificates: Copies of certificates for welding procedures and personnel.
- B. Certification: Certification by SJI that manufacturer complies with SJI Standard Specifications and Load Tables.
- C. Design calculations for special joists. Design calculations for special joists shall bear the seal and signature of a registered professional engineer.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing joists similar to those indicated for this Project and with a record of successful in-service performance.
 - 1. Manufacturer must be certified by SJI to manufacture joists complying with SJI standard specifications and load tables.

2. Assumes responsibility for engineering special joists to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
 3. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.
- B. SJI Specifications: Comply with SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders" (hereafter, "Specifications"), applicable to types of joists indicated.
- C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel"; and AWS D1.3 "Structural Welding Code--Sheet Steel." Welders shall be AWS certified.
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
 - B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.
 1. Use ASD. Data is given at service-load level.
 2. Design special joists to withstand design loads with live-load deflections no greater than the 1/360 of the span, or as indicated.

2.2 PRIMERS

- A. Primer: SSPC-Paint 15, Type I, red oxide; FS TT-P-636, red oxide; or manufacturer's standard shop primer complying with performance requirements of either of these red-oxide primers.

2.3 K-SERIES STEEL JOISTS

- A. Manufacture steel joists according to "Standard Specifications for Open Web Steel Joists, K-Series," in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord; of joist type indicated.
 1. Joist Type: K-series steel joists and KCS-type K-series steel joists.
- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- C. Provide holes in chord members for connecting and securing other construction to joists.
- D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."
- E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."
- F. Do not camber roof joists.

- G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

2.4 JOIST ACCESSORIES

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span.
- B. Steel bearing plates with integral anchorages are specified in Division 05 Section "Metal Fabrications."
- C. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.5 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories to be primed by power-tool cleaning, SSPC-SP 3.
- B. Apply one shop coat of primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
 - 4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads have been applied.
- C. Field weld joists to supporting steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists to supporting steel framework using carbon-steel bolts, unless otherwise indicated.
- E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds.
- B. Field welds will be visually inspected according to AWS D1.1.
- C. In addition to visual inspection, field welds may be tested according to AWS D1.1 and the following procedures, as applicable:
 - 1. Radiographic Testing: ASTM E 94 and ASTM E 142.
 - 2. Magnetic Particle Inspection: ASTM E 709.
 - 3. Ultrasonic Testing: ASTM E 164.
 - 4. Liquid Penetrant Inspection: ASTM E 165.
- D. Bolted connections will be visually inspected.
 - 1. High-strength, field-bolted connections will be tested and verified according to procedures in RCSC's "Allowable Stress Design Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts."
- E. Correct deficiencies in Work that inspections and test reports have indicated are not in compliance with specified requirements.
- F. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.4 REPAIRS AND PROTECTION

- A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates and abutting structural steel.
 - 1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
 - 2. Apply a compatible primer of the same type as the shop primer used on adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 052100

SECTION 053100 - STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Provisions of the Contract and of the Contract Documents apply to this section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Roof deck.
- 2. Non-composite form deck
- 3. Deck accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction. Reproductions of structural steel drawings or any portion of are prohibited without the permission of the Architect.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.
- B. Welding Certificates: Copies of certificates for welding procedures and personnel.
- C. Research/Evaluation Reports: Evidence of steel deck's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel." Welders shall be AWS certified.
- C. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

- D. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."
- E. FM Listing: Provide steel roof deck evaluated by FM and listed in FM's "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 ROOF DECK

- A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and the following:
 - 1. Galvanized Steel Sheet: ASTM A 653, Structural Steel (SS), Grade 50, G60 zinc coating.
 - 2. Galvanized and Shop-Primed Steel Sheet: ASTM A 653, Structural Steel (SS), Grade 50, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's baked-on, lead-and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664. (Exposed-to-view locations indicated to receive painted finish).
 - 3. Deck Profile: Type WR, wide rib.
 - 4. Profile Depth: As indicated.
 - 5. Design Uncoated-Steel Thickness: As indicated.
 - 6. Span Condition: Triple span or more.
 - 7. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.2 NONCOMPOSITE FORM DECK

- A. Noncomposite Form Deck: Fabricate ribbed-steel sheet noncomposite form-deck panels to comply with the "ANSI/SDI Standard for Noncomposite Steel Floor Deck", the minimum section properties indicated, and the following:
 - 1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 80, G60 zinc coating.
 - 2. Profile Depth: As indicated.
 - 3. Design Uncoated-Steel Thickness: As indicated.
 - 4. Span Condition: Triple span or more.
 - 5. Side Laps: Overlapped or interlocking seam at Contractor's option

2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- C. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- E. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 29 for overhang and slab depth.
- G. Column Closures, End Closures, Z-Closures, Cover Plates, Ridge Plates, Valley Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory-punched hole of 3/8-inch minimum diameter.
- I. Shear Connectors: ASTM A 108, Grades 1015 through 1020 headed stud type, cold-finished carbon steel, AWS D1.1, Type B, with arc shields.
- J. Galvanizing Repair Paint: ASTM A 780.
- K. Repair Paint: Lead- and chromate-free rust inhibitive primer complying with performance requirements of FS TT-P-664.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate decking bundles to prevent overloading of supporting members.

- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

3.3 ROOF DECK INSTALLATION

- A. Fasten roof deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated, and as follows:
 - 1. Weld Diameter: As indicated.
 - 2. Weld Spacing: Space and locate welds as indicated.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, as indicated:
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. Lapped 2 inches minimum, typical.
- D. Miscellaneous Roof Deck Accessories: Install ridge and valley plates, finish strips, cover plates, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.
- E. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install flexible closure strips directly above walls, at all locations where deck extends beyond the vertical plane of exterior walls. Install with adhesive according to manufacturer's written instructions to ensure complete closure.
- F. Sound Absorbing Insulation: Factory install, as indicated.

3.4 FLOOR DECK INSTALLATION

- A. Fasten floor deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: As indicated.
 - 2. Weld Spacing: Space and locate welds as indicated.

- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, as indicated:
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. Butted
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.
- E. Floor Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of decking. Weld cover plates at changes in direction of floor deck panels, unless otherwise indicated.

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a testing agency with a certified welding inspector (CWI) to perform field quality-control testing.
- B. Field welds will be subject to inspection.
- C. CWI will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on top surface of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions. This applies at all deck welds.
- B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.
- C. Repair Painting: Wire brush and clean rust spots, weld, and abraded areas on underside of prime paint deck immediately after installation and apply repair paint.
 - 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

END OF SECTION 053100

SECTION 054000 - COLD-FORMED STEEL FRAMING – STRUCTURAL (CFSF-S)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Interior non-load-bearing wall framing exceeding the limits of CFSF-NS
 - 2. Ceiling joist framing.
 - 3. Bulkhead framing.
 - 4. Exterior soffit framing.

1.3 DEFINITIONS

- A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thickness shall be permitted at bends due to cold forming.
- B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

1.4 SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory indicated.
- B. LEED Submittal: Refer to Division 1 Section “Sustainable Design Requirements.”
- C. Shop Drawings: Show layout, spacing, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
- D. Welding certificates.
- E. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
 - 1. Steel sheet.
 - 2. Power-actuated anchors.
 - 3. Mechanical fasteners.
 - 4. Vertical deflection clips.
 - 5. Miscellaneous structural clips and accessories.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, “Structural Welding Code--Steel,” and AWS D1.3, “Structural Welding Code--Sheet Steel.”
- B. Fire-Test-Response Characteristics: Where indicated, provide cold-formed steel framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

- C. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in the Contract Documents.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed steel framing from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed steel framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Cold-Formed Steel Framing Design Standards:
 - 1. Wall Studs: AISI S211.
 - 2. Headers: AISI S212.
- B. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- C. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 - 1. Grade: ST33H 18 and 20 gauge, ST50H 16, 14 and 12 gauge.
 - 2. Coating: G60
- B. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade 50, Class 1.
 - 2. Coating: G90

2.3 INTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Applies to walls that exceed the limitations of Specification Section 092216 Cold Formed Steel Framing (Non-Structural).
- B. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Steel Thickness: As indicated.

2. Flange Width: 1-5/8 inches unless otherwise indicated.
- C. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
 1. Minimum Base-Steel Thickness: As indicated.
 2. Flange Width: 1-1/4 inches unless otherwise indicated.
- D. Vertical Deflection Clips: Manufacturer's standard bypass or head clips as required, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- E. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
 1. Minimum Base-Steel Thickness: As indicated.
 2. Flange Width: 1 inch plus the design gap for 1-story structures and 1 inch plus twice the design gap for other applications, minimum.

2.4 CEILING JOIST AND BULKHEAD FRAMING

- A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges, and as follows:
 1. Minimum Base-Steel Thickness: As indicated.
 2. Flange Width: 1-5/8 inches unless otherwise indicated.

2.5 SOFFITT FRAMING

- A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
 1. Minimum Base-Steel Thickness: As indicated.
 2. Flange Width: 1-5/8 inches unless otherwise indicated.

2.6 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
 1. Supplementary framing.
 2. Bracing, bridging, and solid blocking.
 3. Web stiffeners.
 4. Anchor clips.
 5. End clips.
 6. Foundation clips.
 7. Gusset plates.
 8. Stud kickers, knee braces, and girts.
 9. Hole reinforcing plates.
 10. Backer plates.

2.7 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.
- B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers.
- C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.
- D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- E. Welding Electrodes: Comply with AWS standards.

2.8 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Nonmetallic, Non-shrink Grout: Premixed, non-metallic, non-corrosive, non-staining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
- C. Shims: Load bearing, high-density multi-monomer plastic, non-leaching.

2.9 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
 - 1. Fabricate framing assemblies using jigs or templates.
 - 2. Cut framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed steel framing members by welding, screw fastening; clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
 - 4. Fasten other materials to cold-formed steel framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.
- C. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
 1. Cut framing members by sawing or shearing; do not torch cut.
 2. Fasten cold-formed steel framing members as indicated. Wire tying of framing members is not permitted.
 - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion and control joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 054003
CONTINUOUS INSULATION (CI) FRAMING SYSTEM, CLIPPED

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2018).
- B. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- D. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2021a.
- E. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- G. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
- H. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members 2018, with Editorial Revision.
- I. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs 2017.
- J. ASTM F594 - Standard Specification for Stainless Steel Nuts 2009 (Reapproved 2020).
- K. ASTM F1941/F1941M - Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric 2016.
- L. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Conduct pre-installation meeting at Project site before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
- B. Coordinate with work of other sections that is to be installed over, or anchored to, the continuous insulation (CI) framing system, including but not limited to structural anchors, claddings and cladding anchors, utilities, insulation, and firestopping.

1.03 DEFINITIONS

- A. Clipped Continuous Insulation (CI) Framing System: An engineered "fixing" system of framing designed to support building veneers on metal girts, transmitting all structural loads through insulation to the wall substrate via intermittent, thermally-isolated clips while maintaining required thermal performance of the wall.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide product data for factory fabricated continuous insulation (CI) framing members and each accessory product.
- C. Shop Drawings: Indicate component details, including sizes, depths, and thicknesses of clips, girts, rails, and accessories or items required of related work.
 - 1. Indicate cladding joint layout, with CI framing system clip and girt layout and spacing coordinated for proper anchorage and support.
 - 2. Indicate anchorage details including mechanical fasteners for securing CI framing system to primary structural wall element.
 - a. Indicate supplemental framing and reinforcing as required due to structural calculations.
 - 3. Design data:
 - 4. Calculations for loadings and stresses of factory fabricated CI framing for project specific claddings and loadings, signed and sealed by a professional structural engineer.
- D. Thermal Modeling Report: Provide test data indicating reduction of R-value of continuous insulation due to framing penetrations. Test data shall demonstrate, at minimum, compliance with ASHRAE Std 90.1 I-P U-factor requirement for walls of construction indicated.
- E. Test Reports: Provide test reports performed by a qualified testing agency, for structural anchors, mechanical fasteners, framing clips, and accessories.
- F. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.
- G. Designer's Qualification Statement.
- H. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Design CI framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Installer Qualifications: Company specializing in exterior/envelope wall systems installation, experienced in the erection and installation of CI framing systems with a history of successful in-service use.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in factory-provided protective coverings and packaging.
- B. Protect materials against damage during transit, delivery, storage, and installation at site.
- C. Prior to installation, store materials and components under cover in a dry, clean location.
- D. Protect CI framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

1.07 WARRANTY

- A. Warranty: Installer's warranty against failures in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion. Failures include structural cracks or punctures, material deterioration, and workmanship.
 - 1. Warranty Period: Two years beginning at the date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Framing:
 - 1. Aluminum Systems:
 - a. ECO Cladding; Alpha Vci / Hci.
 - b. GIP GmbH; VECO-A.
 - c. Hilti; FOX VI.
 - d. SFS intec Ltd. / NVELOPE Rainscreen Systems Ltd.; NV / NH2.
 - 2. Steel System:
 - a. GIP GmbH; VECO-G.
 - b. Knight Wall Systems; MFI D-Series.
 - 3. Substitutions: See Section 016000 - Product Requirements.

2.02 CONTINUOUS INSULATION (CI) FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
 - B. Design Requirements: Provide completed CI framing system, capable of supporting indicated exterior finish cladding(s) in a "rainscreen" design when anchored to indicated structural substrates. System shall consist of thermally isolated brackets supporting vertical girts. Where necessary due to cladding orientation or engineered design, vertical girts shall support horizontal rails. Design shall have the following characteristics:
 - 1. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
 - 2. Design Loads: Refer to Structural Drawings for wind and live loads.
 - 3. Spacing and types of girts and rails shall be as required by cladding manufacturer to support each indicated type of cladding.
 - a. Coordinate with cladding manufacturer(s) for dead loads of cladding system(s).
 - b. Coordinate with indicated joint layouts to ensure secondary girts are spaced to provide appropriate structural attachment for cladding(s).
 - 4. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 - 5. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
 - C. Thermal Performance: System shall obtain effective R-value or U-factor indicated.
 - 1. Continuous framing profiles fully penetrating insulation are not allowed. Metal framing shall not thermally bridge exterior and interior except for fasteners.
 - 2. Framing assembly shall not reduce continuous insulation nominal R-value to less than 90% effective R-value.
 - 3. Continuous insulation framing system shall be thermally modeled to demonstrate, at minimum, compliance with ANSI/ASHRAE 90.1 maximum U-factor for walls.
 - D. Flatness: Installed system and components shall be flat within the tolerances allowable by cladding manufacturer; with no noticeable warping, buckling, deflections, or other surface irregularities that distort cladding.
 - E. Heat Resistance: All components that will come into contact with spray foam insulation shall be capable of exposure to the heat generated by spray foam installation without damage, including
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plastic washers and thermal spacers. Plastics and resins shall be rated for exposure to temperatures of 300 degrees Fahrenheit or more intermittently without loss of structural capacity or integrity.

- F. Ventilation: System design shall allow for movement of air in the cavity behind the cladding, including compartmentalization and/or cross-ventilation for a pressure-equalized system where indicated.
- G. Drainage: System design shall allow for drainage of moisture from the cavity behind the cladding.
- H. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with Code of Standard Practice.
- I. Shop fabricate framing system to the greatest extent possible.
- J. Deliver to project site in largest practical sections.

2.03 CONTINUOUS INSULATION FRAMING MATERIALS

- A. Steel Framing: Either ASTM A792/A792M aluminum-alloy coated steel or ASTM A1046 zinc-aluminum-magnesium alloy coated steel.
- B. Aluminum Framing: ASTM B209/B209M, Alloy 6061-T6 for plate and sheet and ASTM B221, Alloy 6063-T6 for extrusions.
- C. Brackets: To suit girts and cladding system loads, and providing for field adjustment of girts to maintain plane of cladding. Provide fixed or floating type as required to accommodate expansion.
- D. Girts: As required to suit anchoring of perpendicular rails. Provide either vertical or horizontal girts as required due to indicated orientation of cladding.
 - 1. Perpendicular Rails: Subframing rails mounted to girts, to meet the requirements of cladding manufacturer for support and attachment at cladding ends and joints, and for regular spacing for attachment of claddings.

2.04 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Type 304 stainless-steel or zinc-plated with electrodeposition coating per ASTM B633 or ASTM F1941/F1941M.
- B. Anchorage Devices: Drilled expansion bolts or chemical anchors; Alloy Group 1 stainless steel per ASTM F593 for bolts and ASTM F594 for nuts.

2.05 ACCESSORIES

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

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

3.02 INSTALLATION

- A. Install components in accordance with manufacturers' instructions.
- B. Attach primary brackets prior to application of spray foam insulation/air barrier. Install brackets true to line with secure connections to primary structural components, at spacing required by load calculations and as indicated on Shop Drawings.

- C. After installation of spray foam insulation/air barrier, remove only amount needed for attachment of secondary girts/rails and cladding support anchors. Notify spray foam installer if amount of material removed affects wall's insulating or air/vapor barrier performance, or if touch up is required.
- D. Install framing girts/rails plumb, square, and true to line, with securely fastened connections.
 - 1. If cutting is required, cut by sawing or shearing, do not torch cut. Protect adjacent surfaces from sparks or i
 - 2. Fasten CI framing members by screw fastening. Locate all mechanical fasteners as indicated on Shop Drawings.
 - 3. Locate screws at slotted holes to allow for expansion and contraction in the CI framing system design.
 - 4. Each girt shall be supported by at least two primary support brackets.
 - 5. Do not bridge building expansion joints with CI framing. Independently frame both sides of joints.

3.03 TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch, unless otherwise indicated by cladding manufacturer.
- B. Maximum Variation of any Member from Plane: 1/8 inch, unless otherwise indicated by cladding manufacturer.

3.04 REPAIR AND PROTECTION

- A. Touch up shop-applied coatings as required if damaged during handling or installation.
- B. After installation of primary support brackets, inspect substrates for damage and repair substrate flashings or membranes as required.
- C. Provide fine adjustments to CI framing as required immediately prior to cladding installation to verify that tolerances are maintained. Prepare CI framing in a timely manner to avoid excessive UV exposure to substrate membranes, air barriers, and other materials.
- D. Provide final protection of CI framing as required to ensure that CI framing system is without damage or deterioration prior to installation of cladding.

END OF SECTION 054003

**SECTION 055000
METAL FABRICATIONS**

PART 1 GENERAL

1.01 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product data for factory fabricated products and accessory materials, including the following:
 - 1. Stair nosings.
 - 2. Nonslip finishes.
 - 3. Nonshrink grout.
 - 4. Shop primer paint products.
 - a. Coordinate with Division 9 Painting topcoat manufacturer and provide compatibility certificates from topcoat manufacturer that shop primers are acceptable substrate for specified topcoats.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Include field measurements, and indicate where field measurements differ from documents.
- D. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

1.02 QUALITY ASSURANCE

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- B. Field Measurements: Take field measurements prior to fabrication and verify that dimensions and tolerances are acceptable for fabricated products to fit the space. Indicate field measurements on shop drawings.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Slotted Channel Fittings: ASTM A1011/A1011M.
- F. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
 - 1. Provide stainless steel fasteners for all exterior construction and for fastening aluminum and stainless steel fabrications.
 - 2. Provide stainless steel fasteners at areas subject to moisture or steam, including mechanical rooms, janitor/custodial rooms with floor sinks, and similar spaces.

- 3. Provide zinc-plated fasteners for interior construction except where stainless steel is indicated.
- G. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

- A. Metal Ladders: Refer to Division 5 Section "Metal Ladders."
- B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
 - 1. In lieu of field formed crowned cap, Contractor may at its option provide precast, symmetrically domed caps.
- C. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- D. Lintels: As detailed; prime paint finish.
- E. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.
- F. Miscellaneous Steel Shapes: Provide steel shapes for miscellaneous applications indicated on drawings, including but not limited to, reinforcing steel shapes at low partitions/knee walls and concrete slab edge angles.

2.04 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize and do not prime items to be embedded in concrete and items to be embedded in masonry. Do not prime items to be embedded in sprayed fireproofing.
- B. Prepare interior items to be primed in accordance with SSPC-SP3 Power Tool Cleaning.
- C. Prepare exterior items to be primed, and interior items to receive specialty protective coating such as zinc-rich primer, in accordance with SSPC-SP 6/NACE No. 3 Commercial Blast Cleaning.
- D. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- E. Prime Painting: One coat.
- F. Galvanizing: Galvanize after fabrication to ASTM A123/A123M requirements.
- G. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

2.05 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Perform field welding in accordance with AWS D1.1/D1.1M.
- D. Obtain approval prior to site cutting or making adjustments not scheduled.
- E. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- F. Installation of Bollards: Anchor bollards in concrete footings to a minimum depth of 36 inches with 6 inches of concrete below bottom of bollards. Fill bollards with concrete.
 - 1. At Contractor's option, provide either precast caps secured to wet concrete fill, or field-mound wet concrete fill to form a rounded cap.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION 055000

**SECTION 055133
METAL LADDERS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements 2008 (Reaffirmed 2018).
- B. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- C. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- D. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.
- E. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
- F. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets on each ladder safety system product to be used, including installation instructions.
- C. Shop Drawings:
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D. Certificate: Provide documentation that ladder products of this section meet or exceed cited 29 CFR 1910.23 and ANSI A14.3 requirements.
- E. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- F. Designer's Qualification Statement.

1.03 QUALITY ASSURANCE

- A. Design ladders under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

PART 2 PRODUCTS

2.01 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B211/B211M, 6063 alloy, T6 temper.
- B. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- C. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- D. Bolts, Nuts, and Washers: Stainless steel.

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

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 PREFABRICATED LADDERS

- A. Prefabricated Ladder: Welded metal unit complying with 29 CFR 1910.23 and ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
 - 1. Components: Manufacturer's standard rails, rungs, treads, handrails, returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
 - a. Provide 24 inch clear ladder width between rails.
 - b. Provide platform and treads with serrated non-slip texture.
 - c. Top guard railing shall extend minimum 42 inches above top of platform surface. Provide intermediate horizontal rail at 21 inches above platform.
 - d. Provide custom size extended wall brackets as required to secure ladder to primary wall structural component, to provide 7 inches from centerline of tread to exterior wall surface. Provide brackets at top and bottom of ladder and spacing no greater than 60 inches on center.
 - e. Provide return rungs on the high roof side such that bottom rung will be less than 12 inches above roof surface.
 - 2. Materials: Aluminum; ASTM B211/B211M 6063 alloy, T52 temper.
 - 3. Finish: Mill finish aluminum.
 - 4. Manufacturers:
 - a. Alaco Ladder, Inc; Model 564-PRPC Parapet Return with Crossover Platform.
 - b. O'Keeffe's Inc; Model 503 - Aluminum Ladder with Platform and Return.
 - c. Precision Ladders, LLC; Model FLH-08 - Tubular Fixed Ladder with Parapet Platform & Roofside Return.

2.04 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Masonry Walls: Confirm that masonry wall assemblies provide adequate structural support for anticipated ladder loads.
- C. Metal Framed Walls: Confirm that blocking and reinforcing have been installed in appropriate locations in the wall assembly to provide adequate structural support for anticipated ladder loads.

3.02 PREPARATION

- A. Supply setting templates to the appropriate entities for steel items and anchors required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.
- D. After erection, touch up and restore scratched or otherwise damaged finishes.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION 055133

**SECTION 061000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- B. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010 (Reapproved 2017).
- C. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2021.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood 2021.
- F. PS 1 - Structural Plywood 2009 (Revised 2019).
- G. PS 2 - Performance Standard for Wood Structural Panels 2018.
- H. PS 20 - American Softwood Lumber Standard 2021.
- I. SPIB (GR) - Grading Rules 2014.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on fire-retardant materials, wood preservative materials and application instructions.

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

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. 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.
 - 2. 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.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.

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- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

- A. Roof Sheathing: PS 2 type, rated Structural I Sheathing.
 - 1. Bond Classification: Exterior.
 - 2. Span Rating: 60.
 - 3. Performance Category: 1/2 PERF CAT.
- B. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 1/2 inch.
 - 1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 2. Edges: Square.
 - 3. Manufacturers:
 - a. CertainTeed Corporation; GlasRoc Brand.
 - b. Georgia-Pacific Gypsum; DensGlass Sheathing.
 - c. National Gypsum Company; Gold Bond eXP Sheathing.
 - d. United States Gypsum Co.; Securock.
 - e. Substitutions: See Section 016000 - Product Requirements.
- C. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 25 or less, when tested in accordance with ASTM E84 (Class A - UL FR-S).

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Provide hot-dipped galvanized steel complying with ASTM A 153 or stainless steel at exterior, high humidity, and preservative-treated wood locations.
 - a. Fasteners at interior FRT shall be per FRT treatment manufacturer's recommendations.
 - 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
 - 3. Anchors: Toggle bolt type for anchorage to hollow masonry.
 - 4. Screws/Anchors for Fastening Parapet Blocking & Nailers:
 - a. For CFSF-S Metal Framed Parapets: #10 SIP low profile flat head screws intended for wood-to-metal connections, at spacing indicated. Pullout capacity of 108 lb minimum in 43 mil (18 gauge) steel.
 - b. For CMU Parapets: 1/4-inch diameter low-profile flat head type concrete screw anchors, at spacing indicated. Length to suit embedment into CMU of 1-1/4 inches minimum. Pullout capacity of 100 lb minimum at 1 inch embedment in face shell of hollow CMU.

2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Provide FRT lumber and plywood stamped with name and mark of qualified testing agency, fire-retardant treatment product and manufacturer, wood

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species and drying method, testing standards, and flame spread and smoke development indices.

- a. For exterior FRT and FRT that will be exposed to moisture, include accelerated weathering test language, with the words "No increase in the listed classification when subjected to Standard Rain Test ASTM D 2898".
 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
1. Exterior Type: AWWA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 and maximum smoke developed index of 450, when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat exterior rough carpentry items associated with roof construction, concealed blocking, and as indicated on Drawings.
 - c. Do not use treated wood in direct contact with the ground.
 2. Interior Type A: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 and maximum smoke developed index of 450, when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Treat interior concealed blocking, plywood backing panels, and other rough carpentry items as indicated.
 - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
 3. Strength Adjustments (Structural Panels/Plywood): Test FRT structural panels/plywood per ASTM D 5516 and develop strength adjustment factors per ASTM D 6305.
 4. Strength Adjustments (Lumber): Test FRT lumber per ASTM D 5664 and develop strength adjustment factors per ASTM D 6841.
- C. Preservative Treatment:
1. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA). Do not use lumber or plywood treated with inorganic boron (SBX) for applications exposed to water, ground/soil contact, or interior floor slabs/concrete. Comply with additional treatment restrictions as required by local authorities having jurisdiction.
 2. Preservative Pressure Treatment of Lumber & Plywood Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Use Category UC2 is acceptable for interior lumber and plywood above grade (not in contact with floor slab).
 - b. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - c. Treat lumber exposed to weather.
 - d. Treat lumber in contact with roofing, flashing, or waterproofing.
 - e. Treat lumber in contact with masonry or concrete.

- f. Treat lumber less than 18 inches above grade, and lumber located directly against below-grade exterior walls.
- g. Treat lumber in other locations as indicated.
- 3. Preservative Pressure Treatment of Lumber in Contact with Ground/Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative.
 - a. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In metal-framed walls, provide continuous FRT blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. In metal-framed walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

3.04 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Parapet Blocking and Nailers: Secure wood blocking and plywood nailers to prepared substrate using mechanical fasteners to attain loading design requirements. Adhesive anchorage of wood nailers & blocking is not acceptable.
 - 1. Coordinate with installation of continuous insulation and air barrier membrane materials.
 - 2. Installation at CMU Parapets: Secure parapet blocking and nailers to CMU with screw anchors in two rows, staggered, at 32 inches on center; except within 10 feet of building corners provide two staggered rows at 24 inches on center. Provide fasteners sized for embedment length into CMU of 1-1/4 inch, minimum. Install screws in accordance with manufacturer's instructions, with screw heads flush with uppermost surface off indicated blocking or plywood nailer.
 - 3. Installation at CFSF-S Metal Framed Parapets: Secure blocking and nailers to metal framing at screws in 2 rows at 16 inches on center; except with 10 feet of building corners provide 2 rows at 12 inches on center. Provide attachment in accordance with APA Form No. T625C, Table 1; for 3/4 inch plywood thickness, wall stud spacing, and wind exposure category indicated.

3.05 INSTALLATION OF CONSTRUCTION PANELS

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - 1. Screw 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 screws.
- C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.

3.06 CLEANING

- A. Waste Disposal: See Section 017419 - Construction Waste Management and Disposal.
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION 061000

SECTION 064100
ARCHITECTURAL WOODWORK AND CASEWORK

PART 1 GENERAL

1.01 DEFINITIONS

- A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches above finished floor, tops of cases less than 72 inches above finished floor and all members visible in open cases or behind glass doors.
- B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches above finished floor and bottoms of cabinets more than 30 inches but less than 42 inches above finished floor.
- C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches above finished floor.

1.02 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- C. AWI (QCP) - Quality Certification Program Current Edition.
- D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- E. ISFA 2-01 - Classification and Standards for Solid Surfacing Material 2013.
- F. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Include field measurements, and indicate where field measurements differ from documents.
- C. Product Data: Provide data for hardware accessories.
- D. Selection Samples: Submit manufacturer's color charts indicating full range of available colors, for each product requiring color selection.
- E. Verification Samples: Submit actual samples, manufacturer's standard size, for each specified finish and color of the following materials:
 - 1. Plastic laminate.
 - 2. Solid surface.
 - 3. PVC edge banding.
- F. Fabricator Qualifications: Include evidence of accreditation with quality control program.
- G. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with experience on Projects of similar size and scope.
 - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
 - 2. Single Source Responsibility: Provide and install this work from single fabricator.
 - a. It is acceptable to subcontract portions of the work to a separate specialty subcontractor (for example, pre-fabricated plastic-laminate-faced casework); however, each fabricator shall be independently accredited; submit accreditation for each fabricator. The primary woodwork contractor shall be responsible for ensuring the work of all Division 06 sections is well coordinated and properly fabricated and installed.
- B. Quality Certification:
 - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
 - a. This AWI (QCP) project is registered as project number 22.0855.
 - 2. Provide for third-party AWI final inspection of fabricated architectural casework (prior to delivery). AWI program of self-certification in lieu of third-party inspection is not acceptable.
 - 3. Provide for third-party AWI final inspection of field-installed woodwork (after installation). AWI program of self-certification in lieu of third-party inspection is not acceptable.
 - 4. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
 - 5. Provide designated labels on shop drawings as required by certification program.
 - 6. Provide designated labels on installed products as required by certification program.
 - 7. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
 - 8. Replace, repair, or rework all work for which certification is refused.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 2 of the Architectural Woodwork Standards: "Care & Storage."
- B. Deliver woodwork after finishes are complete, including painting, and HVAC is operating at occupancy conditions in all spaces where woodwork will be installed.
- C. Store in an environmentally controlled location. Protect units from moisture damage.

1.07 FIELD CONDITIONS

- A. During and after installation of woodwork, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
 - B. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - C. All countertop surfaces shall be NSF approved for food contact.
-

- D. Accessibility Requirements: Fabricate and install woodwork and casework in compliance with ICC/ANSI A117.1 and with ADA Standards for Accessible Design.

2.02 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Plastic-Laminate-Clad Cabinets: Custom grade, except as modified below. Solid wood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base cabinets.
1. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
 2. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions:
 - a. Base Cabinets: 24 inches.
 - b. Tall Cabinets: 24 inches.
 - c. Wall Cabinets: 12 inches.
 3. Drawer Construction: Provide premium grade for drawer box construction.
 4. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
 - a. Finish: Matte or suede, gloss rating of 5 to 20.
 - b. Surface Color and Pattern: As selected by Architect from manufacturer's full line.
 - c. Exposed Interior Surfaces: Thermally fused laminate (melamine) is acceptable only at drawer boxes. Provide HPDL, type VGS or CLS, at semi-exposed interiors of cabinets (cabinets with doors). Provide type VGS for exposed interior horizontal shelving surfaces.
 - d. Apply undecorated laminate backing sheet to concealed reverse side of plastic laminate finished surfaces.
- C. ADA Sink Cabinets: Fabricate a panel of 3/4-inch moisture resistant core material and veneer/cladding material to match adjacent cabinets. Panel shall be removable for service access to undercounter plumbing. Provide with Z-clip attachment system for concealed fastening and with a steel cable retainer, minimum 4 feet long, so that panel can be set aside for service access. Fasten Z-clips and steel cable retainer to panel and to substrate with tamper-resistant fasteners.
1. Provide an undercounter vertical "apron" piece at front of ADA sink locations as indicated, flush to fronts of adjacent cabinets and finished to match.

2.03 WOOD-BASED COMPONENTS

- A. Core Material for Cabinets: ANSI A208.1, Grade M-2 particleboard.
1. At Contractor's option, cabinet backs may be fabricated of ANSI A208.2, Grade MD medium-density fiberboard.
- B. Core Material for Countertops: Manufacturer's standard ANSI A208.1, Grade M-2 particleboard, ANSI A208.2, Grade MD fiberboard, or exterior grade plywood.
1. At countertops containing sinks, provide core material meeting ANSI MR10 for moisture resistance. Available Products:
 - a. Arauco North America; Duraflake VESTA Moisture Resistant ULEF.
 - b. Collins Pine; FreeForm.
 - c. Georgia-Pacific; Ultrastock MR MDF.
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- d. Roseburg Forest Products; SkyBlend MR-10.

2.04 LAMINATE MATERIALS

- A. Manufacturers:
1. Formica Corporation.
 2. Panolam Industries International, Inc; Nevamar Standard HPL.
 3. Panolam Industries International, Inc; Pionite Standard HPL.
 4. Wilsonart LLC.
- B. Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels.
- C. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- D. Provide specific types as follows:
1. Horizontal Countertop Surfaces: HGS, 0.048 inch (1.2 mm) nominal thickness.
 2. Vertical Surfaces and Non-Countertop Horizontal Surfaces: VGS, 0.028 inch (0.7 mm) nominal thickness.
 3. Cabinet Liner: CLS, 0.020 inch (0.5 mm) nominal thickness.
 4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.05 SOLID SURFACING MATERIAL

- A. Solid Surfacing Material: ISFA 2-01.
1. Products:
 - a. Avonite Surfaces, a Brand of Aristech Surfaces, LLC; Avonite.
 - b. E. I. du Pont de Nemours and Company; Corian.
 - c. Formica Group; Solid Surfacing.
 - d. Hanwha L&C; Hanex.
 - e. LG Hausys America; HI-MACS.
 - f. Lotte Advanced Materials Co. Ltd.; Staron.
 - g. Wilsonart LLC; Solid Surface.
 2. Thickness: 1/2-inch.
 3. Type: Standard Type.
 4. Color and Pattern: As selected by Architect from manufacturer's full line.

2.06 COUNTERTOPS

- A. Fabricate in accordance with AWI/AWMAC/WI (AWS), Section 11 - Countertops, Custom Grade and with manufacturer's requirements.
- B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.
 2. Core: Particleboard or fiberboard as specified, except provide moisture resistant type at sink locations.
 3. Exposed Edge Treatment: Square, substrate built up to 1-1/2 inch thick unless otherwise indicated; covered with 3 mm edge banding with eased ends.
 4. Back and End Splashes: 3/4-inch thick core material with Grade HGS face and 0.5 mm edge banding/tape at edges.

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- C. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over structural substrate/core.
1. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 2. Core: Fabricate structural countertop core of manufacturer's recommended moisture-resistant sheet fabrication. Build up core material for total countertop thickness indicated.
 3. Fabricate in accordance with manufacturer's standard requirements, and in one piece to the greatest extent possible.
 - a. Shop-fabricate cutouts and holes in solid surface for plumbing fixtures, deck-mounted soap dispensers, and other items indicated on Drawings.
 4. Provide manufacturer's standard configuration for exposed edges, back and end splashes, and per the requirements below:
 - a. Edge and Corner Profiles: Eased.
 - b. Provide built up edges to standard thickness indicated (1-1/2 inches unless otherwise indicated).
 - c. Provide 4 inch high back and end splashes, unless otherwise indicated.

2.07 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Plastic Edge Banding: Extruded PVC, flat shaped; smooth finish; of width to match component thickness.
1. Provide 3 mm edge banding at all door and drawer front edges and laminate countertop edges.
 2. Provide 0.5 mm edge banding (tape) at cabinet body edges, shelf edges, and other semi-exposed/exposed interior edges.
 3. Color: As selected by Architect from manufacturer's full range.
- C. Grommets: Standard plastic grommets for cut-outs, color as selected by Architect from manufacturer's full range.
1. Grommet Size: To fit 2-1/2 inch diameter cut-out, nominal, unless otherwise indicated.
 2. Grommets shall have removable caps and slot for wire passage.
- D. Horizontal Sliding Glass Door Pass-Thru/Transaction Assemblies: Upper and lower track of satin anodized aluminum, with matching shoe equipped with nylon rollers. Track/shoe construction shall maintain approx. 1/4 inch open space between two sliding panes of glass.
1. Provide custom fabricated product for dimensions and details as indicated on Drawings.
 2. Glazing: 1/2-inch thick nominal, clear, fully tempered glass; with flat polished edges where exposed.
 - a. Glazing shall comply with 16 CFR 1201, Category II impact resistance.
 3. Accessories: Provide with rubber bumpers at each jamb for soft-close operation and provide with keyed lock, mounted through glass, for operation from secure (non-corridor) side, with two keys.
 4. Products: Basis-of-Design product is C.R. Laurence, Sharyn model pass-thru. Other manufacturers offering comparable products:
 - a. Creative Industries, Inc.
 - b. Virginia Glass and Mirror.
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- E. Mailroom Casework Modules: Modular paper sorting assembly of closed-back, open-front case modules with adjustable horizontal shelves, fabricated of fire-resistant, impact-resistant, high-strength plastic or coated steel. Provide manufacturer's standard module sizes for overall unit dimensions and mail slot quantity required. Provide with metal nameplate at each mail slot.
 - 1. Manufacturers:
 - a. Datum Filing Systems.
 - b. Hamilton Sorter Company.
 - c. Modular Millwork, Division of International Office Products Cooperative.

2.08 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated shelf rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- C. Fixed Standard Shelf, Countertop, and Workstation Brackets: Install at 36 inches o.c. for full length of countertop/shelf.
 - 1. Material: Steel.
 - 2. Load Capacity: 500 lbs minimum per pair of brackets, installed at 36 inches o.c.
 - 3. Size: 21 inches high by 28 inches deep for standard 30 inch deep countertops. Provide additional sizes as required for other applications.
 - 4. Finish: Manufacturer's standard, factory-applied powder coat.
 - 5. Color: Paint to match wall paint.
 - 6. Products:
 - a. A&M Hardware, Inc; Standard Brackets.
 - b. Best Brackets; ADA Workstation Support Standard Steel Bracket.
 - c. FastCap; SpeedBrace.
 - d. Lyman Associates; Counter Top Supports.
 - e. Substitutions: See Section 016000 - Product Requirements.
- D. Drawer and Door Pulls: BHMA A156.9, B02011, back-mounted "U" shaped wire pull, steel with chrome finish, 4 inch centers.
- E. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with chrome finish.
- F. Drawer Slides:
 - 1. Type: Full extension.
 - 2. Static Load Capacity: Heavy Duty grade.
 - a. For standard box drawers under 30 inches wide, provide BHMA Grade 1HD-100 with minimum load capacity of 100 lbf.
 - b. For file drawers and drawers 30 inches wide or larger, provide BHMA Grade 2HD-200 with minimum load capacity of 200 lbf.
 - c. For pencil drawer slides, provide 3/4 extension with minimum load capacity of 45 lbf.
 - 3. Mounting: Side mounted.
 - 4. Stops: Integral type.
 - 5. Features: Provide soft close type.
 - 6. Manufacturers:
 - a. Accuride International, Inc.
 - b. Fullerer USA.

- c. Grass America Inc.
- d. Knappe & Vogt Manufacturing Company.
- G. Hinges: Butt type, BHMA A156.9 Grade 1, 2-3/4 inch, 5-knuckle steel with nickel-plated finish. Provide with antifriction bearings and rounded hospital tips.
 - 1. Provide two hinges for doors less than 48 inches high, and three hinges for doors more than 48 inches high.
- H. Hinges: European style concealed type, BHMA A156.9, B01602, steel with nickel-plated finish.
 - 1. Provide minimum 110 degree opening standard, and 160 degree opening at ADA sink base cabinets.
- I. Undercounter Wire Management: Provide the following, as indicated:
 - 1. Vinyl J-shaped channel wire manager for undercounter mounting, continuous for full length of countertop.

2.09 MISCELLANEOUS INTERIOR WOODWORK / CARPENTRY ITEMS

- A. Quality Standard: Provide Custom Grade for all interior woodwork / carpentry items, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Closet and Utility Shelving: Provide 3/4 inch thick panels and brackets with closet rod attached to bracket below shelf.
 - 1. Shelf Material: Decorative thermoset panels, with PVC T-mold edge.
 - 2. Rod and Flange Material: 1-5/16 inch diameter, aluminum tube, with matching flanges.
 - a. Provide Intermediate bracket every 24" on center.
- C. Wood Benches: Provide custom fabrications as detailed,.
 - 1. Fabricate benches of 3/4-inch thick panels; oak veneer over fire-retardant MDF for wood bench tops and trim. Provide bench top over 3/4 inch plywood.
 - a. Provide solid wood edging at all exposed edges, wood species and finish to match veneer, with eased exposed corners.
 - 2. Provide concealed fasteners for attachment of bench components to each other and to substrate construction.
 - 3. Finish benches with two coats of manufacturer's recommended lacquer on exposed surfaces and one coat on concealed surfaces.

2.10 FABRICATION

- A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
 - B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
 - C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
 - 1. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.
 - 2. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
 - 3. Seal or prime paint concealed cut edges of wood and laminate casework.
 - D. Hardware Application: Factory-machine casework members for hardware that is not surface applied.
 - E. Apron Frames: Construction similar to other cabinets, with modifications.
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1. Frames fabricated from panels standard with the manufacturer. Include front and back panels, with drawer suspension framing mechanically fastened to support channels spanning between them.
- F. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel exposed edges. Locate counter butt joints minimum 2 feet from sink cut-outs.
- G. Solid Surfacing: Fabricate in one piece to greatest extent possible; join pieces with adhesive sealant and finish joints smooth in accordance with manufacturer's recommendations and instructions. At Solid Surface countertop edges, provide butt or square edge at all corners in lieu of mitered.
- H. Countertop Fabrication: Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 1. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall or as indicated.
 - a. At Reception and Counseling desks, provide a 3 inch apron as detailed.
 2. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- I. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 1. Height: 4 inches, unless otherwise indicated.
 2. Mechanically fasten back and end splashes to countertops with steel brackets at 16 inches on center.
- J. Wall-Mounted Counters (not mounted over cabinets): Provide ADA compliant knee space with brackets, skirts, or aprons, as indicated on Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.
- G. Secure wall cabinets at top and bottom, at each end and no more than 16 inches on center. Secure directly into metal wall framing, or into FRT wood or metal channel blocking with No. 10 wafer head screws. Wall mounted hanger strips are not acceptable.
- H. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

- A. Test installed work for rigidity and ability to support loads.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION 064100

**SECTION 064200
WOOD PANELING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications 2016.
- B. AWI (QCP) - Quality Certification Program Current Edition.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- D. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2020.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on fire-retardant treatment materials and application instructions.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- D. Selection Samples: Provide manufacturer's color charts for available colors for each product specified.
- E. Verification Samples: Provide two samples of veneer-faced panels with selected color, manufacturer's standard size.
- F. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

1.03 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section.
 - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Quality Certification:
 - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
 - a. Refer to Section 064100 - Architectural Woodwork and Casework for AWI (QCP) project number and additional requirements. The work of both sections shall be completed under the same certification.
 - 2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
 - 3. Provide designated labels on shop drawings as required by certification program.
 - 4. Provide designated labels on installed products as required by certification program.
 - 5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.
- B. Do not deliver wood materials to project site until building is fully enclosed and interior temperature and humidity are in accordance with recommendations of AWI/AWMAC/WI (AWS).

PART 2 PRODUCTS

2.01 PANELING

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless otherwise indicated.
- B. Flat Paneling:
 - 1. Species: Oak.
 - 2. Cut: Plain sliced.
 - 3. Panels: Veneer-faced hardwood plywood of full width and balanced sequence matched.
 - 4. Visible Edges: Match faces.
 - 5. Reveals: Extruded aluminum.
 - 6. Outside Corners: Mitered and splined.
- C. Prefabricated CNC Machined Decorative Paneling:
 - 1. Basis-of-Design Product: 3Form; Profile Panels.
 - a. Manufacturers wishing to submit their product as a substitution shall submit full product data including full range of profiles and finishes to determine acceptability of performance and finish options.
 - 2. Construction: Provide manufacturer's standard MDF, CNC milled to profile indicated. Provide with manufacturer's standard white wrapped vinyl finish material.
 - 3. Profile: Horizontal profiled bands (basis-of-design is 3Form "Band" profile).
 - 4. Panel Size: 48 inch by 96 inch nominal.
 - 5. Panel Depth: Approx 1/2 inch to 3/4 inch, dependent on profiled cut.

2.02 WOOD-BASED MATERIALS - GENERAL

- A. Hardwood Plywood: HPVA HP-1 Grade A; veneer core, type of glue recommended for application; of grain quality suitable for transparent finish.
- B. Medium Density Fiberboard (MDF): Composite panel composed of cellulosic fibers, additives, and bonding system; cured under heat and pressure; comply with ANSI A208.2.

2.03 FABRICATION

- A. Shop prepare and identify panels for grain matching during site erection.
- B. Prepare panels for delivery to site, permitting passage through building openings.
- C. Finish exposed edges of panels as specified by grade requirements.

2.04 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 5, Varnish, Conversion or System - 11, Polyurethane, Catalyzed.
 - b. Stain: As selected by Architect.
 - c. Sheen: Satin.

2.05 ACCESSORIES

- A. Metal Trim: Provide in layout indicated on Drawings.
 - 1. Material: Extruded aluminum; clear anodized finish.
 - 2. Shape: Channels/reveals; provide 1/2-inch reveal width unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated on shop drawings.
- B. Verify adequacy of backing and support framing.
- C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Do not begin installation until wood materials have been fully acclimated to interior conditions.
- C. Set and secure materials and components in place, plumb and level, using concealed fasteners wherever possible.
- D. Where necessary to cut and fit on site, scribe work abutting other components. Do not use additional overlay trim to conceal gaps.
- E. Touch up damaged finish to match original, using materials provided by fabricator; replace components that cannot be refinished like new.

3.03 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION 064200

**SECTION 072100
THERMAL INSULATION**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Protect foam-plastic insulation from physical damage, including chipping, cracking, or soiling. Do not use boards that are damaged due to delivery or handling.
- B. Store insulation in a manner that protects from damage or deterioration, including moisture, soiling, or UV exposure.

1.04 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.
- B. Coordinate with insulation manufacturer for UV exposure requirements and coordinate the schedule of construction to ensure insulation is concealed in a timely manner.

PART 2 PRODUCTS

2.01 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 - 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.

2.02 BATT INSULATION MATERIALS

- A. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.

2.03 MISCELLANEOUS GAP / CRACK FILLER

- A. General: Fill miscellaneous joints and cracks with mineral wool batt insulation (specified above) or with closed-cell polyurethane foam at Contractor's option.
- B. Closed Cell Polyurethane Foam:
 - 1. Provide insulation that conforms to ULC S705.1, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material" or ASTM C 1029, Type II, and performance requirements listed.
 - 2. Flame-spread index of 0 and maximum smoke development index of 5, when tested in accordance with ASTM E84.
 - 3. Products:
 - a. Dow; Enerfoam Professional Foam Sealant.
 - b. Hilti; CF-AS Crack and Joint All Seasons.
 - c. Substitutions: See Section 016000 - Product Requirements.

2.04 ACCESSORIES

- A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
 - 1. Application: Taping of insulation joints, and sealing of interior circular penetrations, such as pipes or cables.
 - 2. Width: As required for application.
- B. Tape joints of rigid insulation in accordance with insulation manufacturers' instructions.
- C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- D. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Adhere a 6 inches wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
- B. Apply adhesive to back of boards per manufacturer's instructions, or, at Contractor's option install insulation boards to tacky dampproofing/mortar parge coat before it has cured.
- C. Install boards horizontally on foundation perimeter.
 - 1. Place boards to maximize adhesive/substrate contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT CAVITY WALLS

- A. Secure impale fasteners to substrate to manufacturer's required quantity and spacing.
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- B. Install boards to fit snugly between wall ties.
- C. Install boards horizontally on walls.
 - 1. Install in running bond pattern.
 - 2. Butt edges and ends tightly to adjacent boards and protrusions.
 - 3. Place impale fastener locking discs.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.04 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.05 PROTECTION

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

END OF SECTION 072100

**SECTION 072736
SPRAYED FOAM (SPF) AIR BARRIER**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.
 - 1. Provide current Evaluation Service Report upon request.
- C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection as required by ABAA QAP.
- D. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

1.04 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP):
 - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
 - a. Install shall also be certified by ABAA/BPQI (Building Performance Quality Institute) in accordance with the training requirements outlined in the ULC S705.2 Installation Standard. Installers shall have their photo-identification certification cards in their possession and available on the project site, for inspection upon request.
 - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.
- B. NFPA 285 Tested Assembly: Provide foam plastic insulation products located in exterior wall assemblies that have been tested in accordance with NFPA 285 which represent those exterior wall assemblies for this Project.
 - 1. Potential heat in Btu per square feet shall not exceed the potential heat of the foam plastic insulation contained in the wall assembly tested as determined by tests in accordance with NFPA 259.

1.05 FIELD CONDITIONS

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

1.06 WARRANTY

- A. Material Warranty: Manufacturer's standard warranty against manufacturing defects, for a minimum period of 3 years.
- B. Installation Warranty: Air barrier subcontractor's installation warranty, effective from date of Substantial Completion for a minimum period of 2 years. Installation warranty shall include all components of the air barrier assembly, including loss of airtight seal, loss of watertight seal, loss of adhesion, loss of cohesion, or failure to cure properly.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Foamed-In-Place Insulation (SPF):
 - 1. BASF Corporation; WALLTITE US Series Closed Cell.
 - 2. Carlisle Spray Foam Insulation; SealTite D7 One Zero.
 - 3. Henry Company; Permax 2.0X.
 - 4. Huntsman Building Solutions; Heatlok HFO Pro.
 - 5. Johns Manville; JM Corbond III Closed Cell Spray Polyurethane Foam.
 - 6. NCFI Polyurethanes; InsulBloc.
 - 7. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS

- A. Spray Polyurethane Foam (SPF) Air Barrier/Insulation: Medium-density, rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
 - 1. Provide insulation that conforms to ULC S705.1, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material" or ASTM C 1029, Type II, and performance requirements listed.
 - 2. Thermal Resistance: R-value of 6.0, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
 - 3. Density: Minimum 1.9 pounds per cubic foot.
 - 4. Air Permeance (Material): Not to exceed 0.004 cfm per square foot, when tested at intended thickness in accordance with ASTM E 2178 at 1.57 psf.
 - 5. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
- B. Air Barrier Assembly Performance: Air barrier assembly, including primary air barrier and auxiliary materials, including joints and transitions to adjacent materials, shall have an air leakage rate not to exceed 0.04 cfm per square foot, at 1.57 psf pressure differential when tested per ASTM E 2357. The air barrier assembly shall also serve as liquid water control layer, and shall be flashed to direct moisture to the exterior.

2.03 ACCESSORIES

- A. Primer: As required by insulation manufacturer.
- B. Membrane at Transitions in Substrate and Connections to Adjacent Elements: Nominal 40-mil thick, impermeable, self-adhering sheet membrane.
 - 1. Available Products:
 - a. Carlisle Coatings and Waterproofing; CCW-705.
 - b. Grace Construction Products; Perm-A-Barrier Flashing.
 - c. Henry Company; Blueskin SA.

- d. Protective Coatings Technology, Inc; Poly-Wall Crack Guard.
 - e. Tremco, Inc.; ExoAir 110.
 - f. W. R. Meadows, Inc.; Air Shield.
- C. Membrane at Transitions between Spray Foam Air Barrier and Roofing and Other Adjacent Materials: Provide impermeable transition membrane that complies with both air barrier manufacturer's recommendations and adjacent material manufacturer's recommendations.
- D. Spray Foam Stop and Screed: L-shaped stop and screed designed as a spray foam termination accessory, fabricated of stable UV-resistant plastic and acceptable to spray foam manufacturer. Outer leg shall be sized to match spray foam thickness indicated. "Jam-Ex" by Exo-Tec Manufacturing, Inc., or equivalent product.
- E. Counterflashing for Masonry Through-Wall Flashing: Nominal 40-mil thick, impermeable, self-adhering membrane.
- 1. Available Products:
 - a. Carlisle Coatings and Waterproofing; CCW-705 TWF.
 - b. Grace Construction Products; Perm-A-Barrier Flashing.
 - c. Henry Company; Blueskin TWF.
 - d. Protective Coatings Technology, Inc.; Poly-Wall Crack Guard.
 - e. Tremco, Inc.; ExoAir TWF.
 - f. W. R. Meadows, Inc.; Detail Strip.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.02 PREPARATION

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.
- C. Building Expansion Joints: Do not bridge joints with spray foam material. Provide a L-shaped stop/screed on each side of joint, pack joint with compressible insulation, and bridge the joint with flexible transition membrane to provide continuous air barrier assembly.
- D. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.04 FIELD QUALITY CONTROL

- A. Field inspections and tests will be performed by third party ABAA testing agency, under provisions of Section 014000 - Quality Requirements.
- B. Coordination of ABAA Tests and Inspections:
 - 1. Arrange and pay for testing and inspection required by ABAA QAP.
 - a. Testing and inspection shall verify conformance with ABAA Quality Assurance Program, the ULC S705.2 Installation Standard, manufacturer's written installation

instructions, and other requirements of this section.

- b. Unless indicated otherwise, provide ABAA Quality Assurance Program audits in accordance with current "Frequency & Cost of Audits" posted on ABAA website. Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed. In the case of deficiencies, the ABAA-licensed inspector may verbally advise the licensed installer at time of inspection.
- 2. Notify ABAA in writing of schedule for air barrier work. Allow adequate time for testing and inspection.
- 3. Cooperate with ABAA testing agency.
- 4. Allow access to air barrier work areas and staging.
- 5. Do not cover air barrier work until tested, inspected, and accepted.
- C. In addition to the ABAA site inspector, coordinate and provide access for air barrier manufacturer's technical representative to make field reviews during installation and provide technical reports to Contractor, Owner, and Architect.
- D. Patch air barrier work that was removed or damaged due to testing.
- E. If testing and inspection reveals any defects, promptly remove and replace defective work at no additional expense to the Owner.

3.05 PROTECTION

- A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION 072736

**SECTION 074213
METAL WALL PANELS**

PART 1 GENERAL

1.01 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
 - 1. Physical characteristics of components shown on shop drawings.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions and recommendations.
- C. Shop Drawings: Indicate dimensions, layout, joints, construction details, support clips, and methods of anchorage.
- D. Selection Samples: Submit manufacturer's color charts representing manufacturer's standard range of available colors.
- E. Verification Samples: Submit physical sample in manufacturer's standard size indicating panel profile and selected color, for each type of product required.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

1.03 FIELD CONDITIONS

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

1.04 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Finish Warranty: Correct defective work within a twenty year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Wall Panels - Concealed Fasteners:
 - 1. Basis-of-Design Product: Centria; IW-40A
 - 2. ATAS International, Inc.
 - 3. Dimensional Metals, Inc.
 - 4. Englert, Inc.
 - 5. IMETCO.
 - 6. Metal Roofing Systems, Inc.
 - 7. Morin Corporation.
 - 8. Substitutions: See Section 016000 - Product Requirements.

2.02 METAL WALL PANEL MATERIALS

- A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
 - 1. Provide exterior wall panels and subgirt framing assembly.
 - 2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
 - 3. Maximum Allowable Deflection of Panel: $L/180$ for length(L) of span.
 - 4. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
 - 5. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
 - 6. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
 - 7. Corners: Factory-fabricated in one continuous piece with minimum 2-inch returns.
- B. Exterior Wall Panels:
 - 1. Profile: Horizontal; style as indicated.
 - 2. Side Seams: Double-interlocked with reveal, sealed with continuous gaskets.
 - 3. Material: Precoated steel sheet, 22 gauge, 0.0299 inch minimum thickness.
 - 4. Panel Width: 12 inches.
 - a. Profile: 11 inch flat, with 1 inch reveal, per Centria IW-40A basis-of-design.
 - 5. Color: As selected by Architect from manufacturer's standard line.
- C. Subgirt Framing Assembly: Provide support assembly for metal wall panel fabricated of 16 gauge galvanized steel Z-girt or hat channel spaced at manufacturer's recommended spacing.
- D. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.
- E. Expansion Joints: Same material, thickness and finish as exterior sheets; manufacturer's standard brake formed type, of profile to suit system.
- F. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- G. Anchors: Galvanized steel.

2.03 FINISHES

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

2.04 ACCESSORIES

- A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
 - B. Fasteners: Manufacturer's standard concealed type to suit application; with soft neoprene washers, steel, hot dip galvanized.
 - 1. Metal-to-Metal Fasteners: Self-drilling, self-tapping screws.
 - C. Field Touch-up Paint: As recommended by panel manufacturer.
-

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Install subgirts/furring perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane, and spaced at intervals recommended by manufacturer, but not more than 24 inches on center.
- B. Protect surrounding areas and adjacent surfaces from damage during execution of this work.

3.03 INSTALLATION

- A. Install panels on walls and soffits in accordance with manufacturer's instructions.
- B. Fasten panels to structural supports; aligned, level, and plumb.
- C. Locate joints over supports.
- D. Lap panel ends 2 inches, minimum.
- E. Provide expansion and control joints where length exceeds that recommended by manufacturer.
- F. Use concealed fasteners unless otherwise indicated by Architect.
- G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.04 TOLERANCES

- A. Offset From True Alignment Between Adjacent Members Abutting or In Line: 1/16 inch, maximum.
- B. Variation from Plane or Location As Indicated on Drawings: 1/4 inch, maximum.

3.05 CLEANING

- A. Remove site cuttings from finish surfaces.
- B. Remove protective material from wall panel surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

3.06 PROTECTION

- A. Protect metal wall panels until completion of project.
- B. Touch-up, repair, or replace damaged wall panels or accessories before Date of Substantial Completion.

END OF SECTION 074213

SECTION 074243
METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- E. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip 2022.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- H. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2021a.
- I. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- K. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- L. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- M. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives 1998 (Reapproved 2021).
- N. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics 2020.
- O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
 - 1. Require attendance by MCM installer, CI framing installer (if a different entity), and other relevant sub-contractors (such as aluminum storefront/curtain wall, air barrier, insulation).
 - 2. Include MCM sheet manufacturer's representative and wall system manufacturer's representative to review procedures.
 - 3. Review in detail the schedule, personnel, and installation of adjacent materials and substrate.
 - 4. Review project specific details including joint details (both panel-to-panel joints and panel to adjacent construction), penetrations, openings.

5. Review field testing, inspection, and other quality assurance requirements.
6. Review procedures for protection of work and other construction.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
 1. Finish manufacturer's data sheet showing physical and performance characteristics.
 2. Storage and handling requirements and recommendations.
 3. Fabrication instructions and recommendations.
 4. Specimen warranty for finish, as specified herein.
- C. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
 1. Physical characteristics of components shown on shop drawings.
 2. Storage and handling requirements and recommendations.
 3. Installation instructions and recommendations.
 4. Specimen warranty for wall system, as specified herein.
- D. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, support clips, number of anchors, supports, reinforcement, trim, flashings, and accessories.
 1. Indicate panel numbering system.
 2. Differentiate between shop and field fabrication.
 3. Indicate substrates and adjacent work with which the wall system must be coordinated.
 4. Include large-scale details of anchorages and connecting elements.
 5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
 6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- E. Selection Samples: Submit manufacturer's color charts representing manufacturer's standard range of available colors.
- F. Verification Samples: For each finish product specified, submit physical sample in manufacturer's standard size indicating selected colors.
- G. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.
- H. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
- I. Maintenance Data: Care of finishes and warranty requirements.

1.04 QUALITY ASSURANCE

- A. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.05 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
 - B. Correct defective work within a two year period after Date of Substantial Completion, including structural failures, metal deterioration, and defects in water tightness and integrity of seals for metal wall panel systems.
-

- C. Correct defective work within a twenty year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather and paint cracking, peeling, or chalking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Composite Material (MCM) Sheet Manufacturers:
 - 1. 3A Composites USA; Alucobond Plus.
 - 2. Alcoa, Inc.; Reynobond FR.
 - 3. Alfrex, LLC; Alfrex fr.
 - 4. ALPOLIC Materials; ALPOLIC/fr (Fire Retardant core).
 - 5. Citadel Architectural Products, Inc; Envelope 2000.
 - 6. Fairview Architectural LLC; VitraBond G2 (Non-Combustible).

2.02 WALL PANEL SYSTEM

- A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage, or failure.
 - 1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
 - 2. Provide panel jointing and weatherseal using a "wet", sealant-sealed system.
 - 3. Anchor panels to supporting framing without exposed fasteners.

2.03 PERFORMANCE REQUIREMENTS

- A. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.

2.04 PANELS

- A. Panels: 1 inch deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
 - 1. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
 - 2. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.
 - 3. Secure members to back face of panels using structural silicone sealant approved by MCM sheet manufacturer.
 - 4. Fabricate panels under controlled shop conditions.
 - 5. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
 - 6. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.
 - a. Make panel lines, breaks, curves, and angles sharp and true.
 - b. Keep plane surfaces free from warp or buckle.
 - c. Keep panel surfaces free of scratches or marks caused during fabrication.

7. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.

2.05 MATERIALS

- A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
 1. Overall Sheet Thickness: 0.157 inch, minimum (4 mm).
 2. Face Sheet Thickness: 0.020 inches, minimum, equal thickness for both exterior and interior facings. Unequal facings are not acceptable.
 3. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
 4. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 5. Flammability: Self-ignition temperature of 650 degrees F or greater when tested in accordance with ASTM D1929.
- B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
 1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
 2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
 3. Stainless Steel Sheet Components: ASTM A480/A480M.
 4. Aluminum Components: ASTM B209/B209M; or ASTM B221 (ASTM B221M).

2.06 FINISHES

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

2.07 ACCESSORIES

- A. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet.
 - B. CI Framing System: Refer to Division 5 Section 054003 - Continuous Insulation (CI) Framing System, Clipped.
 - C. Cladding Support Clips: Thermally-broken, galvanized steel clips for support of cladding z-girts, angles, channels and other framing.
 1. Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 galvanized coating.
 - D. Anchors, Clips, and Accessories: Use one of the following:
 1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
 2. Steel complying with ASTM A36/A36M and hot-dipped zinc coating to ASTM A153/A153M.
 3. Steel complying with ASTM A36/A36M and hot-dipped galvanized coating to ASTM A123/A123M, Coating Grade 10.
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- E. Fasteners:
 - 1. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
 - 2. Bolts: Stainless steel.
 - 3. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- F. Joint Sealer: Provide color as selected by Architect silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.
- G. Provide panel system manufacturer's and installer's standard corrosion resistant accessories, including fasteners, clips, anchorage devices, and attachments.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine dimensions, tolerances, and interfaces with other work.
 - 1. Verify that air barrier system/insulation and CI framing system are properly installed.
- B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.

3.03 INSTALLATION

- A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.
- B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.
- C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.
- D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.
- F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
- G. Where joints are designed for field-applied sealant, seal joints completely with specified sealant.
- H. Install flashings as indicated on shop drawings. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.

- I. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
 - 1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
 - 2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
 - 3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
 - 4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.
- J. Replace damaged products.
 - 1. Exception: Field repairs of minor damage to finishes are permitted only when approved in writing by Architect, panel manufacturer, and fabricator.
 - 2. Field Repairs to Finishes: Using materials and methods sufficient that repairs are not discernible when viewed at distance of 10 feet under all typical light conditions experienced at the project.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.

3.05 CLEANING

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

3.06 PROTECTION

- A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION 074243

**SECTION 075400
THERMOPLASTIC MEMBRANE ROOFING**

PART 1 GENERAL

1.01 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene at the Project site one week before starting work of this section.
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Shop Drawings: Submit drawings that indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
 - 1. Submit in the form of manufacturer's assembly letter, indicating each component of the roofing assembly as specified, and that assembly meets performance requirements and manufacturer's warranty conditions.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.
- G. Warranty Documentation:
 - 1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 - 2. Submit installer's written verification that installation complies with warranty conditions for waterproof membrane.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of products specified, with UL-listed roof assemblies for roof systems indicated.
- B. Installer Qualifications: Company specializing in installation of roof systems indicated, and approved / certified by roofing manufacturer to install products specified.
- C. Insulation Manufacturer Qualifications: Approved by roof membrane manufacturer, and approved and labeled under third party quality program as required by applicable building code.
 - 1. Insulation Labeling: All foam insulation shall bear the label of testing/inspection agency, and shall include manufacturer identification, product identification, and performance characteristics.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact, unless otherwise indicated.
 - B. Store materials in weather protected environment, clear of ground and moisture.
 - C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
 - D. Protect foam insulation from direct exposure to sunlight.
-

1.05 FIELD CONDITIONS

- A. Do not install roofing materials during unsuitable weather, or when unsuitable weather is expected. Proceed only when field conditions are in accordance with roofing manufacturer's installation and warranty requirements.
- B. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- C. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Special Warranty - Manufacturer: Manufacturer's standard warranty form, customized for project-specific conditions.
 - 1. Manufacturer's warranty shall be a "total system" or "edge-to-edge" warranty; no dollar limit ("NDL").
 - 2. Include all components of roofing system including, but not limited to, roofing membrane, roof insulation, adhesives and fasteners, flashings, edge metals and copings, substrate board, vapor retarder/air barrier, and cover board.
 - 3. Manufacturer's Total System Warranty Period: 20 years, from date of Substantial Completion.
- C. Special Warranty - Installer: Installer shall sign and submit per warranty form attached at end of this section.
 - 1. Installer's warranty shall cover all components of roofing system, matching manufacturer's warranty above.
 - 2. Installer's Warranty Period: 2 years, from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Thermoplastic Polyolefin (TPO) Membrane Roofing Materials:
 - 1. Carlisle Roofing Systems, Inc.
 - 2. Firestone Building Products, LLC.
 - 3. Johns Manville.

2.02 ROOFING

- A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.
- B. Roofing Assembly Requirements:
 - 1. Roof Covering External Fire Resistance Classification: UL (FRD) Class A.
 - 2. Assembly Thermal Resistance (R-Value): Roofing assembly shall have a total minimum R-value of 30 in accordance with IECC for Commercial Buildings.

2.03 MEMBRANE ROOFING AND ASSOCIATED MATERIALS

- A. Membrane Roofing Materials:
 - 1. TPO: Thermoplastic polyolefin (TPO) complying with ASTM D6878/D6878M, sheet contains reinforcing fabrics or scrim.
 - a. Thickness: 60 mil, 0.060 inch, minimum.

2. Sheet Width: Factory fabricated into widest possible sheets.
 3. Color: White.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Flexible Flashing Material: Same material as membrane.

2.04 DECK SHEATHING

- A. Deck Sheathing: Glass-mat faced gypsum panels complying with ASTM C1177/C1177M.
1. Thickness: 1/2 inch, fire-resistant.
 2. Products:
 - a. CertainTeed Corporation; GlasRoc Sheathing.
 - b. Georgia-Pacific; DensDeck Prime.
 - c. National Gypsum Company; DEXcell Glass Mat Roof Board.
 - d. USG Corporation; Securock Ultralight Glass-Mat Roof Board.

2.05 VAPOR RETARDER / AIR BARRIER

- A. Vapor Retarder / Air Barrier Sheet, Self-Adhered: Composite sheet fabricated of rubberized asphalt factory laminated to polyethylene/polypropylene film with release liner. Product shall be approved by primary roofing manufacturer, and comply with the following:
1. Total Thickness: 30 mils, minimum.
 2. Air Permeance: Less than 0.004 cfm/sq.ft. when tested per ASTM E 2178.
 3. Vapor Permeance: Less than 0.1 perm when tested per ASTM E 96.
 4. Products:
 - a. Carlisle; VapAir Seal 725 TR.
 - b. Firestone; V-Force Vapor Barrier.
 - c. Johns Manville; JM Vapor Barrier SA.

2.06 COVER BOARDS

- A. Cover Board: High compressive strength polyisocyanurate (ISO) board insulation complying with ASTM C1289, and the following characteristics:
1. Classification: Type II, Class 4 - Faced with coated or uncoated polymer-bonded glass fiber mat facers on both major surfaces of the core foam.
 2. Compressive Strength: Type II, Class 4; Grade 1, 80 psi.
 3. Board Thickness: 1/2 inch.
 4. Thermal Resistance: R-value of 2.5, minimum, at 1/2 inch thick and 75 degrees F mean temperature.
 5. Products:
 - a. Carlisle; SecurShield HD.
 - b. Firestone; Isogard HD Cover Board.
 - c. Johns Manville; ProtectoR.

2.07 INSULATION

- A. Surface Burning Characteristics: Foam plastic insulation shall have a maximum flame spread index of 75, and maximum smoke developed index of 450, when tested in accordance with ASTM E84 at maximum thickness intended for use.
- B. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
1. Classifications:

- a. Type II:
 - 1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 2, 20 psi (138 kPa), minimum.
- 2. Tapered Board: Slope as indicated, but no lower than 1/4 inch per foot; minimum thickness 1/2 inch; fabricate of fewest layers possible.

2.08 ACCESSORIES

- A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- B. Sheathing Joint Tape: Paper type, self adhering.
- C. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self adhering.
- D. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
 - 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.
- E. Membrane Adhesive: As recommended by membrane manufacturer.
- F. Insulation Adhesive: As recommended by insulation manufacturer.
- G. Sealants: As recommended by membrane manufacturer.
- H. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 - 1. Composition: Roofing membrane manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and other accessories are in place.

3.02 PREPARATION - METAL DECK

- A. Install deck sheathing on metal deck:
 - 1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
 - 2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
 - 3. Tape joints.
 - 4. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual recommendations and roofing manufacturer's instructions.
 - a. At locations where metal roof deck will be exposed from below in the finished work, carefully coordinate fastener attachment such that fasteners do not penetrate the bottom flanges of the metal deck. Remove fasteners that penetrate the bottom flanges and replace with properly located fasteners, and restore metal deck to

Owner's satisfaction.

3.03 INSTALLATION, GENERAL

- A. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.
- B. Do not apply roofing membrane during cold or wet weather conditions.
- C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.04 INSTALLATION - VAPOR RETARDER AND INSULATION, UNDER MEMBRANE

- A. Install vapor retarder over sheathing surface in accordance with manufacturer's instructions.
 - 1. Extend vapor retarder under blocking to deck edge.
 - 2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
- C. Attachment of Insulation:
 - 1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and FM DS 1-28 Factory Mutual requirements.
 - a. At locations where metal roof deck will be exposed from below in the finished work, carefully coordinate fastener attachment such that fasteners do not penetrate the bottom flanges of the metal deck. Remove fasteners that penetrate the bottom flanges and replace with properly located fasteners, and restore metal deck to Owner's satisfaction.
 - 2. Embed subsequent layer(s) of insulation into full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.
 - 3. Install a minimum of two layers of insulation, with a minimum total thickness of 5 inches, to achieve a cumulative Long Term Thermal Resistance (LTTR) value of 28.5 per ASTM C1289, followed by a cover board.
- D. Cover Boards: Secure cover boards in accordance with roofing manufacturer's instructions with manufacturer's insulation adhesive.
- E. Lay subsequent layers of insulation, and cover board, with joints staggered minimum 6 inches from joints of preceding layer.
- F. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- G. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- H. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- I. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
- J. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.
- K. Do not install more insulation than can be covered with membrane in same day.

3.05 INSTALLATION - MEMBRANE

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Fully Adhered Application: Apply adhesive to substrate per manufacturer's instruction. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- E. At intersections with vertical surfaces:
 - 1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
 - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- F. Around roof penetrations, seal flanges and flashings with flexible flashing.
- G. Install roofing expansion joints where indicated. Make joints watertight.
- H. Coordinate installation of roof drains and sumps and related flashings.
- I. Install walkway pads in layout indicated. If not indicated, provide from roof access hatch/door to each major piece of rooftop equipment and fully around perimeter of equipment. Space pad joints to permit drainage.

3.06 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Provide on-site inspection by roofing manufacturer's technical representative at least three times (deck/substrate examination, in-progress, and warranty inspection) during installation of this work.
- C. Repair or replace roofing components where inspection determines they are defective.
 - 1. Repair or replace roofing system where ponding occurs in excess of specified requirement.

3.07 CLEANING

- A. See Section 017000 - Execution and Closeout Requirements for additional requirements.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

3.08 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION 075400

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No: 611565

ROOFING INSTALLER'S WARRANTY

WHEREAS _____

of (Address) _____

herein called the "Contractor," has provided roofing and associated "work" on the following project:

Owner: _____

Address: _____

Name of Building: _____

Address: _____

Area of Work: _____ Date of Acceptance: _____

Warranty Period: _____ Date of Expiration: _____

Roofing Contractor: _____

Address: _____

AND WHEREAS Contractor has contracted directly with the Owner to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE the (General) Contractor shall maintain the entire roof system in a completely water-tight condition at no cost to the Owner for two (2) years from date of final acceptance; except this water-tight guarantee shall not be enforced when the Contractor can prove water damage was caused by the Owner.

This guarantee covers the roofing membrane and flashing, metal flashing, parapet coping, and properly detailed penetrations of the roofing membrane for such things as stacks, curbs, and expansion joints which exist when the work is performed.

The Roofing Contractor shall guarantee its materials and workmanship associated with the roofing, flashings, and sheet metal work incidental to the work required under the roofing subcontract, against defect due to faulty materials or workmanship for a period of two (2) years from the date of completion of such work. It is understood and agreed by all parties hereto that the responsibility of the roofing contractor under this guarantee form or any contract document shall be limited to the limited guarantee herein expressed by said roofing contractor.

The undersigned named Owner for the Commonwealth agrees, from the date of acceptance of the project, to maintain the roof in accordance with the manufacturer's written requirements and agrees to avoid damage to the roof surface by any parties under his control working or walking on the roof. The Owner recognizes his responsibility to inspect the roof semi-annually.

IN WITNESS THEREOF, this instrument has been duly executed this

_____ day of _____, 20_____.

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No: 611565

General Contractor (Firm)

By:

Name

Authorized Signature

Roofing Contractor (Firm)

By:

Name

Authorized Signature

Owner

By:

Name

Authorized Signature

END OF SECTION

**SECTION 075700
COATED FOAMED ROOFING - MINOR ALTERATIONS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- B. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics 2016.
- C. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics 2020.
- D. ASTM D1623 - Standard Test Method for Tensile And Tensile Adhesion Properties of Rigid Cellular Plastics 2017.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- F. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings 2020a.
- G. UL (DIR) - Online Certifications Directory Current Edition.
- H. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings Current Edition, Including All Revisions.

1.02 ADMINISTRATIVE REQUIREMENTS

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on foam insulation and overcoat, physical and chemical properties, preparation of substrate required, product limitations, and cautionary requirements.
- C. Installer's qualification statement.
- D. Warranty: Submit certificate from existing roofing warranty manufacturer at end of construction to ensure that existing warranty remains in effect from manufacturer.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work on spray foam roofing materials, with documented experience on roof renovation and alteration work similar in scope to this project.
- B. Existing Warranty: Existing warranty is in place for the spray foam roofing. Contractor shall notify warrantor and all alterations and renovations shall be performed in a manner to maintain terms of existing warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B. Store foamed roofing products in ambient temperatures between 40 degrees F and 80 degrees F.

1.06 FIELD CONDITIONS

- A. Do not install foam roofing materials during the following conditions:
 - 1. When ambient temperature is below 40 degrees F.

2. When wind velocity is above 10 mph.
 3. During periods of precipitation.
- B. Schedule application so that no partially completed sections of roof are left exposed at end of workday.

1.07 WARRANTY

- A. Existing Spray Foam Roofing Warranty: The Owner shall provide a copy of warranty documents after Notice of Award. The Contractor shall contact warrantor to ensure all alteration work is done according to procedures and requirements of manufacturer to maintain existing warranty and to maintain a weatherproof roof assembly.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Coated Foamed Roofing and Accessories: Provide products by manufacturers that are compatible and acceptable to existing roofing manufacturer's warranty requirements.

2.02 REGULATORY REQUIREMENTS

- A. Comply with applicable building codes for fire resistance rating of roofing system.
- B. UL Assembly: Provide products listed and labeled with UL (DIR) and in compliance with Class A fire test rating of roof coverings in compliance with UL 790 or ASTM E108.

2.03 FOAM INSULATION MATERIALS

- A. Foam Insulation: Sprayed polyurethane foam (SPF) type, closed cell; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
1. Density: 2.5 lbs/cu ft, nominal, in accordance with ASTM D1622.
 2. Tensile Strength: 65 psi, minimum, in accordance with ASTM D1623.
 3. Compressive Strength: 45 psi, minimum, in accordance with ASTM D1621.
 4. Thermal Resistance: R-value of 6.9, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
 5. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, at 4 inch thick when tested in accordance with ASTM E84.
- B. Substrate Primer: As required by insulation manufacturer.

2.04 OVERCOAT MATERIALS

- A. Overcoat: Polyurethane-based multi-layer coating over spray polyurethane foam (SPF), manufacturer's standard light color.
1. Dry Film Thickness (DFT): 60 mil overall thickness, nominal, unless otherwise required by terms of existing manufacturer warranty.

2.05 ACCESSORIES

- A. Spray Foam Cant Strip: Spray polyurethane foam (SPF) insulation, applied at interruptions and penetrations through roof surface and providing 45 degree slope transition to roof surface.
- B. Sealant: Type required or recommended by roofing manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

3.02 PREPARATION - TO EXISTING ROOF SYSTEM

- A. Clean surfaces of loose foreign matter.
- B. Remove substances that would bleed through finished coatings.
- C. Remove mildew, dirt, grease, oil, chalk and other contaminants that would interfere with adhesion and bonding of coating.
- D. Existing Painted and Sealed Surfaces:
 - 1. Strip existing paint and coatings from surface.
 - 2. Remove loose, flaking, peeling and oxidized paint; feather edge and sand smooth edges of chipped paint.
- E. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent.

3.03 INSTALLATION - INSULATION

- A. Apply primer and foam insulation in accordance with manufacturer's instructions.
- B. Place insulation to match existing roofing thickness; plus 1/4 inch. Build up slightly around existing roofing thickness to slope away from penetrating elements and onto existing roofing for drainage.
- C. Extend foam 2 inches up vertical intersections, fillet insulation and feather out. Form a cant of foam at perpendicular interruptions.
- D. Apply foam to permit first coat of overcoat application on same day. If this time limit is exceeded, prepare foam skin surface in accordance with manufacturer's instructions.
- E. Develop finish skin surface to smooth and unbroken "rough orange peel" texture. Uneven surfaces are not acceptable.

3.04 INSTALLATION - FLASHINGS AND ACCESSORIES

- A. Seal flashings and flanges of items penetrating membrane.

3.05 INSTALLATION - OVERCOAT

- A. Install overcoat in accordance with manufacturer's instructions.
- B. Prepare and seal penetrations through roof with sealant.
- C. Extend overcoat to cover foam insulation and extend 2 inches above foam termination on protrusions to a self-terminating, watertight seal.

3.06 CLEANING

- A. Remove excess insulation or overcoat from finished surfaces.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.07 PROTECTION

- A. Ensure areas where foamed roofing materials are applied is free of traffic for minimum three days after overcoat application.

END OF SECTION 075700

SECTION 076200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used including technical material properties.
 - 1. Include installation instructions and manufacturer's recommendations for installation and maintenance.
 - 2. Include ANSI/SPRI/FM 4435/ES-1 wind pull-off performance data for systems that will be used in edge metal conditions.
- C. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- D. Selection Samples: Provide manufacturer's color charts for each product and material requiring color selection.
- E. Verification Samples: Submit physical samples, manufacturer's standard size, for each selected color.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work, with experience in projects of size and scope similar to this Project.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 22 gauge (0.028-inch) thick base metal, shop pre-coated with PVDF coating.
 - 1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 - 2. Color: As selected by Architect from manufacturer's standard colors.
- B. Pre-Finished Aluminum: ASTM B209/B209M; 18 gauge, 0.040 inch thick; plain finish shop pre-coated with PVDF coating.
 - 1. Polyvinylidene Fluoride (PVDF) Coating: Superior performing organic powder coating, AAMA 2605; pretreated metal with two-coat system including primer and color coat with at least 70 percent PVDF coating.
 - 2. Color: As selected by Architect from manufacturer's standard colors.

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- C. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 24 gauge (0.025-inch) thick; smooth No. 2D finish.
- D. Copper: ASTM B370, cold rolled 16 oz/sq ft, 24 gauge, 0.0216 inch thick; natural finish.

2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Tin edges of copper sheet to be soldered; solder shop formed metal joints, and after soldering, remove flux, wipe and wash solder joints clean; provide weathertight joints.
- F. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.
 - 1. Hem exterior corners of flashings and drip edges, in a manner that eliminates sharp, exposed cut metal edges, at locations below 6'-0" above grade (locations within reach range of building occupants).
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

2.03 GUTTER AND DOWNSPOUT FABRICATION

- A. General: Provide minimum 0.040-inch aluminum extrusions for gutters and minimum 0.032-inch aluminum for downspouts. Finish all parts of gutter/downspout system a single color to match, including brackets, elbows and bends, and exposed fastener heads.
- B. Gutters: SMACNA Ogee profile (Style K); unless otherwise indicated.
- C. Downspouts: Rectangular profile; unless otherwise indicated.
- D. Gutter and Downspout Sizing: Unless otherwise indicated, provide 4-inch deep by 5-inch wide downspouts, with gutter depth to accept 4-inch deep downspout.
- E. Accessories: Profiled to suit gutters and downspouts. Provide additional elbows, bends, extended bracket depths, and other accessories as required for downspouts to avoid conflict with cladding profiles, masonry or precast extrusions, and other surface ornamentation on wall.
 - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
 - 2. Gutter Supports: Straps and spacer bars (SMACNA figure 1-17), spaced no more than 24 inches on center.
 - 3. Downspout Supports: Brackets; spaced no more than 60 inches on center.
 - 4. Downspout Strainers: Provide ball-type mesh strainer at each downspout; pre-fabricated, non-corrosive construction compatible with gutter/downspout material.
- F. Splash Blocks: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment. Lightweight "patio" blocks are not acceptable.
 - 1. Provide a splash block at all conditions where downspout is not indicated to connect to downspout boot, and at conditions where downspout empties onto lower roof.
- G. Downspout Boots: Cast iron, inlet sized to match downspout; outlet sized for underground drainage piping. Coordinate with Plumbing Drawings and Division 22.
- H. Seal metal joints.

2.04 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.

- B. Primer: Zinc chromate type.
- C. Concealed Sealants: Non-curing butyl sealant.
- D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.
- F. Reglets and Counterflashings (Masonry): Embedded type, copper. Coordinate with Division 4 Section "Unit Masonry."
- G. Reglets and Counterflashings (Non-Masonry): Surface mounted two-piece reglet and counterflashing, or one-piece counterflashing, fabricated of pre-finished aluminum or galvanized steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets and one-piece counterflashings true to lines and levels, and seal tops with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.03 INSTALLATION

- A. Comply with SMACNA installation instructions and drawing details.
- B. For reglets installed into masonry veneer, furnish reglets to mason for installation as Division 4 Unit Masonry work progresses.
- C. Insert flashings into reglets to form tight fit; secure in place with wedges; seal flashings into reglets with sealant.
- D. Secure flashings in place using concealed fasteners.
- E. Apply plastic cement compound between metal flashings and felt flashings.
- F. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- G. Seal metal joints watertight.
- H. Secure gutters and downspouts in place with concealed fasteners.
- I. Slope gutters 1/4 inch per 10 feet, minimum.
- J. Connect downspouts to downspout boots, and grout connection watertight.
- K. At low roof conditions, and where not indicated to connect to downspout boots, provide a bottom elbow and set splash blocks under downspouts.

END OF SECTION 076200

**SECTION 077100
ROOF SPECIALTIES**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2020.
- B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems 2017.
- C. NRCA (RM) - The NRCA Roofing Manual 2022.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
 - 1. Include test data/confirmation that copings and edge metals conform to ANSI/SPRI/FM 4435/ES-1 performance requirements.
- C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- D. Samples for Selection: Provide manufacturer's color charts for each product and material requiring color selection.
- E. Samples for Verification: Submit physical samples, manufacturer's standard size, for each selected color.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Roof Edge Metals and Copings: Provide private-labeled products by one of the roofing manufacturers listed in Division 7 Section "EPDM Roofing" as required to meet requirements and comply with terms of manufacturer's total system warranty.

2.02 COMPONENTS

- A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
 - 1. Configuration: Fascia, and edge securement for roof membrane.
 - 2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test methods RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable local building code.
- B. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
 - 1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness, and finish as cap; concealed stainless steel fasteners.
 - a. Provide cantilever design sized for installation over masonry veneer without attachment to veneer.
 - b. Size copings to allow for cavity ventilation; provide custom "vent" component as indicated at inside face of coping, with continuous perforated insect screen vent piece.

2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
 3. Wall Width: As indicated on drawings.
 4. Outside Face Height: 6 inches.
 5. Inside Face Height: 4 inches.
 6. Material: Formed aluminum sheet, 0.050 inch thick, minimum, for wall thickness up to 15 inches. Provide minimum 0.063 inch thick where total wall thickness is over 15 inches..
 7. Finish: AAMA 2605, 70 percent polyvinylidene fluoride (PVDF).
 8. Color: To be selected by Architect from manufacturer's standard range.
- C. Roof Penetration Sealing Systems: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- D. Multiple Penetration/Pipe Housing: Where multiple penetrations are required in close proximity, provide pipe chase housing fabricated of structural aluminum or galvanized steel curb, pre-finished aluminum chase housing with removable top cover, and individual gasketed pipe seals which exit the side walls of the housing. Size housing and provide number and size of pipe seals as required for each application.
1. Manufacturers:
 - a. Alta Products, LLC; Sigrist Pipe Chase Housing.
 - b. Roof Penetration Housings, LLC; the Vault.

2.03 FINISHES

- A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

2.04 ACCESSORIES

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Install components weathertight; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- C. Seal joints within components when required by component manufacturer.
- D. Anchor components securely.
- E. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

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- F. Coping Installation: Install coping cleats and chair with concealed fasteners. Anchor as required to meet ANSI/SPRI performance requirements and manufacturer's instructions, but at spacing of no greater than 36 inches on center.
- G. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

END OF SECTION 077100

**SECTION 077200
ROOF ACCESSORIES**

PART 1 GENERAL

1.01 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 ROOF CURBS

- A. General: Coordinate with Division 22, 23, and 26 for roof curbs and equipment supports specified with specific pieces of equipment.
- B. Manufacturers:
 - 1. AES Industries Inc.
 - 2. Curbs Plus, Inc.
 - 3. The Pate Company.
 - 4. LMCurbs.
 - 5. Roof Products & Systems (RPS).
 - 6. Thybar Corporation.
 - 7. Substitutions: See Section 016000 - Product Requirements.
- C. Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
 - 1. Roof Curb Mounting Substrate: Curb substrate consists of corrugated metal roof deck with insulation.
 - 2. Sheet Metal Material: Galvanized (zinc-coated) or galvalume (aluminum-zinc alloy) steel sheet; minimum 18 gauge (0.052-inch) thick; mill finish.
 - 3. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
 - a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch clearance between curb and metal roof panel flange allowing water to properly flow past curb.
 - b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and

- seal connection.
- c. Maintain at least 12 inch clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
- d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
- 4. Provide layouts and configurations indicated on drawings.
- D. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.
 - 1. Provide preservative treated wood nailers along top of rails.

2.02 ROOF HATCHES AND VENTS

- A. Roof Hatch Manufacturers:
 - 1. Bilco Company; Model E-50TB.
 - 2. Milcor, Inc; Thermal Pro TP-1.
 - 3. Nystrom, Inc; ThermalMAX RHTA.
 - 4. Substitutions: See Section 016000 - Product Requirements.
 - B. Roof Hatches and Smoke Vents: Factory-assembled aluminum frame and cover, complete with operating and release hardware.
 - 1. Mounting Substrate: Provide frames and curbs suitable for mounting on standing seam metal roof panel system.
 - a. Coordinate with roof insulation height, including tapered insulation design as indicated, to provide a minimum 8 inch curb height above the highest adjacent point of roof membrane.
 - 2. Thermally Broken Hatches: Provide manufacturer's standard insulation and thermally-broken frame and cover.
 - 3. For Ladder Access: Single leaf; 30 by 36 inches.
 - 4. Operation and Hardware: Provide with manufacturer's standard gas springs with assisted lift and automatic hold open arm. Provide interior and exterior turn handles and interior padlock hasp (padlock NIC).
 - C. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
 - 1. Material: Mill finished aluminum, 11 gauge, 0.0907 inch thick.
 - 2. Insulation: Manufacturer's standard; 3 inch rigid polyisocyanurate, located on outside face of curb.
 - D. Metal Covers: Flush, insulated, hollow metal construction.
 - 1. Capable of supporting 40 psf live load.
 - 2. Material: Mill finished aluminum; outer cover 11 gauge, 0.0907 inch thick, liner 0.04 inch thick.
 - 3. Insulation: Manufacturer's standard 3 inch rigid glass fiber.
 - 4. Gasket: Neoprene, continuous around cover perimeter.
 - E. Safety Railing System: Roof hatch manufacturer's standard accessory safety rail system mounted directly to curb. Do not install safety railing to roof assembly.
 - 1. Railing: Comply with 29 CFR 1910.23 for ladder safety, with a safety factor of two.
 - 2. Self-Closing Gate: Comply with 29 CFR 1910.29 for safe egress and fall protection through hatch opening.
 - 3. Posts and Rails: Manufacturer's standard galvanized steel, aluminum pipe, or fiberglass pipe; pre-finished in safety yellow color.
 - 4. Fasteners: Stainless steel, Type 316.
-

5. Products:
 - a. BILCO Company; Bil-Guard 2.0.
 - b. Milcor, Inc.; SAF-T-RAIL.
 - c. Nystrom, Inc.; Roof Hatch Safety Railing SRC.
 - d. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.
- B. Roof Curbs and Equipment Supports: Install in lengths and in a manner such that curbs and equipment supports span multiple structural framing members, with adequate blocking and supports to distribute the equipment loads over metal decking and structural members without crushing.

3.04 CLEANING

- A. Clean installed work to like-new condition.

3.05 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 077200

**SECTION 078400
FIRESTOPPING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).
- C. ITS (DIR) - Directory of Listed Products current edition.
- D. FM (AG) - FM Approval Guide current edition.
- E. UL 1479 - Standard for Fire Tests of Penetration Firestops Current Edition, Including All Revisions.
- F. UL (FRD) - Fire Resistance Directory Current Edition.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Installer's qualification statement.

1.03 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Labeling: Provide permanent labels adjacent to each firestopping assembly. Labels shall be durable metal or plastic and fastened mechanically or with a self-adhering backing. Labels shall include the tested assembly/system number, fire rating of the adjacent building element/ firestopping, the firestopping installer and certification, date of installation, and specific instructions to "Do Not Disturb" and "Alert Building Personnel of Damage."
- C. Installer Qualifications: Company specializing in performing the work of this section and trained/certified by firestopping manufacturer.

1.04 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. 3M Fire Protection Products.
 - 2. A/D Fire Protection Systems Inc.
 - 3. Rectorseal, a CSW Industrials Company.
 - 4. Hilti, Inc.
 - 5. Specified Technologies Inc.
 - 6. Tremco Commercial Sealants & Waterproofing.
 - 7. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS

- A. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero (0) in accordance with ASTM G21.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- C. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
 - 1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated, but not less than 1 hour.
- B. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
- C. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
- D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - 1. Air Leakage (Smoke Barriers): Provide systems that have been tested to show L Rating of no more than 5.0 cfm/sq. ft., both at ambient and elevated 400 deg F temperatures.

2.04 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.
-

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.
 - 1. Coordinate with Division 09 Painting contractor to ensure that all fire-rated walls and partitions are properly labeled.

3.04 FIELD QUALITY CONTROL

- A. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION 078400

**SECTION 079200
JOINT SEALANTS**

PART 1 GENERAL

1.01 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- F. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- G. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

1.02 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section, and is approved and/or certified by manufacturer.
- B. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
 - 1. Adhesion Testing: In accordance with ASTM C794.
 - 2. Compatibility Testing: In accordance with ASTM C1087.
 - 3. Allow sufficient time for testing to avoid delaying the work.
 - 4. Deliver to manufacturer sufficient samples for testing.
 - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
 - 6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
- C. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
 - 1. Identification of testing agency.
 - 2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
 - a. Test date.
 - b. Copy of test method documents.

- c. Age of sealant upon date of testing.
 - d. Test results, modeled after the sample form in the test method document.
 - e. Indicate use of photographic record of test.
- D. Field Adhesion Test Procedures:
- 1. Allow sealants to fully cure as recommended by manufacturer before testing.
 - 2. Have a copy of the test method document available during tests.
 - 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
 - 4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
 - 5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
 - 6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- E. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
- 1. Sample: At least 18 inches long.
 - 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
 - 3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

1.03 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.
 - b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints indicated below.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Wall and ceiling joints.

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- c. Joints between plumbing fixtures and floor or wall construction.
 - d. Other joints indicated below.
- 3. Do not seal the following types of joints.
 - a. Intentional weepholes in masonry.
 - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
 - d. Joints where installation of sealant is specified in another section.
 - e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant (ES-1), unless otherwise indicated.
 - 1. Type ES-5 - Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.
 - 2. Type ES-1 or ES-2 - Joints between walls and frames of doors, windows, and louvers.
 - 3. Type SRS-1 - Bedding joints.
- C. Interior Joints: Use non-sag polyurethane sealant (ES-4), unless otherwise indicated.
 - 1. Type ES-3 - Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
 - 2. Type ES-5 - Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.
 - 3. Type AS-1 - Joints at sound-rated or acoustic assemblies, and at full-height panel wall and partition assemblies indicated to have sound attenuation batts.
 - 4. Type LS-1 - Joints around perimeters of interior doors, windows, elevator entrances, and similar framed openings.
- D. Interior Wet Areas: Bathrooms, restrooms, and kitchens; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.
- E. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

2.02 NONSAG JOINT SEALANTS

- A. Type ES-1 - Low-Modulus Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 50 percent, minimum.
 - 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 - 4. Color: To be selected by Architect from manufacturer's standard range.
 - 5. Manufacturers:
 - a. Master Builders Solutions; MasterSeal NP 100.
 - b. Momentive Performance Materials, Inc/GE Silicones; SCS 2000 SilPruf.
 - c. Pecora Corporation; Pecora 890 NST (Non-Staining Technology) or 890 FST (Field Tint).
 - d. Polymeric Systems, Inc.; PSI-641.
 - e. Tremco Commercial Sealants & Waterproofing; Spectrem 3 or Spectrem 4-TS (Field Tint).
 - f. Substitutions: See Section 016000 - Product Requirements.

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- B. Type ES-2 - Medium-Modulus Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent, minimum.
 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 4. Color: To be selected by Architect from manufacturer's standard range.
 5. Manufacturers:
 - a. Dow Chemical Company; DOWSIL 795 Silicone Building Sealant.
 - b. Momentive Performance Materials, Inc/GE Silicones; SCS9000 SilPruf NB - Non-Staining Silicone Weatherproofing Sealant.
 - c. Pecora Corporation; Pecora 895 NST (Non-Staining Technology).
 - d. Tremco Commercial Sealants & Waterproofing; Spectrem 2.
 - e. Substitutions: See Section 016000 - Product Requirements.
- C. Type ES-3 - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic. Neutral- or acid-curing per manufacturer standard.
1. Color: White.
 2. Manufacturers:
 - a. Dow; DOWSIL 786 Mildew Resistant.
 - b. Pecora Corporation; Pecora 898 NST (Non-Staining Technology).
 - c. Tremco Commercial Sealants & Waterproofing; Tremsil 600 or Tremsil 200.
 - d. Substitutions: See Section 016000 - Product Requirements.
- D. Type ES-4 - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; multi-component; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 25 percent, minimum.
 2. Color: To be selected by Architect from manufacturer's standard range.
 3. Manufacturers:
 - a. ITW Polymers Sealants; Permthane SM 7200.
 - b. Master Builders Solutions by BASF; MasterSeal NP2.
 - c. Pecora Corporation; DynaTrol II.
 - d. Sika Corporation; Sikaflex-2c NS.
 - e. Tremco Commercial Sealants & Waterproofing; Dymeric 240 FC or Vulkem 227.
 - f. Substitutions: See Section 016000 - Product Requirements.
- E. Type LS-1 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
1. Color: To be selected by Architect from manufacturer's standard range.
 2. Grade: ASTM C834; Grade NF.
 3. Manufacturers:
 - a. Bostik, Inc; Chem-Calk 600.
 - b. ITW Polymers Sealants; SM 8200.
 - c. Master Builders Solutions; MasterSeal NP 520.
 - d. Pecora Corporation; AC-20 +Silicone.
 - e. Tremco Commercial Sealants & Waterproofing; Tremflex 834.
 - f. Substitutions: See Section 016000 - Product Requirements.

- F. Type AS-1 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging acoustical sealant.
 - 1. Color: Standard colors matching finished surfaces, Type OP (opaque).
 - 2. Grade: ASTM C834; Grade NF.
 - 3. Manufacturers:
 - a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant.
 - b. Franklin International, Inc; Titebond GREENchoice Acoustical Smoke & Sound Sealant.
 - c. Hilti, Inc; CP 506 Smoke and Acoustical Sealant.
 - d. Master Builders Solutions; MasterSeal NP 520.
 - e. Momentive Performance Materials, Inc/GE Silicones; RCS20 Acoustical.
 - f. Pecora Corporation; AC-20 FTR or AIS-919.
 - g. Specified Technologies Inc; Smoke N' Sound Acoustical Sealant.
 - h. Tremco Commercial Sealants & Waterproofing; Tremstop Smoke and Sound.
 - i. Substitutions: See Section 016000 - Product Requirements.
- G. Type SRS-1 - Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
 - 1. Manufacturers:
 - a. Bostik, Inc; Chem-Calk 300.
 - b. Pecora Corporation; Pecora BC-158 Butyl Rubber Sealant.
 - c. Tremco Inc.; Tremco Butyl Sealant.
 - d. Substitutions: See Section 016000 - Product Requirements.

2.03 SELF-LEVELING SEALANTS

- A. Type ES-5 - Self-Leveling Polyurethane Sealant for Traffic: Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Manufacturers:
 - a. Bostik, Inc.; Chem-Calk 550.
 - b. ITW Polymers Sealants; Permthane SM 7201.
 - c. Pacific Polymers, Inc; Elast-Thane 227 Type 1 (Self-Leveling).
 - d. Polymeric Systems, Inc; PSI-270SL.
 - e. Tremco Commercial Sealants & Waterproofing; THC-901 or THC-900.
 - f. W. R. MEADOWS, Inc; POURTHANE SL.
 - g. Substitutions: See Section 016000 - Product Requirements.

2.04 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
 - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 - 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
 - 3. Record each test on Preinstallation Adhesion Test Log as indicated.
 - 4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
 - 5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Destructive Adhesion Testing: If there are any failures in first 1000 linear feet, notify Architect immediately.
- C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.
- D. Repair destructive test location damage immediately after evaluation and recording of results.

END OF SECTION 079200

**SECTION 079513
EXPANSION JOINT COVER ASSEMBLIES**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ITS (DIR) - Directory of Listed Products current edition.
- B. UL (DIR) - Online Certifications Directory Current Edition.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.
- D. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal/Resilient Expansion Joint Cover Assemblies:
 - 1. Architectural Art Mfg, Inc.
 - 2. Balco, Inc.
 - 3. Construction Specialties, Inc.
 - 4. Inpro.
 - 5. MM Systems Corp.:
 - 6. Substitutions: See Section 016000 - Product Requirements.
- B. Preformed Foam Expansion Joint Assemblies:
 - 1. Construction Specialties, Inc.
 - 2. EMSEAL Joint Systems, Ltd.
 - 3. MM Systems Corp.
 - 4. Schul International Company, Inc.
 - 5. Watson Bowman Acme Corp.
 - 6. Substitutions: See Section 016000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS

- A. General: Provide 3-inch joint assemblies at all locations, unless otherwise indicated.
 - 1. Color for all joints shall be selected from manufacturer's full range of available colors.
- B. Interior Wall Joints (Metal; Surface Mounted): Anodized aluminum plate with exposed fasteners.
 - 1. Products: (Wall-to-wall and wall-to-corner models)

- a. Architectural Art Mfg; G30-59-14 and G30-69-14.
 - b. Balco; WD-3 and WDC-3.
 - c. Construction Specialties; ASM-300 and ASMC-300.
 - d. Inpro; 801-A07-075 and 801-A09-075.
 - e. MM Systems; X-M-2 and X-N-3.
- C. Exterior Wall Joints (Preformed Foam): Pre-compressed and self-expanding, open-cell urethane foam. Pre-coated with water repellent coating on exterior surface, and with adhesive coating on sides to fit in opening.
- 1. Products:
 - a. Construction Specialties; Model VF.
 - b. EMSEAL Joint Systems, Ltd.; Colorseal.
 - c. MM Systems; Series ESS.
 - d. Schul International Company, Inc.; Color Econoseal.
 - e. Watson Bowman Acme Corp; WeatherSeal II.

2.03 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Joint Dimensions and Configurations: As indicated on drawings.
 - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 - 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Covers In Gypsum Board Assemblies: Provide style with anchoring wings that can be completely covered by joint compound.
- C. Covers In Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
 - 1. Acceptable Evaluation Agencies: UL (DIR) and ITS (DIR).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.
- B. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

3.02 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.

3.03 PROTECTION

- A. Do not permit traffic over unprotected floor joint surfaces.

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B. Provide strippable coating to protect finish surface.

END OF SECTION 079513

**SECTION 081113
STEEL DOORS AND FRAMES**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- C. BHMA A156.115 - Hardware Preparation In Steel Doors And Steel Frames 2016.
- D. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2019.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company.
 - 2. Curries, an Assa Abloy Group company.
 - 3. Fleming Door Products, an Assa Abloy Group company.
 - 4. Krieger Specialty Products.
 - 5. Mesker, dormakaba Group.
 - 6. Pioneer Industries, Inc.; an Assa Abloy Group company.
 - 7. Republic Doors, an Allegion brand.
 - 8. Steelcraft, an Allegion brand.
 - 9. Technical Glass Products.

2.02 PERFORMANCE REQUIREMENTS

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

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2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 3. Door Top and Bottom Closures: Flush end closure channel, with top and door faces aligned.
 - a. Inverted channel closure is acceptable for bottom edges and top edges of interior doors that are not exposed to view from above.
 4. Door Edge Profile: Hinged edge square, and lock edge beveled Beveled edge.
 5. Typical Door Face Sheets: Flush.
 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.
 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvannealed) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvannealed) for corrosive locations.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated. Fabricate from metallic-coated steel sheet.
 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 3 - Extra Heavy-duty.
 - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
 2. Door Core Material: Vertical steel stiffeners with fiberglass batts.
 - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
 3. Door Thermal Resistance: R-Value of 6, minimum.
 4. Door Thickness: 1-3/4 inches, nominal.
 5. Weatherstripping: Refer to Division 08 "Door Hardware".
- C. Interior Doors, Non-Fire-Rated: Fabricate from either cold-rolled steel sheet or metallic-coated steel sheet.
 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.

- d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
- 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements, except kraft paper honeycomb core is not acceptable.
- 3. Door Thickness: 1-3/4 inches, nominal.
- D. Fire-Rated Doors: Comply with NFPA 80.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Match construction and physical performance levels above for interior or exterior doors, as applicable.
 - 2. Fire Rating: As indicated, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - 3. Per NFPA 80, fire exit doors shall be labeled "Fire Door to Be Equipped with Fire Exit Hardware," and shall be reinforced and constructed to maintain the rating of the specific listed and labeled fire exit devices mounted on them.
 - 4. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - a. Attach fire rating label to each fire rated unit.
 - 5. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
 - 6. Door Thickness: 1-3/4 inches, nominal.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Exterior Door Frames: Face welded type.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 - 2. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.
 - 3. Weatherstripping: Refer to Division 08 Section "Door Hardware".
- D. Interior Door Frames, Non-Fire Rated: Face welded type.
 - 1. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.
- E. Door Frames, Fire-Rated: Face welded type.
 - 1. Fire Rating: Same as door, labeled.
 - 2. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.
- F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- G. Mullions for Pairs of Doors: Fixed, except where removable is indicated, with profile similar to jambs.
 - 1. Where removable mullion is indicated, coordinate with removable mullion to be provided as an exit device accessory per Division 08 Section "Door Hardware."
- H. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- I. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- J. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

- K. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.05 FINISHES

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

2.06 ACCESSORIES

- A. Glazing: As specified in Section 088000 and 088813.
- B. Removable and Fixed Stops: Formed sheet steel, mitered or butted corners; prepared for countersink style tamper proof screws.
 - 1. Provide fixed stops for exterior applications, and toward the secure side of interior glazed lites (for example, toward the corridor or more public accessible spaces).
 - 2. Heights of Stops: Unless otherwise indicated or recommended by glazing manufacturer, provide standard 5/8-inch height stops where allowed by standards, and provide 3/4-inch height for exterior 1-inch glazing units.
- C. Astragals and Edges for Double Doors: Pairs of door astragals, and door edge sealing and protection devices.
 - 1. Provide UL listed products, complying with NFPA 80, and as required to maintain indicated fire rating.
 - 2. Provide surface mounted overlapping-type astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.
- D. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- E. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- F. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- G. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
 - 1. Install in accordance with ANSI/SDI A250.11.
 - 2. Do not remove temporary frame spreaders until after frames have been properly set and secured.
 - B. Install fire rated units in accordance with NFPA 80.
 - C. Coordinate frame anchor placement with wall construction.
-

- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 087100.
- F. Comply with glazing installation requirements of Section 088000.
- G. Coordinate installation of electrical connections to electrical hardware items.
- H. Touch up damaged factory finishes.

3.03 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
 - 1. Comply with clearances indicated in NFPA 80 for fire-rated doors.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.

END OF SECTION 081113

**SECTION 081416
FLUSH WOOD DOORS**

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 088000 - Glazing.

1.02 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- C. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.
- D. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Samples: Submit two samples of door veneer, approximately 8 by 8 inches in size illustrating wood grain, stain color, and sheen.
- E. Warranty, executed in Owner's name.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.05 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Eggers Industries.
 - 2. Lambton Doors.
 - 3. Masonite Architectural; Aspiro Select Wood Veneer Doors.
 - 4. Oshkosh Door.
-

5. VT Industries, Inc.

2.02 DOORS

- A. Doors: See drawings for locations and additional requirements.
1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
 2. Doors shall be manufactured by the hot-press method, bonding faces, crossbands, and core together in a single operation with Type I glue. Doors manufactured by cold-pressing 2- or 3-ply pre-manufactured door skins to multiple cores in the same press will not be accepted.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
1. Provide solid core doors at each location.
 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled.
 - a. Provide stile construction with concealed intumescent seals at pairs of doors, meeting required fire-ratings without the need of astragal or metal edge construction.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), particleboard Grade LD-2 per ANSI A 208.1; plies and faces as indicated.
1. Provide structural-composite-lumber (SCLC) core for doors with glazing area cut out for 9-inch stile width doors.
 2. Provide structural-composite-lumber (SCLC) core for doors with exit devices.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Match existing in field based on field verification. For bid purposes, provide red oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
1. Vertical Edges: Any option allowed by quality standard for grade.
 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.

2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
1. Provide solid blocks at lock edge for hardware reinforcement.
- C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- F. Provide edge clearances in accordance with the quality standard specified.
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2.06 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 5, Varnish, Conversion or System 11, catalyzed polyurethane.
 - b. Stain: As selected by Architect.
 - c. Sheen: Satin.
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing where doors will be exposed to view from above.

2.07 ACCESSORIES

- A. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws. At fire-rated doors, provide noncombustible wood stops with concealed metal clips for indicated fire rating.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION 081416

**SECTION 083100
ACCESS DOORS AND PANELS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ITS (DIR) - Directory of Listed Products current edition.
- B. UL (FRD) - Fire Resistance Directory Current Edition.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of each access door and/or panel unit.
 - 1. Include a schedule indicating wall/ceiling type, door types, sizes, and hardware for each access door required.

1.03 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.
 - 1. This (083100) material specification includes access doors required for Divisions 21 (Fire Suppression), Division 22, (Plumbing), 23 (HVAC) and Division 26 (Electrical) work and any other access doors indicated on Drawings.

PART 2 PRODUCTS

2.01 WALL AND CEILING MOUNTED ACCESS UNITS

- A. Manufacturers:
 - 1. Activar Construction Products Group, Inc. - JL Industries.
 - 2. ACUDOR Products Inc.
 - 3. Babcock-Davis.
 - 4. Bauco Access Panel Solutions Inc.
 - 5. Best Access Doors.
 - 6. Cendrex, Inc.
 - 7. Karp Associates, Inc.
 - 8. Larsen's Manufacturing Company.
 - 9. Milcor, Inc.
 - 10. Nystrom, Inc.
 - 11. Williams Brothers Corporation of America.
 - 12. Substitutions: See Section 016000 - Product Requirements.
- B. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
 - 1. Material: Steel.
 - 2. Style (Gypsum Board locations): Recessed door panel for infill with wall/ceiling finish.
 - a. Gypsum Board Mounting Criteria: Use drywall bead type frame.

3. Style (Masonry locations): Exposed frame, with door surface flush with frame surface.
4. Door Style: Double-skinned hollow panel.
5. Frames: 16 gauge, 0.0598 inch, minimum thickness.
6. Double-Skinned Hollow Steel Sheet Door Panels: 16 gauge, 0.059 inch, minimum thickness, on both sides and along each edge.
7. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
 - a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
 - b. Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated doors.
 - c. Fire-rated door assemblies shall conform with and be installed in accordance with (1) NFPA 80, (2) door and frame manufacturer's installation instructions, and (3) listing requirements of qualified testing agency.
8. Steel Finish: Primed.
9. Hardware:
 - a. Hardware for Fire-Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
 - c. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION 083100

**SECTION 084313
ALUMINUM-FRAMED STOREFRONTS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.
- B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- G. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).

1.02 ADMINISTRATIVE REQUIREMENTS

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

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
 - 1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- E. Designer's Qualification Statement.

1.04 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.

- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.06 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
- C. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum-Framed Storefront - Exterior High-Performance - Double Thermal Break - Center Set - 2" x 4.5":
 - 1. EFCO Corp; 403X.
 - 2. Kawneer North America; 451UT.
 - 3. Oldcastle Building Envelope; 3000 XT.
 - 4. Tubelite, Inc; TU 24000 Thermal=block.
 - 5. YKK AP America, Inc; YES 45 XT.
- B. Aluminum-Framed Storefront - Interior - Non-Thermal - Center Set - 2" x 4.5":
 - 1. EFCO Corp; 402.
 - 2. Kawneer North America; Trifab VG 451.
 - 3. Oldcastle Building Envelope; FG 3000.
 - 4. Tubelite, Inc; E14000 Non-Thermal.
 - 5. YKK AP America, Inc; YES 45 FI.
- C. Aluminum-Framed Entrances - Standard 1.75-inch thickness, insulated:
 - 1. EFCO Corp; D500.
 - 2. Kawneer North America; 500.
 - 3. Oldcastle Building Envelope; 500.
 - 4. Tubelite, Inc; Standard Wide Stile Doors.
 - 5. YKK AP America, Inc; 50D.

2.02 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Glazing Position: Centered (front to back).
 - 2. Finish: High performance organic coatings.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - 3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments

- concealed from view; reinforced as required for imposed loads.
4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Performance Requirements:
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of ASCE 7 and as indicated on Structural drawings.
 - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
 2. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.

2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Glazing Stops: Flush.
- B. Glazing: Refer to Section 088000.
- C. Infill Spandrel Panels (Glazing Type G3): Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
1. Surface Burning Characteristics: Provide assemblies with Class A rating, with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 2. Products:
 - a. Citadel Architectural Products; GlazeGuard 1000 WR+.
 - b. Laminators, Inc; Thermolite/Omega Foam-Ply.
 - c. Mapes Architectural Products; Mapes-R Infill.
 3. Total Panel Thickness: 1 inch.
 4. Face Sheets (Front and Back): Equal 0.024-inch smooth aluminum faces bonded to nominal 1/8-inch exterior grade hardboard or high-density corrugated polypropylene.
 5. Core: Rigid polyisocyanurate insulation core; minimum total panel R-value of 6.
 6. Finish: Same as storefront.
- D. Swing Doors: Glazed aluminum.
1. Thickness: 1-3/4 inches.
 2. Top Rail: 7 inches wide.
 3. Vertical Stiles: 5 inches wide (wide stile).

4. Bottom Rail: 12 inches wide.
5. Glazing Stops: Beveled.
6. Finish: Same as storefront.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209/B209M.
- C. Fasteners: Stainless steel.
- D. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch minimum thickness or sheet aluminum, 22 gauge, 0.026 inch minimum thickness.
- E. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
- F. Sealant for Setting Thresholds: Non-curing butyl type.
- G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.05 HARDWARE

- A. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- B. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install hardware using templates provided.
- K. Install glass and infill panels using glazing method required to achieve performance criteria; refer to Section 088000.

- L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.

3.05 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 084313

**SECTION 084413
GLAZED ALUMINUM CURTAIN WALLS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.
- B. AAMA 501.4 - Recommended Static Test Method for Evaluating Window Wall, Curtain Wall and Storefront Systems Subjected to Seismic and Wind-Induced Inter-Story Drift 2018.
- C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- D. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- H. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- K. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants 2018.
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- M. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- N. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).
- O. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- P. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

1.02 ADMINISTRATIVE REQUIREMENTS

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

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.

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- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Selection Samples: Submit manufacturer's color charts illustrating manufacturer's standard range of available colors.
- E. Verification Samples: Submit physical samples, manufacturer's standard size, of each selected color.
- F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- G. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- H. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
- I. Designer's Qualification Statement.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.06 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
- C. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Glazed Aluminum Curtain Wall - Exterior High-Performance - Fiberglass Pressure Plates - Front Set - 2.5" x 6":
 - 1. EFCO Corp; 5600 XTherm.
 - 2. Kawneer North America; 1600UT.
 - 3. Oldcastle Building Envelope; Reliance Thermal.
 - 4. Tubelite, Inc; 400T Curtainwall.

5. YKK AP America, Inc; YCO 750 XT.
- B. Aluminum-Framed Entrances - Standard 1.75-inch thickness, insulated:
 1. EFCO Corp; D500.
 2. Kawneer North America; 500.
 3. Oldcastle Building Envelope; 500.
 4. Tubelite, Inc; Standard Wide Stile Doors.
 5. YKK AP America, Inc; 50D.

2.02 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 1. Outside glazed, with pressure plate and mullion cover, where indicated on drawings.
 2. Fabrication Method: Field fabricated stick system.
 3. Glazing Method: Field glazed system.
 4. Vertical Mullion Dimensions: 2-1/2 inches wide by 7-1/2 inches deep.
 5. Finish: High performance organic coatings.
 - a. Factory finish surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 6. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 7. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 8. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 9. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.
 10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
 1. Design Wind Loads: Comply with the requirements of ASCE 7 and as indicated on Structural drawings.
 - a. Measure performance by testing in accordance with ASTM E330/E330M, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.
 - b. Member Deflection: For spans less than 13 feet 6 inches, limit member deflection to flexure limit of glass in any direction, and maximum of 1/175 of span or 3/4 inch, whichever is less and with full recovery of glazing materials.
 - c. Member Deflection: For spans over 13 feet 6 inches and less than 40 feet, limit member deflection to flexure limit of glass in any direction, and maximum of 1/240 of span plus 1/4 inch, with full recovery of glazing materials.

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2. Interstory Differential Lateral Movement: Meeting pass/fail criteria of AAMA 501.4 for Use Group I, Standard Occupancy, when tested at design displacement of 0.010 times greater adjacent story height, maximum, and 1.5 times design displacement, through three complete cycles.
3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
 - a. Expansion and contraction caused by 180 degrees F surface temperature.
 - b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
 - c. Movement of curtain wall relative to perimeter framing.
 - d. Deflection of structural support framing, under permanent and dynamic loads.
- C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
 1. Test Pressure Differential: 15 psf.
 2. Test Method: ASTM E331.
- D. Air Leakage: 0.06 cfm/sq ft maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.27 psf pressure difference across assembly.
- E. Thermal Performance Requirements:
 1. Condensation Resistance Factor of Framing: 56, minimum, measured in accordance with AAMA 1503.
 2. Overall U-value Including Glazing: 0.38 Btu/(hr sq ft deg F), maximum.

2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Framing members for interior applications need not be thermally broken.
 2. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: As specified in Section 088000.
- C. Infill Spandrel Panels (Glazing Type G3): Insulated, aluminum sheet face and back, with edges formed to fit glazing channel and sealed.
 1. Surface Burning Characteristics: Provide assemblies with Class A rating, with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 2. Products:
 - a. Citadel Architectural Products; GlazeGuard 1000 WR+.
 - b. Laminators, Inc; Thermolite/Omega Foam-Ply.
 - c. Mapes Architectural Products; Mapes-R Infill.
 3. Total Panel Thickness: 1 inch.
 4. Face Sheets (Front and Back): Equal 0.024-inch smooth aluminum faces bonded to nominal 1/8-inch exterior grade hardboard or high-density corrugated polypropylene.
 5. Core: Rigid polyisocyanurate insulation core; minimum total panel R-value of 6.
 6. Finish: Same as curtain wall.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
 - B. Sheet Aluminum: ASTM B209 (ASTM B209M).
-

- C. Structural Steel Sections (Reinforcing): ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Structural Supporting Anchors Attached to Structural Steel: Design for bolted attachment.
- E. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- F. Concealed Flashings: Stainless steel, 26 gauge, 0.0187 inch minimum thickness or sheet aluminum, 22 gauge, 0.026 inch minimum thickness.
- G. Firestopping: As specified in Section 078400.
- H. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- I. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, and compatible with flashing material.
- J. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- K. Glazing Accessories: As specified in Section 088000.
- L. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.05 FINISHES

- A. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.
- B. Color: To be selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

- A. Install curtain wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Install firestopping at each floor slab edge in accordance with tested assembly.
- H. Pressure Plate Framing: Install glazing and infill panels in accordance with Section 088000, using exterior dry glazing method.
- I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A. Provide services of curtain wall manufacturer's technical representative to inspect for proper installation of system and submit report.

3.05 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.

3.06 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 084413

**SECTION 085653
SECURITY WINDOWS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- D. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- E. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).
- F. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- G. SSPC-Paint 33 - Coal Tar Mastic Coating, Cold-Applied 2006, with Editorial Revision (2015).
- H. UL 752 - Standard for Bullet-Resisting Equipment Current Edition, Including All Revisions.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Furnish anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, to be embedded into concrete or masonry, with setting diagrams and installation, to applicable installer in time for installation.
- B. Preinstallation Meeting: Prior to start of installation arrange a meeting on site to familiarize installer and installers of related work with requirements relating to this work.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's published data showing materials, construction details, dimensions of components, and finishes.
- C. Shop Drawings: Drawings prepared specifically for this project, showing plans, elevations, sections, details of construction, anchorage to other work, hardware, and glazing.
 - 1. For existing openings show verified field dimensions.
 - 2. Show required opening dimensions and allowance for field deviation.
- D. Test Reports: Test reports for specific window model and glazing to be furnished, showing compliance with specified requirements; window and glazing may be tested separately, provided window test sample adequately simulates the glazing to be used.
 - 1. Include testing agency qualifications.
 - 2. For structural, forced entry, and ballistic tests, provide details on method of anchorage to test frame.
 - 3. Reports for thermal requirements may be based on calculations, in accordance with the specified standard.
- E. Selection Samples: Color charts for factory finishes.

- F. Verification Samples:
 - 1. Actual sections of frame members, at least 12 inch long, showing finish, weatherstripping, and fasteners.
- G. Installer's Qualification Statement.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Independent testing agency able to show experience in conducting tests of the type specified.
- B. Installer Qualifications: Company specializing in performing work of the type specified; certified or approved in writing by security window manufacturer.
- C. Welder Qualifications: Qualified in accordance with AWS procedures for type of welding required.

1.05 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Provide manufacturer's warranty agreeing to repair or replace windows and window components that fail within three years after Date of Substantial Completion due to, but not limited to, the following:
 - 1. Structural failure, failure of welds, and deterioration of metals and finishes beyond that expected under detention use and normal weathering.
 - 2. Failure of glazing due to excessive deflection of supporting members under wind load.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Security Transaction Windows (Ticket Window) with Pass-Through Device:
 - 1. Armortex.
 - 2. C.R. Laurence Co., Inc.
 - 3. Creative Industries, Inc.
 - 4. Quikserv Corporation.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Provide windows from a single manufacturer.

2.02 ASSEMBLIES

- A. Security and Detention Windows:
 - 1. Dimensions, profiles, features, and performance specified and indicated on drawings are required; do not deviate unless specifically approved by Architect under substitution procedures; see Section 016000.
 - 2. Design to fit openings indicated on drawings; design to accommodate deviation of actual construction from dimensions indicated on drawings.
 - 3. Fabricate frames and sash with corners mitered or coped full depth with concealed welded joints.
 - 4. Design anchorages to provide performance equivalent to that required for window unit; provide anchorages at least equivalent to those by which the tested units were anchored to the test frame.
 - 5. Separate dissimilar metals to prevent corrosion by galvanic action by painting contact surfaces with primer or with sealant or tape recommended by manufacturer for the

- purpose.
6. Weld components before finishing and in concealed locations, to greatest extent possible; minimize distortion and discoloration of finish; remove residue of welding; grind exposed welds smooth and finish to match.
 7. Label units to indicate which side is which, such as inside/outside or secure/non-secure; use labels that are removable after installation but durable enough not to be lost during delivery, storage, handling, and installation.
- B. Exterior Window Requirements: Comply with following performance requirements as well as other specified criteria.
1. Structural Performance: Capable of withstanding wind loads as specified by code without permanent deformation or breakage of components, when tested in accordance with ASTM E330/E330M.
 2. Deflection of Framing Members Supporting Glass: Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edge to less than 1/175 of their lengths under specified design load.
 3. Air Leakage of Fixed Windows: 0.10 cfm/sq ft maximum leakage for fixed window units when tested at 6.27 psf pressure difference in accordance with ASTM E283/E283M.
 4. Water Penetration: None, when tested in accordance with ASTM E331 at test pressure difference of 2.86 psf.
 5. Thermal Performance: Whole-window U-value of 0.38 Btu/sq ft h degF at 15 mph exterior wind velocity and winter condition temperatures.
 6. Provide thermally improved construction using integral, low conductance thermal barrier in frame and sash members.
 7. Provide weep holes and internal water passages to conduct infiltrated water to exterior.
 8. Provide water shed members where sash frames lap in wrong direction to shed water.
 9. Provide factory-installed weatherstripping on operable sash.

2.03 SECURITY TRANSACTION WINDOWS WITH PASS-THROUGH DEVICE

- A. Security Transaction Windows with Pass-Through Device:
1. Location: Built within exterior wall, as indicated on drawings.
 2. Type of Use: Walk-up.
 3. Ballistic Resistance: Tested to meet UL 752, Level 1.
 4. Window Type: Fixed.
 - a. Overall Window Frame Size: As indicated on drawings.
 - b. Frame Material: Aluminum.
 - 1) Finish: Natural anodized.
 5. Glazing: Insulating glass, clear, and ballistic resistant safety glazing.
 6. Pass-Through Device: Slide-up or hinged tilt up rectangular window, approx 8 - 9 inches wide by 3 - 4 inches high, as standard with manufacturer; with Level 1 ballistic resistance. Pass-through automatically drops back into closed position when not in use.
 7. Countertop: Provide integral stainless steel countertop. Custom size countertop for depth of wall plus 4 inches on each side.
 8. Communication: Standard talk-through portal, round, with Level 1 ballistic resistance.

2.04 ASSEMBLY COMPONENTS

- A. Aluminum Framing: ASTM B221 (ASTM B221M) extrusions of alloy and temper selected by manufacturer for strength, corrosion resistance, and finish required; not less than 1/8 inch thick at any location of frame and sash members.

- B. Weeps: Include integral weeps for exterior window framing to drain water to the exterior along horizontal framing members.
- C. Frame Anchors: Mild steel plates, shapes, or bars, concealed in completed construction; provide anchorage devices as necessary to securely fasten windows to adjacent construction; use security fasteners for exposed anchors.
 - 1. For Setting in Masonry: Minimum 3/16 inch thick angles or plates, minimum 4 inches long with hooked ends, welded to back of window frame.
 - 2. Provide minimum of two anchors per side of window plus one additional anchor for each 18 inches or fraction thereof more than 36 inches in height or width.
- D. Weatherstripping: Factory installed; molded EPDM or neoprene.
- E. Glazing Seals: Factory installed; molded EPDM or neoprene compressible gaskets and compression strips.
- F. Security Fasteners: Operable only by tools produced by fastener manufacturer or manufacturer's licensee; head style appropriate to installation conditions, strength, and finish of materials being fastened; use countersunk heads wherever possible.
- G. Bituminous Paint: Cold-applied asbestos-free asphalt mastic, complying with SSPC-Paint 33; 30 mils, 0.030 inch minimum thickness per coat.
- H. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.05 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Stainless Steel Finish (Countertop & Accessories):
 - 1. Satin polished (No. 4) finish, without tool or die marks, stretch lines, or scratches, with grain running in long dimension of each piece.
 - 2. Passivated, rinsed, and chemically clean.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that window openings are ready for installation of windows.
- B. Verify that correct embedded anchors are in place and in proper location; repair or replace anchors as required to achieve satisfactory installation.
- C. Notify Architect if conditions are not suitable for installation of windows; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and drawing details.
- B. Install windows in correct orientation (inside/outside or secure/non-secure).
- C. Anchor windows securely in manner so as to achieve performance specified.
- D. Separate metal members from concrete and masonry using bituminous paint.
- E. Set sill members and sill flashing in continuous bead of sealant.

3.03 ADJUSTING

- A. Adjust operating components for smooth operation while also providing tight fit at contact points and a secure enclosure; lubricate operating hardware.

3.04 CLEANING

- A. Clean exposed surfaces promptly after installation without damaging finishes.
- B. Remove and replace defective work.

END OF SECTION 085653

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Commercial door hardware for the following:
 1. Swinging doors.
 2. Other doors to the extent indicated.
 3. Aluminum door hardware.
2. Cylinders for doors specified in other Sections.
3. Electrified door hardware.

B. Related Sections include the following:

1. Division 8 Section "Steel Doors and Frames" for astragals provided as part of a fire-rated labeled assembly and for door silencers provided as part of the frame.
2. Division 8 Sections "Flush Wood Doors" and "Stile and Rail Wood Doors" for wood doors, including integral intumescent seals provided as part of fire-rated assemblies.
3. Division 11 Sections for security hollow metal work and security hardware.
4. Division 26 Sections for connections to electrical power system and for low-voltage wiring work.

C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.

1. Final replacement cores and keys to be installed by Owner. Construction cores are the property of the supplier and need to be returned to the contractor to return to the supplier.

1.3 SUBMITTALS

A. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

C. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.

1. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.
3. Content: Include the following information:
 1. Type, style, function, size, label, hand, and finish of each door hardware item.
 2. Manufacturer of each item.
 3. Fastenings and other pertinent information.
 4. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 5. Explanation of abbreviations, symbols, and codes contained in schedule.
 6. Mounting locations for door hardware.
 7. Door and frame sizes and materials.
4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

D. Product Certificates: For electrified door hardware, signed by product manufacturer.

1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

E. Keying Schedule: Prepared by or under the supervision of lock manufacturer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

F. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.

G. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Supplier Qualifications: Door hardware supplier with **local** warehousing facilities and who is or employs a qualified Architectural Hardware Consultant, available during course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and 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.

1. Electrified Door Hardware Consultant Qualifications: A qualified Architectural Hardware Consultant who is experienced in providing consulting services for electrified door hardware installations.

D. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

E. Regulatory Requirements: Comply with provisions of the following:

1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), ANSI A117.1, as follows:
 1. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape easy to grasp with one hand and not requiring tight grasping, tight pinching, or twisting of wrist.
 2. Door Closers: Comply with the following opening-force requirements:
 - 1) Interior Hinged Doors: Maximum 5 lbf applied perpendicular to door.
 - 2) Fire Doors: Minimum opening force per authorities having jurisdiction.
 3. Thresholds: Not more than 1/2 inch high, beveled with maximum slope of 1:2.
2. NFPA 101: Comply with the following for means of egress doors:
 1. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 2. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
 3. Thresholds: Not more than 1/2 inch high.

F. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches or less above the sill. (Positive pressure testing per IBC 2006).

G. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

H. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Requirements for key control system.
3. Address for delivery of keys.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site. Aluminum door hardware should be delivered to jobsite and inventoried by general contractor prior to being turned over to the aluminum door supplier when templates are not adequate to manufacture aluminum doors and frames.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver keys to Construction Manager at the Project site.

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies.

1.7 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
 - 1. Exit Devices: Two years from date of Substantial Completion.
 - 2. Manual Closers: 10 years from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets indicated in door and frame schedule, and the Door Hardware Schedule at the end of Part 3.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

2.2 HINGES AND PIVOTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hinges:
 1. Hager Companies (HAG).
 2. Lawrence Brothers, Inc. (LB).
 3. *McKinney Products Company (MCK).
 4. Stanley Commercial Hardware (STH).
2. Continuous Hinges: Stainless Steel/Barrel Construction
 1. *Pemko.
 2. Markar Products, Inc. (MP).
 3. McKinney Products Company (MCK).
 4. Stanley Commercial Hardware (STH).
3. Power Transfers for Continuous Hinges:
 1. Von Duprin (VD) (EPT).
 2. *Securitron (SEC) (CEPT-10).

B. Quantity: As scheduled.

C. Size: Provide sizes scheduled.

D. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Exterior Hinges: Brass, with stainless-steel pin body and brass protruding heads.
2. Interior Hinges: Steel, with steel pin.
3. Hinges for Fire-Rated Assemblies: Steel, with steel pin.

E. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:

1. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
 1. Out-swinging exterior doors.
2. Corners: Square.

F. Continuous-Geared Hinges: Overall width of 4 inches; fabricated to full height of door and frame. Fabricate hinges to template screw locations.

G. Electrified Functions for Hinges: Comply with the following:

1. Power Transfer: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle.

H. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors and frames.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head screws; Finish screw heads to match surface of hinges.

2.3 LOCKS AND LATCHES

A. Manufacturers:

1. *Corbin lock – No Substitutions (owner preference)

B. Mortise Locks: Stamped steel case with steel or brass parts; BHMA Grade 1, unless Grade 2 is indicated; Series 1000.

C. Auxiliary Locks: BHMA Grade 1, unless Grade 2 is indicated.

D. Certified Products: Provide door hardware listed in the following BHMA directories:

1. Mechanical Locks and Latches: BHMA's "Directory of Certified Locks & Latches."

E. Lock Trim: Comply with the following:

1. Lever: Cast
2. Escutcheon (Rose): Cast
3. Lockset Designs: Provide the lockset design designated in schedule or, if sets are provided by another manufacturer, provide designs that match those designated.

F. Lock Functions: Function numbers and descriptions indicated in the Door Hardware Schedule comply with the following:

1. Mortise Locks: BHMA A156.13.

G. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Mortise Locks: Minimum 3/4-inch latchbolt throw.

H. Backset: 2-3/4 inches, unless otherwise indicated.

I. Cylindrical Locks: BHMA Grade 1, Series 4000. Corbin CL3300 N23 Series.

2.4 EXIT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. *Sargent Manufacturing Company (SGT) (80 Series).
2. Corbin Lock: Series ED5000.

B. Certified Products: Exit devices listed in BHMA's "Directory of Certified Exit Devices."

C. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

D. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

E. Outside Trim: Lever with cylinder material and finish to match locksets.

1. Match design for locksets and latchsets, unless otherwise indicated.

2.5 KEYING SYSTEM

A. Standard Lock Cylinders: BHMA A156.5, Grade 1.

B. Cylinders: Manufacturer's standard tumbler type with removable cores, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Seven.

2. Mortise Type: Threaded cylinders with rings and cam as required.
 3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
- C. Construction Keying: Comply with the following:
1. Construction Master Keys: Provide 45 construction cores. Provide 5 construction master keys.
- D. Manufacturer: Corbin Locks – No substitutions.

2.6 KEY REQUIREMENTS

- A. Upon receipt of approved Hardware Schedule, arrange an interview with the contractor and owner's representative to obtain and determine necessary keying information.
1. Metals: Construct lock cylinder parts from brass, bronze, stainless steel or nickel silver.
 2. Cores shall be Sargent and identified on the core face.
 3. All locksets, exit devices, and padlocks shall accept same.
 4. Exterior Doors shall be furnished with a construction core master keying system for interim use during construction.
- B. Stamp each key with change number and stamp set symbol; and stamp each master key with set symbol, as applicable.
1. Provide change keys in individual envelopes for each cylinder delivered.
 2. Envelopes shall be marked with respective door identification numbers.
 3. The inscription "Do Not Duplicate" shall be stamped on all change keys.
- C. Keys shall be supplied in the following quantities; confirm with Construction Manager.
1. Construction Keys: Eight (8)
 2. Grandmaster Keys: Two (5)
 3. Masterkeys (each Masterkey set): Five (5)
 4. Change Keys per Lock: Three (3)
- D. Deliver master keys and key blanks to Construction Manager at the Project site.

2.7 KEY CONTROL SYSTEM

- A. Key Control Cabinet: BHMA A156.5, Grade 1; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 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: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock. Locate cabinet per owner's instructions.
- B. Cross-Index System: Single-index system for recording key information. Include three receipt forms for each key-holding hook.
1. Available Manufacturers:
 1. Key Control Systems, Inc. (KCS).
 2. Lund Equipment Co., Inc. (LUN).
 3. MMF Industries (MMF).
 4. Sunroc Corporation (SUN).

2.8 ELECTRIC STRIKES

A. Standard: BHMA A156.31, Grade 1.

B. General: Use fail-secure electric strikes with fire-rated devices.

C. Available Manufacturers:

1. Folger Adam Security Inc. (FAS).
2. *HES, Inc. (HES).
3. Von Duprin (VD).

2.9 POWER SUPPLIES, MAGNETIC LOCKS

A. *Securitron (SEC), Precision Hardware, Inc. (PH).

2.10 ACCESSORIES FOR PAIRS OF DOORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Removable Mullions:
 1. *Sargent Manufacturing Company (SGT).

2.11 CLOSERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Surface-Mounted Closers: No Substitutions
 1. *Sargent Manufacturing Company (SGT) (351 Series).
 2. LCN Manufacturing Company (4040/4041 Series).
 3. Norton (7500 Series)

B. Surface Closers: BHMA Grade 1

C. Certified Products: Provide door closers listed in BHMA's "Directory of Certified Door Closers."

D. Size of Units: Comply with manufacturer's written recommendations 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. Provide new handed closers.

2.12 AUTO DOOR OPERATORS: (if required)

A. Furnish and install 4100 LE Swing Door Operator, complete with controls, as manufactured by Horton Automatics, a Division of Overhead Door Corporation or Equal

B. ANSI A156.9 STANDARD: Provide automatic entrance doors that comply with applicable requirements of Low-energy Automatic Door Standard.

C. UL 325: Provide powered door operators that comply with UL 325, Electrical Door, Drapery, Gate, Louver and Window Operators and Systems.

D. MANUFACTURER'S QUALIFICATIONS: Provide units produced by a firm with minimum five years experience in the fabrication of automatic doors of the type required for this project.

E. INSTALLER'S QUALIFICATIONS: Provide operators installed by Installer who is an authorized representative of the automatic entrance door manufacturer for both the installation and maintenance of the type of units required for this project. Operators are furnished and installed by this section.

F. Units to be warranted against defect in material and workmanship for a period of one year from the date of the Installation.

2.13 PROTECTIVE TRIM UNITS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Metal Protective Trim Units:
 1. Hager Companies (HAG).
 2. Ives: H. B. Ives (IVS).
 3. *Rockwood Manufacturing Company (RM).

B. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.

C. Furnish protection plates sized 2 inches less than door width on push side and 1 inch less than door width on pull side, by height specified in Door Hardware Schedule.

2.14 STOPS AND HOLDERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Door Controls International (DCI).
2. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
3. Hager Companies (HAG).
4. Ives: H. B. Ives (IVS).
5. *Rockwood Manufacturing Company (RM).

B. Stops and Bumpers: BHMA Grade 1.

C. Combination Overhead Stops and Holders: BHMA Grade 1, unless Grade 2 is indicated.

D. Electromagnetic Door Holders: (If required)

1. *ABH (AB).
2. Rixson (RIX).
3. LCN (LCN).

E. Floor Stops: For doors, unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic.

1. Where floor or wall stops are not appropriate, provide overhead holders.

2.15 DOOR GASKETING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Door Gasketing:
 1. National Guard Products, Inc. (NGP).
 2. *Pemko Manufacturing Co., Inc. (PEM).
 3. Reese Enterprises, Inc. (RE).
 4. Zero International, Inc. (ZRO).

2. Door Bottoms:
 1. National Guard Products, Inc. (NGP).
 2. *Pemko Manufacturing Co., Inc. (PEM).
 3. Reese Enterprises, Inc. (RE).
 4. Zero International, Inc. (ZRO).

B. General: Provide continuous weather-strip gasketing on exterior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
3. Door Bottoms: Apply to door bottom, forming seal with threshold when door is closed.

2.16 THRESHOLDS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. National Guard Products, Inc. (NGP).
2. *Pemko Manufacturing Co., Inc. (PEM).
3. Reese Enterprises, Inc. (RE).
4. Zero International, Inc. (ZRO).

2.17 MISCELLANEOUS DOOR HARDWARE

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hager Companies (HAG).
2. Ives: H. B. Ives (IVS).
3. *Rockwood Manufacturing Company (RM).

B. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems, where applicable.

C. Auxiliary Hardware: BHMA Grade 1, unless otherwise indicated.

2.18 FABRICATION

A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal, 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 BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. 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. Steel Machine or Wood Screws: For the following fire-rated applications:
 1. Mortise hinges to doors.
 2. Strike plates to frames.
 3. Closers to doors and frames.
3. Steel Through Bolts: For the following fire-rated applications, unless door blocking is provided:
 1. Surface hinges to doors.
 2. Closers to doors and frames.
 3. Surface-mounted exit devices.
4. Spacers or Sex Bolts: For through bolting of hollow metal doors.
5. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.19 FINISHES

- A. Standard: Comply with BHMA A156.18.
- 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 within the range of approved Samples and assembled or installed to minimize contrast.
- D. BHMA Designations: Comply with base material and finish requirements indicated by the following:
 1. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
 2. BHMA 628: Satin aluminum, clear anodized, over aluminum base metal.
 3. BHMA 630: Satin stainless steel, over stainless-steel base metal.
 4. BHMA 652: Satin chromium plated over nickel, over steel base metal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: Comply with DHI A115 series.

1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

B. Wood Doors: Comply with DHI A115-W series.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Door Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI WDHS.3, Locations for Wood Doors."
3. Use elementary mounting heights at elementary schools.

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 protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

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 according to industry standards.

C. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.

1. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

D. Thresholds: Set thresholds for exterior doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

3.4 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. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
2. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:

1. Examine and readjust each item of door hardware as necessary to ensure function of doors, and door hardware, and electrified door hardware.
2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.5 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 door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DOOR HARDWARE SCHEDULE

- A. All wall stops are cast. Use floor stops where wall stops will not work and overhead stops are not scheduled.

NOTE: Supplier to field survey existing frames for hardware compatibility.

SET 1

2	EACH	CONT HINGE	XFC __ x PT
2	EACH	TRANSFER	CEPT-10 630
1	EACH	KEYED MULLION	L980 x US28
1	EACH	MULLION KIT	980C1 26D LESS CYLINDER
1	EACH	CYLINDER	1080-114-A02-7-626 CT7
1	EACH	CORE	8000-7 626
2	EACH	EXIT	LC-55-56-8804 ETL 630
2	EACH	RIM CYLINDER	3080-178-7-626 CT7
2	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-CPS x RH
1	EACH	FILLER	EN581-2
1	EACH	BKT	EN125V
1	EACH	AUTO OPERATOR	4100LE CL x LH
1	EACH	O.H. STOP	690S 626
2	EACH	ACTUATOR	10PBS1 (EXT AND VEST)
1	EACH	INTERFACE RELAY	BR3
1	EACH	POWER SUPPLY	BPS24-2
2	EACH	DOOR POSITION SWITCH	679-05HM
1	EACH	THRESHOLD	172A
2	EACH	BOTTOM	309AP
2	EACH	PUSH BUTTON	PB3ER

SEALS AND ASTRAGALS BY DOOR SUPPLIER

DPS MONITORS DOOR STATUS. CARD READER UNLOCKS DOORS, SHUNTS DPS SIGNAL AND ACTIVATES EXTERIOR ACTUATOR BUTTON ALLOWING H.C. ENTRY. INTERIOR ACTUATOR UNLOCKS DOORS, SHUNTS DPS AND ALLOWS H.C. EGRESS. PUSH BUTTONS IN ADMIN AND SECURITY PERFORM SAME FUNCTION AS CARD READER OPERATION.

DOOR: 101B

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
Architect's Project No: 611565

SET 2

2	EACH	CONT HINGE	XFC _ _
1	EACH	KEYED MULLION	L980 x US28
1	EACH	MULLION KIT	980C1 26D LESS CYLINDER
1	EACH	CYLINDER	1080-114-A02-7-626 CT7
1	EACH	CORE	8000-7 626
2	EACH	EXIT	16-LC-8804 ETL 630
2	EACH	MORTISE CYLINDER	1080-114-A02-7-626 CT7
2	EACH	RIM CYLINDER	3080-178-7-626 CT7
4	EACH	CORE	8000-7 626
2	EACH	DOOR CLOSER	EN351-CPS
2	EACH	FILLER	EN581-2
2	EACH	BKT	EN125V
2	EACH	DOOR POSITION SWITCH	679-05HM
1	EACH	THRESHOLD	172A
2	EACH	BOTTOM	309AP

SEALS AND ASTRAGALS BY DOOR SUPPLIER

DOOR: A101B

SET 3

2	EACH	CONT HINGE	XFC _ _ x PT
2	EACH	TRANSFER	CEPT-10 630
1	EACH	KEYED MULLION	L980 x US28
1	EACH	MULLION KIT	980C1 26D LESS CYLINDER
1	EACH	CYLINDER	1080-114-A02-7-626 CT7
1	EACH	CORE	8000-7 626
2	EACH	EXIT	LC-55-56-8804 ETL 630
2	EACH	RIM CYLINDER	3080-178-7-626 CT7
2	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-CPS x RH
1	EACH	FILLER	EN581-2
1	EACH	BKT	EN125V
1	EACH	AUTO OPERATOR	4100LE CL x LH
1	EACH	O.H. STOP	690S 626
2	EACH	ACTUATOR	10PBS1 (EXT AND VEST)
1	EACH	INTERFACE RELAY	BR3
1	EACH	POWER SUPPLY	BPS24-2
2	EACH	DOOR POSITION SWITCH	679-05HM

SEALS AND ASTRAGALS BY DOOR SUPPLIER

DPS MONITORS DOOR STATUS. CARD READER UNLOCKS DOORS, SHUNTS DPS SIGNAL AND ACTIVATES VESTIBULE ACTUATOR BUTTON ALLOWING H.C. ENTRY. CORRIDOR ACTUATOR UNLOCKS DOORS, SHUNTS DPS AND ALLOWS H.C. EGRESS.

DOOR: A101D

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
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SET 4

2	EACH	CONT HINGE	XFC __
1	EACH	KEYED MULLION	L980 x US28
1	EACH	MULLION KIT	980C1 26D LESS CYLINDER
1	EACH	CYLINDER	1080-114-A02-7-626 CT7
1	EACH	CORE	8000-7 626
2	EACH	EXIT	16-LC-8804 ETL 630
2	EACH	MORTISE CYLINDER	1080-114-A02-7-626 CT7
2	EACH	RIM CYLINDER	3080-178-7-626 CT7
4	EACH	CORE	8000-7 626
2	EACH	DOOR CLOSER	EN351-CPS
2	EACH	FILLER	EN581-2
2	EACH	BKT	EN125V

SEALS AND ASTRAGALS BY DOOR SUPPLIER

DOOR: A101C

SET 5

1	EACH	CONT HINGE	XFC __ x PT
1	EACH	TRANSFER	CEPT-10 630
1	EACH	ELECTRIC LOCK	CL33905 x NZD x 626 x CT7 x M92
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	DOOR POSITION SWITCH	679-05HM
1	EACH	POWER SUPPLY	BPS24-1
2	EACH	PUSH BUTTON	PB3ER

CARD READER UNLOCKS DOOR, SHUNTS DPS SIGNAL. PUSH BUTTONS IN ADMIN AND SECURITY UNLOCKS DOOR AND SHUNTS DPS FOR REMOTE ENTRY. REQUEST TO EXIT IN LEVER SHUNTS DPS FOR EGRESS.

DOOR: A102A

SET 6

1	EACH	CONT HINGE	XFC __
1	EACH	LOCKSET	CL3362 NZD 626 x CT7
2	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	O.H. STOP (FILLER NEEDED BY FRAME SUPPLIER AT STOP)	590S x 626

DOOR: A102B

SET 7

1	EACH	CONT HINGE	XMC _ _
1	EACH	ARMORED LOOP	TSB-C (DOOR CORD)
1	EACH	ELECTRIC LOCK	CL33905 x NZD x 626 x CT7 x M92
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	FILLER STOP	441H 626 (ALLOW MAX DOOR SWING)
3	EACH	SILENCER	608
1	EACH	SURFACE DPS	BY ACCESS CONTROL PROVIDER
1	EACH	POWER SUPPLY	BPS24-1

REUSE EXISTING FRAME

CARD READER BY OTHER TRADES UNLOCKS DOOR AND SHUNTS DPS SIGNAL. REQUEST TO EXIT IN LEVER SHUNTS DPS FOR EGRESS.

DOOR: A113

SET 8

1	EACH	CONT HINGE	XMC _ _
1	EACH	ARMORED LOOP	TSB-C (DOOR CORD)
1	EACH	ELECTRIC LOCK	CL33905 x NZD x 626 x CT7 x M92
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	O.H. STOP	590S 626
3	EACH	SILENCER	608
1	EACH	SURFACE DPS	BY ACCESS CONTROL PROVIDER
1	EACH	POWER SUPPLY	BPS24-1

REUSE EXISTING FRAME – GC – REHAND AND CUT IN NEW STK.

CARD READER BY OTHER TRADES UNLOCKS DOOR AND SHUNTS DPS SIGNAL. REQUEST TO EXIT IN LEVER SHUNTS DPS FOR EGRESS.

DOOR: A135

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
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SET 9

2	EACH	CONT HINGE	XFC __ x PT
2	EACH	TRANSFER	CEPT-10 630
1	EACH	KEYED MULLION	L980 x US28
1	EACH	MULLION KIT	980C1 26D LESS CYLINDER
1	EACH	CYLINDER	1080-114-A02-7-626 CT7
1	EACH	CORE	8000-7 626
1	EACH	ELECT EXIT	LC-55-56-8804 ETL 630 RHR
1	EACH	ELECT EXIT	55-8810 x 630 LHR
1	EACH	RIM CYLINDER	3080-178-7-626 CT7
1	EACH	CORE	8000-7 626
2	EACH	DOOR CLOSER	EN351-CPS
2	EACH	FILLER	EN581-2
2	EACH	BKT	EN125V
1	EACH	POWER SUPPLY	BPS24-1
2	EACH	DOOR POSITION SWITCH	679-05HM
1	EACH	THRESHOLD	172A
2	EACH	BOTTOM	309AP

SEALS AND ASTRAGALS BY DOOR SUPPLIER

DPS MONITORS DOOR STATUS. CARD READER UNLOCKS DOORS, SHUNTS DPS SIGNAL.
REQUEST TO EXIT IN BAR SHUNTS DPS FOR AUTHORIZED EGRESS.

DOORS: D116A, D116B

SET 10

2	EACH	CONT HINGE	XMC __
2	EACH	FLUSH BOLT	555 - 12" 626
1	EACH	D.P. STRIKE	570 626
1	EACH	ELECT LOCKSET	CL3357 x NZD x 626 CT6
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-CPSH (ACT)
1	EACH	O.H. STOP	590H 626 (INACT)
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
2	EACH	DOOR POSITION SWITCH	BY ACCESS CONTROL PROVIDER
1	EACH	THRESHOLD	172A
2	EACH	DOOR BOTTOM	3452ANB
1	SET	ASTRAGAL	18041 CNB
1	SET	SEAL	S88D
1	EACH	DRIP	346C

DPS MONITORS DOOR STATUS.

DOOR: D117

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
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SET 11

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3351 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	WALL STOP	403 626
1	EACH	SEAL	S88D (OMIT AT ALUM FRAMES)
1	EACH	COAT HOOK	RM801 x WS x 626

DOORS: A104, A105, A106, A107, A110, A112, A139

SET 12

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3351 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	WALL STOP	403 626

DOOR: A103

SET 13

3	EACH	HINGE	TA2714 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3351 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	WALL STOP	403 626
1	EACH	SEAL	S88D (OMIT AT ALUM FRAMES)
1	EACH	COAT HOOK	RM801 x WS x 626

DOORS: A141, A145, A138, A129, A130, A131

SET 14

1	EACH	CONT HINGE	XMC _ _
1	EACH	LOCKSET	CL3351 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	WALL STOP	403 626
1	EACH	SEAL	S88D
1	EACH	COAT HOOK	RM801 x WS x 626

GC – REVERSE DOOR SWING AND CUT NEW STK AS REQUIRED.

DOORS: A127, A128

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
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SET 15

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3351 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	O.H. STOP	690S 626

SEALS BY FRAME SUPPLIER.

DOORS: D121A, D121B, A116

SET 16

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	PRIVACY	CL3320 NZD 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	MOP PLATE	K1050 4" X 1" LDW 630
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	608

DOORS: A111, A117, A147, A133

SET 17

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	PRIVACY	CL3320 NZD 626
1	EACH	MOP PLATE	K1050 4" X 1" LDW 630
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	608

DOOR: 148

SET 18

3	EACH	HINGE	T4A3786 5" X 4-1/2" 26D
1	EACH	PRIVACY	CL3320 NZD 626
1	EACH	ARMOR PLATE	K1050 28" X 2" LDW 630
1	EACH	MOP PLATE	K1050 4" X 1" LDW 630
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	608

DOOR: A149

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
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SET 19

1	EACH	CONT HINGE	XMC _ _
1	EACH	LOCKSET	CL3329 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	MOP PLATE	K1050 4" X 1" LDW 630
1	EACH	WALL STOP	403 x 626
3	EACH	SILENCER	608
3	EACH	EMERGENCY KEYS	

GC – RESWING DOOR AND FIELD CUT STRIKE.

DOOR: A132

SET 20

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3329 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	MOP PLATE	K1050 4" X 1" LDW 630
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	608
3	EACH	EMERGENCY KEYS	

DOORS: D124, D125

SET 21

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	608

DOOR: A134

SET 22

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3355 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	608

DOORS: A114A, D122, D119

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
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SET 23

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	WALL STOP	403 626
1	SET	SEAL	S88D

DOORS: A108, A140

SET 24

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	O.H. STOP	590S 626
1	SET	SEAL	S88D

DOORS: D101, D107

SET 25

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-CPS
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	SET	SEAL	S88D

DOORS: A118, A143, A137

SET 26

1	EACH	CONT HINGE	XMC _ _
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	WALL STOP	403 x 626
1	EACH	SEAL	S88D

CUT FRAME FOR NEW STRIKE.

DOOR: A114

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
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SET 27

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3351 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	O.H. STOP	1540S 626
3	EACH	SILENCER	608

DOOR: A126

SET 28

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3351 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	FLOOR STOP	441H 626

SEALS BY DOOR SUPPLIER.

DOOR: A125

SET 29

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3362 NZD 626 CT7
2	EACH	CORE	8000-7 626
1	EACH	O.H. HOLDER	590H 626
1	SET	SEAL	S88D

DOOR: A150B

SET 30

3	EACH	HINGE	T4A3786 5" X 4-1/2" 26D
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	O.H. STOP	590S 626
3	EACH	SILENCER	608

DOORS: A150A, A151, D06

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
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SET 31

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	WALL STOP	403 626
3	EACH	SILENCER	608

DOOR: D114

SET 32

1	EACH	CONT HINGE	XMC _ _
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	O.H. STOP	590S 626
1	SET	SEAL	S88D

DOORS: A102C, D102, D105

SET 33

1	EACH	CONT HINGE	XMC _ _
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	WALL STOP	403 626
1	EACH	SEAL	S88D

DOORS: A109, A119

SET 34

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3355 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	O.H. STOP	1540S 626
3	EACH	SILENCER	608

DOOR: A144

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
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SET 35

2	EACH	CONT HINGE	XFC _ _
2	EACH	EXIT DEVICE	NB-AD8643 ETL 630
2	EACH	CYLINDER	1080-114-A02-7 626 CT7
2	EACH	CORE	8000-7 626
2	EACH	DOOR CLOSER	EN351-CPSH
2	EACH	FILLER	EN581-2
2	EACH	BKT	EN125V

SEALS BY DOOR SUPPLIER.

DOOR: A121

SET 36

3	EACH	HINGE	T4A3786 5" X 4-1/2" 26D
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	WALL STOP	403 x 626
1	SET	SEAL	S88D

DOOR: A142A

SET 37

3	EACH	CONT HINGE	XMC _ _
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	WALL STOP	403 x 626
1	SET	SEAL	S88D

DOOR: A142B

SET 38

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3351 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	WALL STOP	403 x 626
1	EACH	THRESHOLD	151A
1	SET	SEAL	S88D
1	EACH	AUTO BOTTOM	434APKL

DOORS: D120, D194

DOOR HARDWARE

087100 - 24

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
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SET 39

1	EACH	CONT HINGE	XMC __
1	EACH	EXIT DEVICE	12-8804 ETL 630
1	EACH	CYLINDER	3080-178-7 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-P10
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	WALL STOP	403 x 626
1	EACH	THRESHOLD	151A
1	SET	SEAL	S88D
1	EACH	AUTO BOTTOM	434APKL

DOORS: D118B, D123B

SET 40

2	EACH	CONT HINGE	XMC __
1	EACH	EXIT DEVICE	12-NB8706 ETL 626 RHR
1	EACH	EXIT DEVICE	12-NB8710 626 LHR
1	EACH	MORTISE CYLINDER	1080-114-A02-7-626 CT7
1	EACH	CORE	8000-7 626
2	EACH	DOOR CLOSER	EN351-P10
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
2	EACH	WALL STOP	403 x 626
1	EACH	THRESHOLD	151A
2	EACH	DOOR BOTTOM	434APKL
1	SET	SEAL	S88D
1	SET	ASTRAGAL	351CS 2-84"

DOORS: D118A, D123A

SET 41

1	EACH	CONT HINGE	XMC __
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	O.H. STOP	590S 626
1	SET	SEAL	S88D

DOOR: D179

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
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SET 42

1	EACH	CONT HINGE	XMC __
1	EACH	EXIT DEVICE	8804 ETL 630
1	EACH	CYLINDER	3080-178-7 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-CPS
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	THRESHOLD	151A
1	SET	SEAL	S88D
1	EACH	AUTO BOTTOM	434APKL

DOOR: D112B

SET 43

2	EACH	CONT HINGE	XMC __
1	EACH	EXIT DEVICE	NB8706 ETL 626 RHR
1	EACH	EXIT DEVICE	NB8710 626 LHR
1	EACH	MORTISE CYLINDER	1080-114-A02-7-626 CT7
1	EACH	CORE	8000-7 626
2	EACH	DOOR CLOSER	EN351-P10
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
2	EACH	WALL STOP	403 x 626
1	EACH	THRESHOLD	151A
2	EACH	DOOR BOTTOM	434APKL
1	SET	SEAL	S88D
1	SET	ASTRAGAL	351CS 2-84"

DOOR: D112A

SET 44

2	EACH	CONT HINGE	XMC __
1	EACH	EXIT DEVICE	12-NB8706 ETL 630 RHR
1	EACH	EXIT DEVICE	12-NB8710 630 LHR
1	EACH	MORTISE CYLINDER	1080-114-A02-7-626 CT7
1	EACH	CORE	8000-7 626
2	EACH	DOOR CLOSER	EN351-P10
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
1	SET	SEAL	9850C
2	EACH	WALL MAGNET	2100 x US28

MAGNETS ARE TIED INTO THE SMOKE DETECTION SYSTEM TO RELEASE.

DOORS: D108, D184

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
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SET 45

1	EACH	CONT HINGE	XMC _ _
1	EACH	EXIT DEVICE	16-8804 ETL 630
1	EACH	MORTISE CYLINDER	1080-114-A02-7-626 CT7 (DOGGING)
1	EACH	RIM CYLINDER	3080-178-7-626 CT7
2	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-P10
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	WALL STOP	403 x 626
1	SET	SEAL	S88D

DOOR: D111

SET 46

2	EACH	CONT HINGE	XMC _ _
1	SET	AUTO BOLT	2948 x 626
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
2	EACH	WALL STOP	403 x 626
1	SET	SEAL	S88D

DOOR: D115

SET 47

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3362 NZD 626 CT7
2	EACH	CORE	8000-7 626
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	O.H. HOLDER	690H 626

SEALS BY DOOR SUPPLIER.

DOORS: D103A, D103B

SET 48

3	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
1	EACH	LOCKSET	CL3355 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-H
1	EACH	KICK PLATE	K1050 8" X 2" LDW 630
1	EACH	WALL STOP	403 x 626
3	EACH	SILENCER	608

DOOR: D104

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SET 49

2	EACH	CYLINDERS AS REQ'D	
2	EACH	CORE	8000-7 626

BALANCE BY DOOR SUPPLIER.
DOOR: D100

SET 50

6	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
2	EACH	FLUSH BOLT	555 - 12" 626
1	EACH	D.P. STRIKE	570 626
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-CPS (ACT)
1	EACH	O.H. STOP	590S 626 (INACT)
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
1	SET	SEAL	S88D

DOORS: D109, D113

SET 51

6	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
2	EACH	FLUSH BOLT	555 - 12" 626
1	EACH	D.P. STRIKE	570 626
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	DOOR CLOSER	EN351-O
1	EACH	O.H. STOP	590S 626
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
1	SET	SEAL	S88D

DOORS: D110, D178

SET 52

2	EACH	CONT HINGE	XMC
1	SET	AUTO BOLT	2945 626
1	EACH	D.P. STRIKE	570 626
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	COORDINATOR	1700 x BLK
2	EACH	DOOR CLOSER	EN351-O
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
2	EACH	O.H. STOP	590S 626
1	SET	SEAL	9850C

DOOR: D186B

DOOR HARDWARE

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SET 53

2	EACH	CONT HINGE	XMC __
1	SET	AUTO BOLT	2945 626
1	EACH	D.P. STRIKE	570 626
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
1	EACH	COORDINATOR	1700 x BLK
2	EACH	DOOR CLOSER	EN351-CPS
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
1	SET	SEAL	9850C

DOOR: D186A

SET 54

6	EACH	HINGE	T4A3786 4-1/2" X 4-1/2" 26D
2	EACH	FLUSH BOLT	555 - 12" 626
1	EACH	D.P. STRIKE	570 626
1	EACH	LOCKSET	CL3357 NZD 626 CT7
1	EACH	CORE	8000-7 626
2	EACH	O.H. STOP	1540S 626
2	EACH	KICK PLATE	K1050 8" X 1" LDW 630
2	EACH	SILENCER	608

DOOR: A136

SET 55 MISC

1	EACH	KEY CABINET	1205AA
8	EACH	CONSTRUCTION MASTER KEY	
2	EACH	CONSTRUCTION EXTRACTOR KEY	
1	EACH	STAMP ALL KEYS	"DO NOT DUPLICATE"
5	EACH	GRANDMASTER KEYS	
5	EACH	MASTER KEYS PER SET	(ALLOW 5 SETS)
3	EACH	KEYS PER LOCKSET	
1	EACH	BITTING LIST	

END OF SECTION 087100

**SECTION 088000
GLAZING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C1036 - Standard Specification for Flat Glass 2021.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- F. GANA (GM) - GANA Glazing Manual 2008.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM) and IGMA TM-3000 for glazing installation methods.

1.05 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. AGC Glass North America, Inc.
 - 2. Cardinal Glass Industries.
 - 3. Guardian Glass, LLC.
 - 4. Pilkington North America Inc.
 - 5. Vitro Architectural Glass (formerly PPG Glass).

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: Calculated in accordance with ASCE 7.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 4. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and air barrier.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 - 2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 - 3. Provide Type I, Quality-Q3, Class 1 (clear) glazing unless otherwise indicated.
 - a. Tinted Glazing: Where tinted glazing is indicated, provide Class 2 (tinted).
 - 4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - 5. Patterned Glass Type: ASTM C1048, Type II - Patterned Flat Glass, Quality - Q6, Form 3 - Patterned glass, with color and performance characteristics as indicated.
 - a. "Frosted" Appearance: Provide non-directional acid-etch or simulated acid-etch "frosted"/translucent finish on one or both faces of glass lite.

2.04 INSULATING GLASS UNITS

- A. Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.

- B. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 3. Warm-Edge Spacers: Manufacturer's warm-edge technology design.
 - a. Spacer Width: As required for specified insulating glass unit.
 - b. Spacer Height: Manufacturer's standard.
 - c. Products:
 - 1) Quanex IG Systems, Inc; Super Spacer TriSeal.
 - 2) Technoform Glass Insulation; TGI-Spacer.
 - 3) Substitutions: See Section 016000 - Product Requirements.
 4. Spacer Color: Black.
 5. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
 - b. Color: Black.
 6. Purge interpane space with dry air, hermetically sealed.

2.05 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- C. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- D. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- E. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 FIELD QUALITY CONTROL

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

3.06 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.07 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

3.08 GLAZING SCHEDULE

- A. Type G1 - Monolithic Interior Vision Glazing:
 - 1. Applications: Interior glazing unless otherwise indicated.
 - 2. Glass Type: Heat-strengthened / fully tempered safety glass.
 - 3. Tint: Clear.

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4. Thickness: 1/4 inch, nominal.
 5. Glazing Method: Dry glazing method, gasket glazing.
 6. Provide with safety glazing labeling.
- B. Type G2 - Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
 2. Space between lites filled with air.
 3. Outboard Lite: Heat-strengthened / fully-tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Gray.
 - b. Coating: Low-E (passive type), on #2 surface.
 - c. Coating Products (Low-E; Gray Tinted):
 - 1) AGC; Energy Select 25 Pure Grey.
 - 2) Cardinal; ES 25 Pure Grey #2.
 - 3) Guardian; SN 68 Gray.
 - 4) Viracon; #VE3-2M.
 - 5) Vitro; Solarban 60 (2) Solargray.
 4. Warm-edge spacer.
 5. Inboard Lite: Heat-strengthened / fully-tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 6. Total Thickness: 1 inch.
 7. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.30, maximum.
 8. Solar Heat Gain Coefficient (SHGC): [_____], maximum.
 9. Glazing Method: Dry glazing method, gasket glazing.
 10. Provide with safety glazing labeling.
- C. Type G3 - Metal Spandrel: Refer to Section 084313 - Aluminum-Framed Storefronts.
- D. Type G4 - Monolithic Interior Glazing - Patterned (Frosted):
1. Applications: Interior glazing as indicated.
 2. Glass Type: Heat-strengthened / fully tempered safety glass.
 3. Pattern: Provide manufacturer's acid etch / simulated acid etch "frosted" pattern on one or both surfaces.
 4. Thickness: 1/4 inch, nominal.
 5. Glazing Method: Dry glazing method, gasket glazing.
 6. Provide with safety glazing labeling.
- E. Type G5 - Fire-Protection Rated Glazing: Refer to Section 088813 - Fire-Rated Glazing.

END OF SECTION 088000

**SECTION 088723
SAFETY AND SECURITY FILMS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- E. ASTM F1642/F1642M - Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings 2017.
- F. GSA TS01 - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings; General Services Administration 2003.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Record of product certification for safety requirements.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Shop Drawings: Detailing installation of film, anchoring accessories, and sealant.
- D. Samples: For each film product to be used, minimum size 4 inches by 6 inches, representing actual product, color, and patterns.
- E. Test Reports: Detailed reports of full-scale chamber tests to specified criteria, using assemblies identical to those required for this project.
- F. Specimen Warranty.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Certified by glazing film manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of authorities having jurisdiction.

1.05 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.06 WARRANTY

- A. Provide 10 year manufacturer's replacement warranty to cover film against peeling, cracking, discoloration, and deterioration.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. 3M Window Film.
- B. Flexvue Films.
- C. Llumar.
- D. Madico, Inc.
- E. Substitutions: See Section 016000 - Product Requirements.

2.02 SAFETY AND SECURITY GLAZING FILM

- A. Blast Resistant Glazing Film: Provide glazing assemblies with security film to provide Level 2 blast resistance when tested in accordance with ASTM F1642/F1642M / GSA TS01 at a peak pressure of 6 psi nominal; and impact resistance complying with ANSI Z97.1 and 16 CFR 1201, Category II, as specified.
 - 1. Test shall be as performed on 1/4 inch thick clear fully tempered glass.
 - 2. Surface applied film.
 - 3. Provide supplemental perimeter adhesive anchorage to secure film at preglazed storefront and similar conditions, applied to all 4 sides of opening perimeter, as required by manufacturer per conditions matching tested assembly.

2.03 MATERIALS

- A. Glazing Film: Transparent polyester film for permanent bonding to glass.
 - 1. Basis-of-Design Product: 3M Scotchshield Ultra S600.
 - 2. Thickness: 6 mils inch, minimum.
 - 3. Color: Clear.
 - 4. Construction: Multi-ply laminate.
 - 5. Adhesive Type: Pressure sensitive acrylic.
 - 6. Tensile Strength: 25,000 psi minimum when tested in accordance with ASTM D882.
 - 7. Breaking Strength: 150 psi minimum when tested in accordance with ASTM D882.
 - 8. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84 (Class A).
- B. Accessory Materials: As recommended or required by film manufacturer.
- C. Supplementary Anchors: As required by performance criteria and acceptable to Architect.
- D. Glass Cleaner: As recommended by glazing film manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Field -Applied Film: Verify that existing conditions are adequate for proper application and performance of film.

- B. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.
- C. Verify glass is not cracked, chipped, broken, or damaged.
- D. Verify that frames are securely anchored and free of defects.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.
- B. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.
- C. Protect adjacent surfaces.
- D. Do not begin installation until substrates have been properly prepared.

3.03 INSTALLATION

- A. Do not apply glazing film when surface temperature is less than 40 degrees F or if precipitation is imminent.
- B. Install in accordance with manufacturer's instructions, without air bubbles, wrinkles, streaks, bands, thin spots, pinholes, or gaps, as required to achieve specified performance.
- C. Accurately cut film with straight edges to required sizes allowing 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required by anchorage method.
- D. Seams: Seam film only as required to accommodate material sizes; form seams vertically without overlaps and gaps; do not install with horizontal seams.
- E. Supplemental Adhesive Anchorage: Install in accordance with manufacturer's instructions and shop drawings.
- F. Clean glass and anchoring accessories following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.
- G. Remove labels and protective covers.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 088723

**SECTION 088813
FIRE-RATED GLAZING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- C. GANA (GM) - GANA Glazing Manual 2008.
- D. ITS (DIR) - Directory of Listed Products current edition.
- E. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.
- F. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies 2022.
- G. UL (DIR) - Online Certifications Directory Current Edition.
- H. UL 9 - Standard for Fire Tests of Window Assemblies Current Edition, Including All Revisions.
- I. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- J. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene preinstallation meeting one week before starting work of this section; require attendance by each of affected installers.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data on Glazing Unit Glazing Types: Provide structural, physical, and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with GANA (GM) for glazing installation methods.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

1.05 FIELD CONDITIONS

- A. Ambient Conditions: Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during, and 24 hours after installation of glazing compounds.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

- B. Manufacturer Warranty for Coated or Laminated Fire Glass: Provide five-year manufacturer warranty coverage for coating deterioration or delamination, including providing products to replace failed units, and commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads and withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 2. Provide glass edge support system sufficiently stiff to limit lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 3. Glass thicknesses listed are minimum.

2.02 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
1. Kind HS - Heat-Strengthened Type: Comply with ASTM C1048.
 2. Kind FT - Fully Tempered Type: Comply with ASTM C1048.

2.03 GLAZING UNITS

- A. Type G5 - Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire rating period of 90 minutes or less.
1. Applications:
 - a. Glazing in fire-resistance-rated door assemblies.
 - b. Other locations as indicated on drawings.
 2. Glass Type: Safety ceramic glass.
 3. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
 4. Safety Glazing Certification: 16 CFR 1201 Category II.
 5. Glazing Method: As required for fire rating.
 6. Fire-Rating Period: As indicated on drawings.
 7. Markings for Fire-Protection-Rated Glazing Assemblies: Provide permanent markings on fire-protection-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction
 - a. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
 - b. "OH" - meets fire window assembly criteria, including hose stream test of NFPA 257 or UL 9 fire test standards.
 - c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire tests standards.
 - d. "XXX" - placeholder that represents fire-rating period, in minutes.
 8. Products:
 - a. SCHOTT North America Inc (D; PYRAN Platinum F (Surface-Applied Safety Film).
 - b. Technical Glass Products; Firelite NT.

- c. Vetrotech North America; Keralite F (film).

2.04 ACCESSORIES

- A. Setting Blocks: Aluminum silicate, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape: Flexible tape made from spun calcium-magnesium-silica fibers in binder; designed to remain stable at temperatures up to 2,012 degrees F.
 - 1. Thickness: As recommended by framing manufacturer for glazing application.
- D. Glazing Gaskets: Flexible intumescent seals.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION - GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers unless more stringent requirements are indicated, including those in referenced glazing standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with contaminating substances that may result from construction operations including, but not limited to weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

- A. Application - Interior Glazed: Set glazing infills from interior of building.

- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sightline.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

3.05 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than four days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

- A. After installation, mark pane with 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION 088813

SECTION 092216
COLD FORMED STEEL FRAMING - NON-STRUCTURAL (CFSF-NS)

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Refer to Section 054000 - Cold-Formed Steel Framing - Structural (CFSF-S): Requirements for structural, load-bearing, metal stud framing and overhead/suspended/bulkhead framing.

1.02 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
- G. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- H. ASTM E413 - Classification for Rating Sound Insulation 2022.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.

PART 2 PRODUCTS

2.01 FRAMING MATERIALS

- A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel.
 - 1. Steel Thickness (Studs and Runners): Minimum 0.0179-inch (18 mil / 25 gauge) unless otherwise required to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf, and as indicated below:
 - a. Provide minimum 0.0329-inch thickness (33 mil / 20 gauge - structural) for all partitions using 3-5/8-inch-deep studs where stud partition height is greater than 12 feet above floor level.
 - b. Provide minimum 0.0329-inch (33 mil / 20 gauge - Structural) for high-density board applications, such as ASTM C 1178 tile backing panels and ASTM C 1629 abuse- or impact-resistant gypsum board, and at door frames.
 - c. Provide minimum 0.0329-inch (33 mil / 20 gauge - Structural) for walls receiving heavy wall-hung items or loads, including but not limited to wall cabinets, wall-hung countertops, TV brackets, liquid tanks, folding and fixed seats, grab bars, handrails, exercise equipment, and shelving greater than 9 inches deep and over 3 feet in length.
 - 2. Studs: C shaped with knurled or embossed faces.

3. Runners: U shaped, sized to match studs.
 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
 5. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
- B. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.
- C. Non-Loadbearing Framing Accessories:
1. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
 - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
 2. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
 3. Sheet Metal Backing: 0.036 inch thick, galvanized.
 4. Fasteners: Self-tapping screws designed for attachment of metal framing and recommended by manufacturer.
 5. Anchorage Devices: Powder actuated or screw anchors with sleeves, recommended by manufacturer for anchorage to indicated substrates.
 6. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness as indicated, or sized to fit stud depth indicated.
 7. Acoustic Sealant: Refer to Division 07 Section "Joint Sealants."

2.02 GYPSUM BOARD SUSPENSION SYSTEM

- A. For interior overhead gypsum board, in lieu of separate stick built fixed-framing bulkheads and soffits fabricated of Structural Cold-Formed Steel Framing (CFSF-S), Contractor may provide a direct hung suspension system, per ASTM C645, composed of pre-fabricated beams and cross-furring members, specifically designed for use with gypsum board.
- B. Products:
1. Armstrong; Quikstix Drywall Grid System.
 2. Certainteed; 1-1/2" Drywall Suspension System.
 3. Rockfon; Chicago Metallic Drywall Grid System.
 4. USG; Drywall Suspension System.

2.03 FABRICATION

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that rough-in utilities are in proper location.

3.02 INSTALLATION OF STUD FRAMING

- A. Extend partition framing to deck at locations indicated, and to 4 inches above ceiling level at all other locations.
- B. Partitions Terminating to Deck: Secure partitions to building structure in accordance with Structural Drawings. Do not fasten runner directly to floor/roof deck; provide clearance for

firestopping. Coordinate with Section 078400 - Firestopping for head-of-wall joint firestopping assemblies and firestopping around structural elements as required.

- C. Partitions Terminating Above Ceiling: Attach studs to runner using specified mechanical devices in accordance with manufacturer's instructions. Brace runners to structural elements in accordance with Structural Drawings.
- D. Align and secure top and bottom runners at 24 inches on center.
- E. At partitions indicated with an acoustic rating:
 - 1. Provide components and install as required to produce STC ratings as indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
- F. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- G. Install studs vertically at 16 inches on center, unless otherwise indicated.
- H. Align stud web openings horizontally.
- I. Secure studs to tracks using crimping method. Do not weld.
- J. Fabricate corners using a minimum of three studs.
- K. Install double studs at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- L. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- M. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- N. Blocking: Use FRT wood blocking or metal channel stud blocking, secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, opening frames, and other built-in-place wall mounted items and equipment.
- O. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches.

3.03 GYPSUM BOARD SUSPENSION SYSTEM

- A. Install suspension system in accordance with manufacturer's instructions. Do not attach overhead suspension hangers to or suspend from steel floor or roof deck; fasten to primary structural beams/joists or provide intermediate slotted track as supplemental structure between primary structural elements.

3.04 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION 092216

**SECTION 092900
GYPSUM BOARD**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 2019.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017 (Reapproved 2022).
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.
- G. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2018.
- H. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2020.
- I. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base 2019.
- J. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- K. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing 2018.
- L. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2021.
- M. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- N. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels 2019.
- O. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels 2019, with Editorial Revision (2020).
- P. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2021.
- Q. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- R. GA-216 - Application and Finishing of Gypsum Panel Products 2021.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

- C. Test Reports: Bullet resistant sheathing and wallboard.

1.03 DELIVERY, STORAGE, HANDLING, AND FIELD CONDITIONS

- A. Do not deliver or install until building is weather-tight and conditioned.
- B. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent damage and to prevent marring and soiling of finished surfaces.
- C. Do not install gypsum products that have gotten wet or moldy, or show signs of past moisture damage.
- D. Maintain uniform temperature and humidity at occupancy conditions during and after installation. Allow products to acclimatize prior to installation.

PART 2 PRODUCTS

2.01 BOARD MATERIALS

- A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; with tapered edges.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever gypsum board is indicated in rooms subject to steam or water, including mechanical rooms, toilet rooms, custodial rooms, and kitchens.
 - 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
 - c. Curved Surfaces: Provide flexible 1/4 inch thickness gypsum board.
- B. Impact Resistant Wallboard:
 - 1. Application: High-traffic areas indicated.
 - 2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
 - 3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
 - 4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
 - 5. Hard Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
 - 6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 7. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
 - 8. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.
 - 9. Type: Fire-resistance-rated Type X, UL or WH listed.
 - 10. Thickness: 5/8 inch.
 - 11. Edges: Tapered.
 - 12. Paper-Faced Products:
 - a. American Gypsum Company; M-Bloc IR Type X.
 - b. CertainTeed Corporation; Extreme Impact Resistant Drywall with M2Tech.
 - c. Continental Building Products; Protecta HIR 300 Type X with Mold Defense.

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- d. National Gypsum Company; Gold Bond Hi-Impact XP Gypsum Board.
- e. Substitutions: See Section 016000 - Product Requirements.
- 13. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus Impact-Resistant.
 - b. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough VHI.
 - c. Substitutions: See Section 016000 - Product Requirements.
- C. Tile Backing Board:
 - 1. Application: Surfaces behind tile in wet areas including tub and shower surrounds.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. ANSI Cement-Based Board: Non-gypsum-based; cementitious panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 and ASTM C 1288 or ASTM C1325.
 - a. Thickness: 5/8 inch.
 - b. Available Products:
 - 1) FinPan, Inc.; Util-A-Crete Backer Board.
 - 2) National Gypsum Company; PermaBase Cement Board.
 - 3) USG Corporation; Durock Cement Board.
 - 4) Substitutions: See Section 016000 - Product Requirements.
- D. Exterior Sheathing Board for Ceilings and Soffits: Sizes to minimize joints in place; ends square cut.
 - 1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 2. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
 - 3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 - 4. Edges: Square.
 - 5. Available Glass Mat Faced Products:
 - a. American Gypsum Company; M-Glass Exterior Sheathing.
 - b. CertainTeed Corporation; GlasRoc Exterior Sheathing.
 - c. Continental Building Products; Weather Defense Platinum Exterior Sheathing.
 - d. Georgia-Pacific Gypsum; DensGlass Sheathing.
 - e. National Gypsum Company; Gold Bond eXP Sheathing.
 - f. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing.

2.02 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness sized to fit metal stud cavity.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant. Refer to sealant AS-1 in Division 07 Section "Joint Sealants."
- C. Putty Pads: Non-hardening endothermic material, in pad form, faced on both sides with poly liner, designed to seal around penetrations and wiring devices, enhancing acoustic performance.
 - 1. Nominal Size: 7-1/4 x 7-1/4 x 3/16 inches.
 - 2. Available Products:
 - a. 3M; Fire Barrier Moldable Putty Pads MPP+.
 - b. Hilti; Firestop Putty Pad, CFS-P PA.

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- c. Specified Technologies, Inc.; SpecSeal Putty Pad.
- D. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
 - 1. Corner Beads: Low profile, for 90 degree outside corners.
 - 2. L-Trim with Tear-Away Strip: Sized to fit gypsum wallboard size(s) indicated.
- E. Decorative Metal Trim:
 - 1. Material: Extruded aluminum alloy 6063-T5 temper.
 - 2. Finish: Anodized, clear.
 - 3. Type: Profile as selected from manufacturer's standard range.
- F. Moisture Guard Trim: ASTM C1047, rigid plastic, 48 inch length, applied to bottom edge of gypsum board.
 - 1. Height: 1-3/4 inch.
 - 2. Depth: Match gypsum board thickness.
 - 3. In lieu of moisture guard trim; Contractor may at its option install gypsum board with a 5/8-inch gap at base of wall.
- G. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
- H. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- I. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.
- J. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent.
 - 1. Available Manufacturers:
 - a. Fry Reglet.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - d. Stockton Products.
 - 2. Flat, horizontal-to-horizontal application: 2-inch wide with three rows of vent slots for a minimum of 3 square inches of opening per linear foot.
 - 3. Finish: High performance organic coating; color selected by Architect from manufacturer's full range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
- C. Putty Pads: Install putty pads on the backside of items penetrating gypsum board on walls/partitions indicated as STC-rated or indicated to receive acoustic sound batts. Items

include, but are not limited to, wiring devices, cable, conduit, and pipe. Completely cover and seal around each penetration.

3.03 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Install gypsum board with an open horizontal joint (gap) not to exceed 5/8-inch above finished floor slab, and tape and finish vertical joints to bottom edge of board to afford a smooth substrate for applied wall base.
- F. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
- G. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints in compliance with ASTM C 840, consistent with lines of building spaces, and as indicated.
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
 - 2. At exterior soffits, not more than 30 feet apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
- D. Decorative Trim: Install at locations shown on drawings and in accordance with manufacturer's instructions.
- E. Moisture Guard Trim: Install on bottom edge of gypsum board according to manufacturer's instructions at all locations where gypsum wall board extends to concrete floor slab. At Contractor's option, in lieu of moisture guard trim install gypsum board with a 5/8-inch gap between bottom of gypsum board and concrete floor slab.
- F. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations indicated on drawings. Provide vent area specified.

3.05 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.

- 3. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
- E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.06 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION 092900

**SECTION 093000
TILING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017.
- B. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.
- C. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 1999 (Reaffirmed 2021).
- D. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship 2019.
- E. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive 2019.
- F. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 2021.
- G. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy 1999 (Reaffirmed 2019).
- H. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2019).
- I. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017.
- J. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2021).
- K. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar 2020.
- L. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive 2021.
- M. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation 2014 (Reaffirmed 2019).
- N. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014 (Reaffirmed 2019).
- O. ANSI A137.1 - American National Standard Specifications for Ceramic Tile 2021.
- P. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products 2018.
- Q. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2021.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting at the Project Site one week before starting work of this section; require attendance by affected installers.
 - 1. Review substrate preparation requirements.
 - 2. Review each type of tile, mortar, grout, and TCNA installation methods.
 - 3. Review requirements for waterproofing and/or crack isolation membrane(s).

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
 - 1. Include waterproofing details at floor drains, shower pans, cove base, and thresholds.
- D. Installer's Qualification Statement.
 - 1. Submit documentation of National Tile Contractors Association (NTCA) or Tile Contractors' Association of America (TCAA) accreditation.
 - 2. Submit documentation of completion of apprenticeship and certification programs.
- E. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Installer shall have documented experience of work similar in scope, materials, and design to that indicated for this Project, with a record of successful in-service performance, with references upon request. Installer shall hold company-wide accreditation or employ individuals with one of the listed certifications (comply with at least one):
 - 1. Company-wide accreditation from one of the following:
 - a. Accredited Five-Star member of the National Tile Contractors Association (NTCA) or Trowel of Excellence member of the Tile Contractors' Association of America (TCAA).
 - 2. Installer Certification:
 - a. Ceramic Tile Education Foundation (CTEF): Certified Tile Installer (CTI).
 - b. Apprenticeship Program: Installer has achieved Journeyworker status through an apprenticeship from the International Union of Bricklayers and Allied Craftworkers (IUBAC) or a U.S. Department of Labor (DOL)-recognized program.

1.05 MOCK-UP

- A. See Section 014000 - Quality Requirements, for general requirements for mock-up.
- B. Construct tile mock-up where indicated on drawings, incorporating all components specified for the location.
 - 1. Provide mock-up of minimum 5 square feet for each type of floor tile, unless otherwise indicated.
 - 2. Provide mock-up of minimum 5 square feet for each type of wall tile, unless otherwise indicated.
 - 3. Approved mock-up may remain as part of the Work.
 - 4. Include transition between wall and base.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store tile, grout, and mortar off the ground, protected from weather and water infiltration.
- B. Store products in unopened containers or packages until ready for use.
- C. Protect materials from freezing or overheating in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature and humidity at levels required by referenced ANSI and TCNA tile standards, and per manufacturer's instructions.

PART 2 PRODUCTS

2.01 TILE

- A. Ceramic Mosaic Tile, Type CT: ANSI A137.1 standard grade.
 - 1. Size: 1 by 2 inch, nominal.
 - 2. Surface Finish: Unglazed.
 - 3. Color(s): To be selected by Architect from manufacturer's full range.
 - 4. Products:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Dal-Tile Corporation.
 - c. Deutsche Steinzeug America, Inc.
 - d. Porcelanite-Lamosa.
 - e. Interceramic.
 - B. Glazed Wall Tile, Type GWT-A1, GWT-A2: ANSI A137.1 standard grade.
 - 1. Basis of Design: Interceramic; Wall Tile Collection
 - 2. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
 - 3. Size: 6 by 6 inch, nominal; 5/16-inch thick.
 - 4. Surface Finish: To be selected by Architects from manufacturer's full range. .
 - 5. Color(s): To be selected by Architect from manufacturer's full range.
 - 6. Pattern: Stacked bond.
 - 7. Trim Units: Matching bullnose shapes in 3 by 6 inch.
 - 8. Other acceptable manufacturers:
 - a. American Olean; a division of Dal-Tile Corporation.
 - b. Dal-Tile Corporation.
 - C. Glazed Wall Tile, Type GWT-B1, GWT-B2, GWT-B3: ANSI A137.1 standard grade.
 - 1. Size: 3 by 6 inch, nominal; 5/16-inch thick.
 - 2. Edges: Cushioned.
 - 3. Surface Finish: High gloss.
 - 4. Color(s): To be selected by Architect from manufacturer's full range.
 - 5. Pattern: Stacked bond.
 - 6. Trim Units: Matching bullnose shapes in sizes coordinated with field tile.
 - 7. Products:
 - a. American Olean; a division of Dal-Tile Corporation; Matte.
 - b. Dal-Tile Corporation; Matte.
-

- c. Interceramic, USA; IC Mattes.

2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Satin natural anodized extruded aluminum, style and dimensions to suit application, for setting using tile mortar or adhesive.
 - 1. Applications:
 - a. Thresholds at door openings.
 - b. Floor to wall joints.
 - 2. Manufacturers:
 - a. Schluter-Systems.
 - b. Genesis APS International.
 - c. Blanke.

2.03 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Modified Dry-Set Mortar (Thinset): ANSI A118.4
 - 1. Products:
 - a. H.B. Fuller Construction Products, Inc.; TEC Full Flex TA 390/391.
 - b. LATICRETE International, Inc.; 252 Silver.
 - c. MAPEI Corporation; Ultraflex 2.
 - d. Summitville Tiles, Inc.; S-1000 MP Thin-Set Latex Mortar.
 - e. Substitutions: See Section 016000 - Product Requirements.

2.04 GROUTS

- A. Provide setting and grout materials from same manufacturer.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3 stain-resistant epoxy grout.
 - 1. Color(s): As selected by Architect from manufacturer's full line.
 - 2. Products:
 - a. Custom Building Products; CEG-Lite 100% Solids Commercial Epoxy Grout.
 - b. H.B. Fuller Construction Products, Inc; TEC AccuColor EFX Epoxy Special Effects Grout.
 - c. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout.
 - d. MAPEI Corporation; Kerapoxy CQ.
 - e. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy.
 - f. Summitville Tiles, Inc; S-500 Ultra Max.

2.05 MAINTENANCE MATERIALS

- A. Tile Sealants: Moisture- and mildew-resistant type sealants; one-part silicone for wall applications and multi-part urethane for floor applications. Sealants and accessories shall comply with requirements below and with requirements of Division 7 Section "Joint Sealants."
 - 1. Color(s): As selected by Architect from manufacturer's full line. Sealant colors shall match grout colors in adjacent joints unless otherwise indicated.
 - 2. Silicone Sealant (Walls): ASTM C 920, Type S, Grade NS, Class 25; Uses NT (non-traffic), G (glass), A (aluminum), O (other substrates indicated).
 - a. Products:
 - 1) GE Silicones, a division of GE Specialty Materials; SCS1700 Sanitary.

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- 2) Pecora Corporation; Pecora 898 NST.
- 3) Tremco Inc.; Tremsil 200.
- 4) Substitutions: See Section 016000 - Product Requirements.
3. Urethane Sealant (Floors): ASTM C 920, Type M, Grade P, Class 25; Uses T (traffic), M (mortar), A (aluminum), O (other substrates indicated).
 - a. Products:
 - 1) Master Builders Solutions; MasterSeal SL 2.
 - 2) Pecora Corporation; NR-200 Urexpand.
 - 3) Sika Corporation; Sikaflex-2c SL.
 - 4) Tremco Inc.; THC-901.
 - 5) Substitutions: See Section 016000 - Product Requirements.
 4. Sealant Accessories: Provide backer rod, primer, and other sealant accessories as recommended by sealant manufacturer for applications required.
- B. Tile Sealer: Stain protection for exposed surfaces of unglazed ceramic tile, other porous tile, and grout. Provide penetrating sealer with no sheen, preserving natural tile appearance.
 1. Products:
 - a. Custom Building Products; Aqua Mix Sealer's Choice Gold.
 - b. Rust-Oleum Corporation; Miracle Sealants 511 Impregnator Natural Looking Penetrating Sealer.
 - c. STONETECH, a division of LATICRETE international, Inc; STONETECH Heavy Duty Sealer.
 - d. Substitutions: See Section 016000 - Product Requirements.
- C. Grout Release: Temporary, water-soluble pre-grout coating.
 1. Products:
 - a. Custom Building Products; Aqua Mix Grout Release.
 - b. MAPEI Corporation; UltraCare Grout Release.
 - c. Substitutions: See Section 016000 - Product Requirements.

2.06 ACCESSORY MATERIALS

- A. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
 1. Crack Resistance: No failure at 1/8 inch gap, minimum; comply with ANSI A118.12.
 2. Fluid or Trowel Applied Type with Embedded Reinforcing Fabric:
 - a. Material: Synthetic rubber or Acrylic.
 - b. Thickness: 30 mils, minimum, dry film thickness.
 - c. Products:
 - 1) Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - 2) H.B. Fuller Construction Products, Inc; TEC HydraFlex Waterproofing Crack Isolation Membrane.
 - 3) LATICRETE International, Inc; 9235 Waterproofing Membrane.
 - 4) MAPEI Corporation; Mapelastic AquaDefense.
 - 5) Merkrete, by Parex USA, Inc; Merkrete Hydro Guard 2000.
 - 6) Summitville Tiles, Inc.; S-9000.
 - 7) Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work, per ANSI A108.01, and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. For ease of cleaning and to prevent staining, precoat tile with temporary grout release. For unglazed ceramic and other porous tile types, provide either combination tile sealer/grout release, or a temporary grout release with final tile sealer applied after tile installation.

3.03 INSTALLATION - GENERAL

- A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.19, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F122/F122A, over combination waterproofing/crack-isolation membrane, with thin set mortar and epoxy grout.

3.05 INSTALLATION - WALL TILE

- A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244 with thinset and epoxy grout.
- B. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202 with thinset mortar and epoxy grout.

3.06 CLEANING

- A. Clean tile and grout surfaces.

3.07 PROTECTION

- A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION 093000

**SECTION 095100
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2017.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2022.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components, acoustical units, and specialty ceiling products as indicated.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Panels: Quantity equal to 2 percent of total installed, of each type.

1.03 QUALITY ASSURANCE

- A. Source Limitations: Provide each acoustical ceiling assembly (ceiling panel and suspension system) from a single manufacturer to obtain manufacturer's system warranty.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver until building is weather-tight and conditioned.
- B. Store materials in dry and clean location until needed for installation. During installation, handle in a manner that will prevent damage and to prevent marring and soiling of finished surfaces.

1.05 FIELD CONDITIONS

- A. Maintain uniform temperature and humidity at occupancy conditions during and after acoustical unit installation. Allow products to acclimatize prior to installation.

1.06 WARRANTY

- A. System Warranty: Provide a single source system warranty covering both acoustical ceiling panels and suspension system.
 - 1. Warranty shall cover material failures including sag, warping, shrinkage, or delamination, biologic growth including mold or mildew, and rusting of suspension system.
 - 2. Warranty Period: Minimum 15 years, from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Each acoustical ceiling shall be Class A rated, with flame spread index of 25 or less, smoke developed index of 50 or less, when tested in accordance with ASTM E84.

2.02 ACOUSTICAL PANELS

- A. Acoustical Panels - General: ASTM E1264, Class A.
 - 1. Antibacterial/Antimicrobial Treatment: Provide acoustical panels that have been factory-treated by manufacturer for resistance to bacteria, mold, mildew, and fungus.
 - 2. Humidity/Sag Treatment: Provide acoustical panels that have been factory-treated by manufacturer for humidity and sag-resistance.
- B. Acoustical Panels ACP-A: Painted mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Type III.
 - a. Form: 2, water felted.
 - 2. Size: 24 by 24 inches.
 - 3. Thickness: 3/4 inch.
 - 4. Light Reflectance: Not less than 0.82, determined in accordance with ASTM E1264.
 - 5. NRC Range: Not less than 0.70, determined in accordance with ASTM E1264.
 - 6. Panel Edge: Square.
 - 7. Color: White.
 - 8. Suspension System: Exposed grid.
 - 9. Products:
 - a. Armstrong World Industries, Inc; School Zone Fine Fissured - Item #1713.
 - b. CertainTeed Ceilings, Inc; Fine Fissured High NRC - Item #HHF-457 DP.
 - c. USG Corporation; Radar High-NRC Acoustical Panels - Item #22421.
 - d. Substitutions: See Section 016000 - Product Requirements.
- C. Acoustical Panels ACP-B: Glass fiber with membrane-faced overlay, with the following characteristics:
 - 1. Classification: ASTM E1264 Type XII.
 - a. Form: 2, cloth.
 - 1) Pattern: "E" - lightly textured.
 - b. Size: 24 by 24 inches.
 - 2. Thickness: Not less than 1 inch.
 - 3. Light Reflectance: Not less than 0.90, determined in accordance with ASTM E1264.
 - 4. NRC Range: Not less than 0.95, determined in accordance with ASTM E1264.
 - 5. Articulation Class (AC): Not less than 190, determined in accordance with ASTM E1264.
 - 6. Panel Edge: Square.
 - 7. Tile Edge: Square.
 - 8. Color: White.
 - 9. Suspension System: Exposed.
 - 10. Products:
 - a. Armstrong World Industries, Inc; Optima - Item #3152.
 - b. CertainTeed Ceilings, Inc; Symphony f - Item #1342-IOF-1.

- c. USG Corporation; Halcyon Acoustical Panels - Item #98221.
- d. Substitutions: See Section 016000 - Product Requirements.

2.03 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
 - 1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
 - 2. Cross Tee/Main Runner Connection: Override (stepped).
 - 3. Main Runner End Coupling: Bayonet ("stab") type; knuckle type is not acceptable.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid and cap.
 - 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 - 2. Profile: Tee; 15/16 inch face width.
 - 3. Finish: Baked enamel.
 - 4. Products:
 - a. Armstrong World Industries, Inc; Prelude XL 15/16".
 - b. CertainTeed Ceilings, Inc; 15/16" EZ Stab Classic System.
 - c. USG Corporation; Donn Brand DX/DXL 15/16 inch Acoustical Suspension System.
 - d. Substitutions: See Section 016000 - Product Requirements.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Perimeter Moldings: Same metal and finish as grid.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- C. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.

- D. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 - 1. Do not hang suspension system directly from steel floor or roof deck.
- E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- F. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- G. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- H. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
- F. Where round obstructions and bullnose concrete block corners occur, provide preformed closures to match perimeter molding.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION 095100

**SECTION 096500
RESILIENT FLOORING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile 2004 (Reapproved 2018).
- D. ASTM F1344 - Standard Specification for Rubber Floor Tile 2021a.
- E. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- F. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

1.04 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.05 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's Warranty: Provide a ten (10) year manufacturer warranty, covering defective material and installation.
- C. Installer's Warranty: Installer shall warrant that the products have been installed in accordance with manufacturer's instructions.

1. The installer shall provide a ten (10) year warranty against product failure due to excessive moisture vapor transmission through the slab.

PART 2 PRODUCTS

2.01 TILE FLOORING

- A. Vinyl Composition Tile - VCT-1, VCT-2: Homogenous, with pattern and color extending throughout thickness of the tile. "Through-color" is not acceptable.
 1. Basis of Design: Tarkett; VCT II.
 2. Minimum Requirements: Comply with ASTM F1066, Class 2 ("through-pattern").
 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 4. Size: 12 by 12 inch.
 5. Thickness: 0.125 inch.
 6. Pattern: Quarter Turn.
 7. Color and Pattern: To be selected by Architect from manufacturer's full range.
- B. Rubber Tile - Type RFT-1, RFT-2, RFT-3, RFT-4: Homogeneous, color and pattern throughout thickness.
 1. Manufacturers:
 - a. Flexco, Inc; Spextones.
 - b. Johnsonite, a Tarkett Company; ColorSplash
 - c. Roppe Corporation; Rubber Tile; Symmetry Color Palette (20 by 20 inch).
 2. Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
 3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 4. Size: 24 by 24 inch nominal.
 5. Total Thickness: 0.125 inch.
 6. Texture: Hammered.
 7. Color: To be selected by Architect from manufacturer's full range.

2.02 ACCESSORIES

- A. Subfloor Filler: Type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Moisture Vapor Treatment: Where resilient flooring and accessories are installed over concrete slabs, and where field testing indicates high moisture vapor testing through concrete slabs, provide alkaline-resistant product designed to control excessive moisture vapor transmission through concrete slab in accordance with Division 01 MVT allowance and unit price, and per the following:
 1. Products: Provide product approved by flooring manufacturer and complying with performance requirements below, equivalent to one of the following:
 - a. Duraamen Engineered Products, Inc.; Perdure MVT.
 - b. Maxxon Corporation; Maxxon MVP.
 - c. Tnemec Company Inc.; Epoxoprime MVT, Series 208.
 2. Performance Requirements:

- a. Verify with flooring manufacturer that submitted product maintains compliance with all provisions of flooring manufacturer's warranty.
 - b. Low-VOC: Provide product with VOC content less than 15 g/L.
 - c. Bond Strength to Concrete: Minimum 400 psi per ASTM D 4541 (100% concrete failure).
 - d. Permeance: Maximum 0.1 perm per ASTM E 96, and 0.10 grains/hr/ft²/in-Hg, per ASTM F3010.
 - e. Applications: Provide MVT for all concrete slabs on-grade and lightweight concrete elevated slabs.
- D. Floor Polish: Fluid-applied polish recommended by resilient flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows: Perform one of each test per 1,000 sf of installation area.
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 2. If test results are not within limits recommended by flooring manufacturer, apply moisture vapor treatment (MVT) in accordance with manufacturer's requirements. MVT shall be provided per unit price and quantity allowance requirements.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Fit joints and butt seams tightly.
 - 2. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern, unless otherwise indicated.

3.05 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.06 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 096500

**SECTION 096513
RESILIENT BASE AND ACCESSORIES**

PART 1 GENERAL

1.01 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Verification Samples: Submit in manufacturer's standard size, illustrating color and pattern for each resilient flooring product specified.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- C. Protect roll materials from damage by storing on end.

1.03 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.
- B. Maintain conditions at occupancy conditions for installation and until Substantial Completion.

PART 2 PRODUCTS

2.01 RESILIENT BASE

- A. Resilient Base - RB: ASTM F1861, Type TP, rubber, thermoplastic; Style B, Cove.
 - 1. Products (Type TP):
 - a. Armstrong World Industries, Inc.; Rubber Coved Toe Wall Base.
 - b. Flexco (USA), Inc.; Flexco Base 2000 - Cove.
 - c. Johnsonite, a Tarkett Company; Rubber Wall Base - Cove.
 - d. Mannington Commercial; Burkebase Type TP - Coved.
 - e. Nora Systems, Inc; nora wall base; Article 820.
 - f. Roppe Corporation; 700 Series TPR Wall Base - Style B (Coved).
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 - 3. Height: 4 inch.
 - 4. Thickness: 0.125 inch minimum.
 - 5. Finish: Matte.
 - 6. Length: Roll; manufacturer's standard length.
 - 7. Color: To be selected by Architect from manufacturer's full range.

2.02 MOLDINGS, TRANSITIONS, AND EDGE STRIPS

- A. Moldings, Transition and Edge Strips:
 - 1. Manufacturers:
 - a. Flexco, Inc.
 - b. Johnsonite.
 - c. Mannington Commercial.
 - d. R.C.A. Rubber Company (The).
 - e. Roppe Corporation.
 - f. VPI, LLC; Floor Products Division.
 - 2. Molding/Transition Strip Profiles: Provide in sizes as required to suit flooring thicknesses and applications.
 - a. Coved edge/cap for carpet.
 - b. Joiner between carpet and resilient flooring or other materials with different heights.
 - c. Transition strip between different types of materials that are the same height or between different styles/patterns of the same material.
 - d. Reducer strip at edges of flooring to reduce height to 0".
 - e. Subfloor leveling accessory to transition between materials with height differences up to 1/2 inch.
 - 3. Material: Manufacturer's standard rubber or vinyl.
 - 4. Color: To be selected by Architect from manufacturer's full range.
 - a. Multiple colors will be required. Transition between existing Terrazzo and RFT will require one color. Provide for two additional colors at other transitions.

2.03 ACCESSORIES

- A. Leveling Compound: Blended cement mix, latex-modified, for use as trowelable underlayment, approved by resilient accessory manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
 - 1. Do not apply wall base until other finish items, including casework and painting, are complete.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with leveling compound to achieve smooth, flat, hard surface.
- C. Prohibit traffic until leveling compound is fully cured.
- D. Clean substrate.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Fit joints and butt seams tightly.
 - 2. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, install such that molding profiles or transition strips are centered under the door panel.
- E. Install edge/reducer strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Resilient Strips: Attach to substrate using adhesive.

3.04 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Install base on solid backing. Bond tightly to wall and floor surfaces.
- C. Job form internal and external corners in accordance with manufacturer's instructions. Form corners by "V" cutting or scribing; do not bend material in a manner that creates stress whitening.
- D. In addition to walls, install base on other permanent construction with exposed vertical faces at floor level, including, but not limited to, columns, pilasters, and casework/cabinet knee and toe spaces.
- E. Scribe and fit to door frames and other interruptions.
- F. At uneven substrate surfaces (such as masonry mortar joints), provide manufacturer's recommended filler sealant or adhesive to fill voids along top of base.

3.05 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.06 PROTECTION

- A. Prohibit traffic on resilient accessories for 48 hours after installation.
- B. Cover resilient accessories and protect from heavy construction traffic and equipment until Substantial Completion.

END OF SECTION 096513

SECTION 096623
RESINOUS MATRIX TERRAZZO FLOORING

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- D. NTMA (GRAD) - Aggregate Gradation Standards Current Edition.
- E. NTMA (EPOXY) - Epoxy Terrazzo Specifications Current Edition.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting at the Project site one week before starting work of this section. Require attendance by concrete subcontractor and any other relevant installers.
 - 1. Review the work of this section, including substrate requirements, including slab recesses, control joints, and preparation.
 - 2. Review scheduling, material deliveries, and temporary facilities and equipment that will be required, and installation procedures.
 - 3. Review specialty finishes, patterns and designs. Review special conditions such as stair treads and nosings.
 - 4. Review protection of the finished work, including traffic limitations and protection measures.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for divider strips, control joint strips, expansion joints, and sealer; include printed copy of current NTMA recommendations for type of terrazzo specified.
 - 1. Include product data for manufacturer's moisture vapor treatment product.
- C. Shop Drawings: Indicate complete terrazzo layout, including patterns and colors. Indicate divider strip and control and expansion joint layout, and details of adjacent components.
- D. Verification Samples: Include terrazzo samples approximately 6 inches square illustrating project-specific colors, chip size and variation, chip gradation, and matrix color. Include samples of divider strips
- E. Installer's Qualification Statement.
- F. Cleaning and Maintenance Data: Include procedures for stain removal, stripping, and sealing. Include specific cleaners and chemicals that should not be used on terrazzo.
- G. Manufacturer's Inspection Reports.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with NTMA's "Terrazzo Specifications and Design Guide" and with recommendations as posted at their web site at www.ntma.com.

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- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
 - 1. Associate member firm of the National Terrazzo and Mosaic Association, Inc.
- C. Installer Qualifications: Company specializing in performing the type of work specified in this section.
 - 1. Contractor member of the National Terrazzo and Mosaic Association, Inc.
- D. Coordination: Epoxy terrazzo flooring manufacturer shall review and approve cast-in-place concrete contractor's quality control measures and shop drawings to ensure concrete slab placement, slab recesses, and finish are acceptable for application of terrazzo.

1.05 MOCK-UP

- A. Construct mock-up of terrazzo illustrating appearance of finished work in each configuration required. Size mock-up to be not less than 100 square feet.
 - 1. Construct mockup directly adjacent to existing terrazzo, to demonstrate material and color comparison and workmanship of blending to existing.
- B. Locate where directed.
- C. Approved mock-up may remain as part of the work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store terrazzo materials in a dry, secure area.
- B. Maintain minimum temperature of 60 degrees F.
- C. Keep products away from fire or open flame.

1.07 FIELD CONDITIONS

- A. Do not install terrazzo when temperature is below 50 degrees F or above 90 degrees F.
- B. Prior to and during each day of installation, the terrazzo contractor shall verify that the dew point is at least 5 degrees F less than the slab and air temperature.
- C. Maintain temperature within specified range 24 hours before, during, and 72 hours after installation of flooring.
- D. Provide ambient lighting with permanent lighting or with lighting that simulates facility's permanent lighting.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design - Resinous Matrix Terrazzo Flooring: Terrazzo & Marble Supply Companies; Terroxy Resin Systems.
- B. Resinous Matrix Terrazzo Flooring:
 - 1. Crossfield Products Corp.; Dex-O-Tex Division; Cheminert.
 - 2. Key Resin Company; Key Epoxy Terrazzo System.
 - 3. Master Terrazzo Technologies LLC; Morricite.
 - 4. Quadrant Chemical Corporation; Quadset Epoxy Terrazzo.
 - 5. Sherwin-Williams Company: General Polymers Brand; Terrazzo 1100.
 - 6. TEC Specialty Construction Brands, Inc; Tuff-Lite Epoxy Terrazzo.

2.02 EPOXY MATRIX TERRAZZO APPLICATIONS

- A. Floors [TERR-E-A1, TERR-E-A2]:
 - 1. Thickness: 3/8 inch, nominal.
 - 2. Color(s): Two custom blends for types A1 and A2 to match existing terrazzo to the approval of Architect.
 - 3. Aggregate Type: Marble chips.
 - 4. Aggregate Size: 50% No. 1 and 50% No. 2.

2.03 MATERIALS

- A. Epoxy Matrix Terrazzo: Aggregate and matrix mix applied to substrate, troweled flat, and ground smooth.
 - 1. Mix Proportions: As required to achieve appearance specified.
- B. Matrix: Two component resin and epoxy hardener with mineral filler and color pigment, non-volatile, thermo-setting.
- C. Aggregate: Type as indicated; sized in accordance with NTMA aggregate gradation standards; color(s) as indicated, uniform in color.
- D. Finishing Grout: Epoxy, color to match terrazzo matrix.

2.04 ACCESSORIES

- A. Divider Strips: 1/4 inch thick zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.
- B. Divider and Control Joint Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.
- C. Sealer: Colorless, non-yellowing, non-strippable, penetrating liquid urethane type to completely seal matrix surface; not detrimental to terrazzo components.
 - 1. Products:
 - a. Essential Industries, Inc; T-Rx.
 - b. Master Terrazzo Technologies; Morricite WB Urethane Sealer 158.
 - c. Terrazzo & Marble Supply Companies; Terroxy WB Urethane Sealer.
- D. Primer: Manufacturer's recommended product; compatible with indicated substrate.
- E. Patch Material: Where existing construction is demolished, leaving anchor holes or other minor damage, provide terrazzo manufacturer's recommended epoxy patching product, color matched to blend to existing terrazzo color.
- F. Moisture Vapor Treatment: Provide terrazzo manufacturer's recommended alkaline-resistant product designed to control excessive moisture vapor transmission through concrete slab, per the following:
 - 1. Performance Requirements:
 - a. Verify with flooring manufacturer that submitted product maintains compliance with all provisions of flooring manufacturer's warranty.
 - b. Low-VOC: Provide product with VOC content less than 15 g/L.
 - c. Bond Strength to Concrete: Minimum 400 psi per ASTM D 4541 (100% concrete failure).
 - d. Permeance: Maximum 0.3 perm per ASTM E 96.
 - e. Applications: Provide MVT for all concrete slabs on-grade and lightweight concrete elevated slabs.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive terrazzo.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for terrazzo flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows. Provide one of each test per 1,000 sf of installation area:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 - 2. Provide Moisture Vapor Treatment at all substrates to receive terrazzo flooring.
- D. Verify that any required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Clean substrate of foreign matter.
- B. Prepare concrete subfloor by shot-blasting surface in accordance with manufacturer's instructions, and according to ICRI Technical Guidelines for CSP 3 or 4 surface profile.
 - 1. Acid washing and/or grinding of concrete slabs is not allowed.
 - 2. Review vacuum blasted concrete slab substrate for cracks with the terrazzo manufacturer's technical representative. Rout out and fill significant non-moving cracks with epoxy resin, and patch lesser non-moving cracks with fine mesh strip set into wet primer and embedded in epoxy resin as recommended by technical representative.
 - 3. Provide an epoxy or cementitious pre-fill material manufactured or recommended by epoxy flooring manufacturer and compatible with flooring system to fill low slab areas to attain acceptable substrate. This companion material is considered part of the epoxy terrazzo flooring system and shall be included in the system warranty. Gypsum composition underlayment pre-fill material is not acceptable.
- C. Apply primer in accordance with manufacturer's instructions.
- D. Patch existing anchor holes, cracks, or damaged areas with epoxy patching material to create a blended matrix matching adjacent existing terrazzo to remain.

3.03 INSTALLATION

- A. Saw cut substrate to install divider and control joint strips.
- B. Install control joint strips straight and flat to locations indicated.
- C. Install divider strips according to pattern approved on shop drawings.
- D. Unless specifically indicated otherwise, where type of floor finish, pattern, or colors are different on opposite sides of door, terminate flooring under centerline of door.
- E. Place terrazzo mix over substrate to thickness indicated.

3.04 FINISHING

- A. Finish terrazzo to NTMA requirements.

- B. Grind terrazzo surfaces with power disc machine; sequence with coarse to fine grit abrasive, using a wet method or using a dry grinder with vacuum to control dust.
- C. Apply grout to fill voids exposed from grinding.
- D. Remove grout coat by grinding, using a fine grit abrasive.

3.05 TOLERANCES

- A. Maximum Variation from Flat Surface: 1/4 inch in 10 feet.
- B. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch.

3.06 FIELD QUALITY CONTROL

- A. Provide on-site inspection by terrazzo manufacturer's representative at minimum two times during installation of this work. Installing Contractor shall notify manufacturer of installation start date and scheduling. Manufacturer's representative shall provide written copies of inspection reports within 10 days of inspection date.
 - 1. The first inspection shall be of the mockup, or, if no mockup is specified, of the first 100 square feet of the install.
 - 2. The second inspection shall be at substantial completion.
 - 3. The installing contractor shall be responsible for immediate repairs or corrections to the work.

3.07 CLEANING

- A. Scrub and clean terrazzo surfaces with neutral pH cleaner in accordance with manufacturer's instructions. Let dry.
- B. Immediately after terrazzo has dried, apply sealer in accordance with NTMA and manufacturer's instructions.
- C. Polish surfaces in accordance with manufacturer's instructions.

3.08 PROTECTION

- A. Do not allow traffic on installed terrazzo for the period required by manufacturer's instructions, or 24 hours, whichever is longer.
- B. Protect finished terrazzo from damage due to subsequent construction until Date of Substantial Completion.
- C. Leave the finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective terrazzo work. Repair or replace defective terrazzo work to attain the specified NTMA standards for finished work. The party responsible for the damaged or otherwise non-conforming work shall be responsible for the cost of repairs.

END OF SECTION 096623

**SECTION 096817
TEXTILE COMPOSITE FLOORING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials 2016 (Reapproved 2021).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- F. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Shop Drawings: Showing the extent of installation, seam direction of TCF, and accessories. Check pattern match, if any, for matching during installation and possible waste factors in ordering required amounts. Indicate built in items such as casework, columns, and doorways, and locations where cutouts are required in TCF.
 - 1. Maintain a copy of approved shop drawings on site during installation, available for review by Owner and Architect.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Textile Composite Flooring:
 - 1. Basis of Design: J&J Flooring Group, Inc.; Kinetex; Umbra II.
 - 2. Forbo Flooring, Inc.; Flotex; Cirrus.
 - 3. Tandus Centiva; Powerbond Hybrid Resilient; 2nd Power.

2.02 PERFORMANCE CHARACTERISTICS

- A. The following performance characteristics shall be met by all products:
 - 1. Critical Radiant Flux: Minimum of 0.45 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
 - 2. Surface Flammability Ignition: Pass Federal Flammability CPSC FF 1-70 (also referenced as ASTM D2859 - the "pill test").
 - 3. Maximum Electrostatic Charge: Pass AATCC 134 (Step & Scuff): 3 Kv. or less at 20 percent relative humidity.

4. Smoke Density: ASTM E 662 / NFPA 258: < 450 Flaming Mode.
5. Static Coefficient of Friction: ASTM C 1028: Passes ADA Guidelines for Accessible Routes (Minimum 0.60).
6. Delamination of Secondary Backing of Pile Floor Coverings: ASTM D 3936: Minimum 15 lbs.
7. Lightfastness: AATCC 16E: > 4 @ 100 hours.
8. Vetterman Drum: ASTM D 5417: Minimum 3 @ 22,000 cycles.
9. Seam Integrity: Seam to remain intact after 50,000 cycles per Phillips Chair Test.

2.03 MATERIALS

- A. Tile Carpeting, Type TCF: Tufted, manufactured in one color dye lot.
 1. Tile Size: 18 x36 inch, nominal per Basis of Design.
 2. Thickness: 0.25 inch.
 3. Color: To be selected by Architect from manufacturer's full range.

2.04 ACCESSORIES

- A. Subfloor Filler: Type recommended by flooring material manufacturer.
- B. Moisture Vapor Treatment: Where carpeting and accessories are installed over concrete slabs, provide alkaline-resistant product designed to control excessive moisture vapor transmission through concrete slab, per the following:
 1. Products: Provide product approved by flooring manufacturer and complying with performance requirements below, equivalent to one of the following:
 - a. Duraamen Engineered Products, Inc.; Perdure MVT.
 - b. Maxxon Corporation; Maxxon MVP.
 - c. Tnemec Company Inc.; Epoxoprime MVT, Series 208.
 2. Performance Requirements:
 - a. Verify with flooring manufacturer that submitted product maintains compliance with all provisions of flooring manufacturer's warranty.
 - b. Low-VOC: Provide product with VOC content less than 15 g/L.
 - c. Bond Strength to Concrete: Minimum 400 psi per ASTM D 4541 (100% concrete failure).
 - d. Permeance: Maximum 0.1 perm per ASTM E 96, and 0.10 grains/hr/ft²/in-Hg, per ASTM F3010.
 - e. Applications: Provide MVT for all concrete slabs on-grade and lightweight concrete elevated slabs.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 1. Test as Follows: Perform one of each test per 1,000 sf of installation area.:

- a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
2. If test results are not within limits recommended by flooring manufacturer, apply moisture vapor treatment (MVT) in accordance with manufacturer's requirements. MVT shall be provided per unit price and quantity allowance requirements.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
- C. Apply moisture vapor treatment (MVT) in accordance with manufacturer's instructions.
- D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install TCF in accordance with manufacturer's instructions.
- C. Cut TCF tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- D. Lay TCF tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- E. Locate change of color or pattern or transition trim between rooms under door centerline.
- F. Fully adhere TCF tile to substrate.
- G. Trim TCF neatly at walls and around interruptions.
- H. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING AND PROTECTION

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum TCF surfaces.
- C. Protect installed TCF from heavy construction traffic, soiling, and damage for the remainder of the construction period.

END OF SECTION 096817

**SECTION 098400
ACOUSTICAL WALL AND CEILING UNITS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2022.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- C. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests 2016.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, panel layout, fabric orientation, and wood grain orientation.
- D. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.
- E. Verification Samples: Fabricated samples of each type of panel specified; 12 by 12 inch, showing construction, edge details, and fabric covering.
- F. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.
- B. Store units flat, in dry, well-ventilated space; do not stand on end.
- C. Protect edges from damage.

1.04 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a two-year period for failure of materials or workmanship commencing on the Date of Substantial Completion.
 - 1. Failures include but are not limited to acoustic performance, fabric separation from core or fabric sagging, panel distortion or warping.

PART 2 PRODUCTS

2.01 FABRIC-COVERED SOUND-ABSORBING WALL UNITS

- A. Manufacturers:
 - 1. Basis of Design Product is Wenger; Absorber Panel.
 - 2. Acoustical Solutions, Inc.; AlphaSorb.
 - 3. Armstrong Ceiling & Wall Solutions; Soundsoak.

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4. Substitutions: See Section 016000 - Product Requirements.
- B. General:
1. Prefinished, factory assembled fabric-covered panels.
 2. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- C. Fabric-Covered Acoustical Panels for Walls:
1. Panel Core: Manufacturer's standard rigid or semi-rigid fiberglass core.
 2. Core Density: 6 to 7 lb/cu ft.
 3. Sound Absorption: Noise Reduction Coefficient (NRC) of 0.80 or greater when tested in accordance with ASTM C423 for Type A mounting, per ASTM E795.
 4. Panel Size: as indicated on drawings.
 5. Panel Thickness: 3 inch, unless otherwise required by manufacturer for acoustic performance.
 6. Edges: Perimeter edges reinforced by a formulated resin hardener.
 7. Corners: Square.
 8. Fabric: Woven polyester. Basis-of-Design is Guilford of Maine; FR701.
 9. Color: As selected by Architect from manufacturer's full range.
 10. Patterns: Where fabric with directional or repeating patterns or fabric with directional weave is used, mark for installation in same direction.
 11. Mounting Method: Back-mounted with mechanical fasteners.

2.02 FABRIC-COVERED PLASTIC SOUND-DIFFUSING WALL UNITS

- A. Manufacturers:
1. Basis of Design Product is Wenger; Diffuser Panel Type I Convex.
 2. Acoustical Solutions, Inc.; AlphaDiffuser Fabric Wrapped Sound Diffuser.
 3. Conwed; Diffuser: Barrel.
 4. Substitutions: See Section 016000 - Product Requirements.
- B. General:
1. Prefinished, factory assembled fabric-covered panels.
 2. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- C. Fabric-Covered Acoustical Panels for Walls:
1. Panel Core: Manufacturer's standard rigid or semi-rigid fiberglass core.
 2. Core Density: 6 to 7 lb/cu ft.
 3. Sound Absorption: Noise Reduction Coefficient (NRC) of 0.80 or greater when tested in accordance with ASTM C423 for Type A mounting, per ASTM E795.
 4. Panel Size: as indicated on drawings.
 5. Panel Thickness: 5 inch and 7 inch, unless otherwise required by manufacturer for acoustic performance.
 6. Edges: Perimeter edges reinforced by a formulated resin hardener.
 7. Corners: Square.
 8. Fabric: Woven polyester. Basis-of-Design is Guilford of Maine; FR701.
 9. Color: As selected by Architect from manufacturer's full range.
 10. Patterns: Where fabric with directional or repeating patterns or fabric with directional weave is used, mark for installation in same direction.
-

11. Mounting Method: Back-mounted with mechanical fasteners.

2.03 FABRIC-COVERED PLASTIC SOUND-DIFFUSING CEILING UNITS

- A. Manufacturers:
 1. Basis-of-Design Product is Wenger; Lay-In Convex Ceiling Diffuser Panel.
 2. Acoustical Solutions, Inc.; AlphaDiffuser Fabric Wrapped Sound Diffuser.
 3. Conwed; Diffusers: Barrel.
 4. Substitutions: See Section 016000 - Product Requirements.
- B. General:
 1. Prefinished, factory assembled fabric-covered panels, for lay-in in ceiling grid.
 2. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- C. Fabric-Covered Acoustical Panels for Ceilings:
 1. Panel Core: Manufacturer's standard convex-shape molded plastic rigid core.
 2. Core Density: 6 to 7 lb/cu ft.
 3. Panel Size: 48 inches by 48 inches, unless otherwise indicated.
 4. Edges: Perimeter edges reinforced by a formulated resin hardener.
 5. Corners: Square.
 6. Fabric: Woven polyester. Basis-of-Design is Guilford of Maine; FR701.
 7. Color: As selected by Architect from manufacturer's full range.
 8. Patterns: Where fabric with directional or repeating patterns or fabric with directional weave is used, mark for installation in same direction.
 9. Mounting Method: Lay-in panel for suspended ceiling system, exposed grid.
 - a. Suspension System: Specified in Section 095100.

2.04 POLYESTER (FELT) ACOUSTIC PANELS

- A. Manufacturers:
 1. Basis-of-Design is Acoufelt; FilaSorb 24; Printed Panel.
 2. Kirei USA; EchoPanel; Prints.
 3. MDC; Zintra Digital Print.
- B. Polyester Acoustic Panels: 100% polyester.
 1. Size: As indicated on Drawings.
 2. Thickness: 24 mm.
 3. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 4. Noise Reduction Coefficient (NRC): 0.60 at 24 mm panel thickness when tested in accordance with ASTM C423 for Type E mounting, per ASTM E795.
 5. Pattern and Color: Digital printed. Design, pattern, and colors shall be selected from manufacturer's full range of available digital prints/colorways.
 6. Mounting Method: Back-mounted with Z-clips and mechanical fasteners.

2.05 FABRICATION

- A. Fabric Wrapped, General: Fabricate panels to sizes and configurations as indicated, with fabric facing installed without sagging, wrinkles, blisters, or visible seams.

- B. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch for thickness, overall length and width, and squareness from corner to corner.

2.06 ACCESSORIES

- A. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support, designed to allow panel removal, and as follows:
 - 1. Two-part clip and base-support bracket system; brackets designed to support full weight of panels and clips designed for lateral support, with one part mechanically attached to back of panel and the other attached to substrate.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.
- B. Install mounting accessories and supports in accordance with shop drawings.
- C. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
- D. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:
 - 1. Plumb and level.
 - 2. Flatness.
 - 3. Width of joints between panels; where applicable.

3.03 CLEANING

- A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

3.04 PROTECTION

- A. Provide protection of installed acoustical panels until Date of Substantial Completion.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION 098400

**SECTION 099100
PAINTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated. Specific items include (but are not limited to) the following:
 - 1. Fire- and Smoke-Rated Wall Identification: Permanently label fire- and smoke-rated walls, partitions, and barriers per requirements of applicable building code, with the words "FIRE / SMOKE BARRIER - PROTECT ALL OPENINGS", using stenciled lettering not less than 3 inches high and with minimum 0.375-inch strokes.
 - a. Locate lettering in concealed accessible floor, floor-ceiling plenums, and attic spaces, located no more than 15 feet from end of wall and at intervals not exceeding 30 feet. Locate directly inside of access doors or panels that provide access to rated walls. Do not paint walls where exposed to view except in support spaces (mechanical / electrical rooms and similar spaces).
 - 2. Refer to the life safety plans and partition schedule on the drawings for rated wall and partition locations.
 - 3. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 4. Elevator pit ladders.
 - 5. Prime surfaces to receive wall coverings.
 - 6. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
 - 6. Marble, granite, slate, and other natural stones.
 - 7. Floors, unless specifically indicated.
 - 8. Ceramic and other tiles.
 - 9. Brick, architectural concrete, architectural precast, cast stone, and integrally colored plaster, fiberglass, or stucco.

10. Glass.
11. Acoustical materials, unless specifically indicated.
12. Concealed pipes, ducts, and conduits.

1.02 REFERENCE STANDARDS

- A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
- B. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
- C. SSPC-SP 6 - Commercial Blast Cleaning 2007.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
 2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.05 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Paints:
 1. Benjamin Moore.
 2. PPG Paints.
 3. Sherwin-Williams Company.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

2.03 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching and Fastener Head Cover Material: Manufacturer's recommended filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
- G. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Galvanized Surfaces:

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- J. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
 2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.06 EXTERIOR PAINT SCHEDULE

- A. General: Provide the following Paint systems for the various substrates, as indicated. Dry film thickness is noted as "DFT." Provide compatibility test areas on existing painted substrates.
 - B. Zinc-Coated or Zinc-rich Primer-Coated Metal with Direct to Metal ("DTM") Gloss Acrylic Enamel Finish: 2 topcoats of DTM gloss enamel over primer, with min. total DFT of 2.5 mils.
 1. Prime Coat (Tie-Coat): Lead-free, acrylic base interior/exterior galvanized metal primer, premium grade. Apply over shop primer.
 - a. Moore: HP04 Ultra Spec HP Acrylic Metal Primer.
 - b. PPG: 90-712 Pitt-Tech Int/Ext Primer/Finish Industrial Enamel.
 - c. S-W: B66 Pro-Cryl Universal Primer.
 2. First and Second Coats: DTM Acrylic Gloss Enamel.
 - a. Moore: HP28 Ultra Spec HP Acrylic Gloss Enamel.
 - b. PPG: 90-1310 Pitt-Tech Plus Int/Ext High Gloss DTM Industrial Enamel.
 - c. S-W: B66W1050 Series Pro Industrial DTM Acrylic Coating (Gloss).
 - C. Field-Applied Coatings for Ferrous Metal (AESS): Aliphatic urethane system of intermediate coat and topcoat. Provide scheduled products for exposed steel fabrications indicated as
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AESS.

1. Field Touch-up: Match moisture curing urethane zinc-rich shop primer.
 2. Intermediate Coat: Moisture curing urethane and micaceous iron oxide or epoxy.
 - a. Moore: Corotech V160 Epoxy Mastic Coating.
 - b. PPG: 95-245 Pitt-Guard Rapid Coat D-T-R Epoxy Coating.
 - c. S-W: Macropoxy 646 Fast Cure Epoxy, B58-600/B58v600.
 3. Top Coat: Aliphatic urethane at 2.0 – 3.0 mils DFT.
 - a. Moore: Corotech V500 Aliphatic Acrylic Urethane.
 - b. PPG: 95-812 Pitthane Ultra Gloss Urethane Enamel.
 - c. S-W: Corothane I Aliphatic Finish Coat B65.
- D. Coatings to Repaint Exterior Ferrous Metal: Aliphatic urethane topcoat system over surface-tolerant epoxy mastic. Provide to repaint existing exposed steel fabrications with extended weather exposure deterioration and surface rust.
1. Preparation: Clean steel to SSPC SP-3 Power Tool Cleaning to remove all rust scale, mill scale and loose rust, oil, grease and other contaminants.
 2. Primer: Surface-tolerant fast curing polyamide epoxy (mastic). 5.0 – 10.0 mils DFT.
 - a. Moore: P45 Mastic Epoxy Gloss Coating.
 - b. PPG: 95-245 Pitt-Guard Rapid Epoxy Mastic SG.
 - c. S-W: Macropoxy 646 Fast Cure Epoxy.
 3. First and Second Top Coats: Aliphatic urethane at 3.0 – 4.0 mils DFT per coat
 - a. Moore: P74 Aliphatic Acrylic Urethane.
 - b. PPG: Pitthane High Build Urethane Enamels 95 -8800 series.
 - c. S-W: B65-300 Series / B60V30 Hi-Solids Polyurethane.
- E. Concrete: Acrylic latex satin finish, two finish coats over alkali-resistant primer with minimum total DFT of not less than 3.5 mils.
1. Prime Coat: Exterior Acrylic weathered masonry sealer/primer.
 - a. Moore: 608 Ultra Spec Masonry Int/Ext 100% Acrylic Sealer/Primer.
 - b. PPG: 4-603 Perma-Crete Int/Ext Alkali Resistant Primer.
 - c. S-W: A24w8300, Loxon Concrete & Masonry Primer.
 2. First and Second Finish Coats: Exterior 100% Acrylic – Satin sheen; premium grade.
 - a. Moore: N401 Regal Select Exterior Paint High Build Low Lustre Finish.
 - b. PPG: 76-45 Sun-Proof Ext House & Trim, Satin.
 - c. S-W: A82 Series A-100 Exterior Latex Satin.
- F. Exterior Gypsum Soffit Board with Smooth Finish 100% Acrylic Coating: Top coat(s) for total DFT of 10.0 mils minimum over primer-sealer.
1. Prime Coat (Tie-Coat): Bonding primer-sealer.
 - a. Moore: N023 Fresh Start All Purpose 100% Acrylic Int/Ex Latex Primer.
 - b. PPG: 6-9 Speedhide Exterior Wood Primer Oil.
 - c. S-W: B51-450, Multi-Purpose Primer.
 2. First and Second Finish Coats: Exterior 100% Acrylic – Satin sheen; premium grade.
 - a. Moore: N401 Regal Select Exterior Paint High Build Low Lustre Finish.
 - b. PPG: 76-45 Sun-Proof Ext House & Trim. Satin Latex 100% Acrylic.
 - c. S-W: A82 Series A-100 Exterior Latex Satin.
 3. First and Second Finish Coats: Exterior 100% Acrylic – Flat finish; premium grade.
 - a. Moore: N400 Regal Select Exterior Paint High Build Flat Finish.
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- b. PPG: 72-45 Sun-Proof Ext House & Trim. Flat Latex 100% Acrylic
- c. S-W: A6 Series A-100 Exterior Latex Flat

3.07 INTERIOR PAINT SCHEDULE

- A. General: Provide the following paint systems for the various substrates, as indicated. Dry film thickness is noted as "DFT." Provide compatibility test areas on existing painted substrates.
- B. Concrete Masonry Units: Low-VOC Acrylic Satin Finish. 2 Coats over filler, with total DFT not less than 2.5 mils. (Provide for CMU except where "epoxy finish" is indicated.)
 - 1. Filler Coat, 100% Acrylic. Apply filler coat at a rate to ensure complete coverage. Brush, spray or roller apply and back roll or squeegee for smooth, pinhole-free treatment.
 - a. Moore: 571 Ultra Spec Hi-Build Masonry Block Filler.
 - b. PPG: 16-90 Pitt Glaze WB Acrylic Interior Exterior Block Filler.
 - c. S-W: B42W46 Heavy Duty Block Filler. (PrepRite not acceptable)
 - 2. Bonding Primer (previously painted): Acrylic bonding primer for exceptional adhesion to hard, glossy surfaces. Test for adhesion. Brush, spray or roller apply and back roll.
 - a. Moore: Stix Bonding Primer.
 - b. PPG: 17-921 PPG Seal Grip Acrylic Universal Primer/Sealer.
 - c. S-W: B51W150 Extreme Bond Interior/Exterior Primer.
 - 3. First & Second Finish Coats: Commercial Interior Low-VOC Acrylic Satin Finish. Provide for wall finishes unless directed otherwise.
 - a. Moore: N538 Ultra Spec 500 Interior Eggshell Finish.
 - b. PPG: 6-4300 Speedhide Zero VOC Interior Eggshell Latex.
 - c. S-W: B20-2600 ProMar 200 Zero VOC Interior Latex Eg-Shel.
- C. Concrete Masonry Units - Semi-Gloss Water-Borne Epoxy Finish: 2 Coats over filler:
 - 1. Block Filler Coat: Acrylic-latex or as required by manufacturer for topcoat. Brush, spray or roller apply and back roll for smooth pinhole-free treatment.
 - a. Moore: 571 Ultra Spec Hi-Build Masonry Block Filler.
 - b. PPG: 6-15 Speedhide Int/Ext Acrylic Masonry Block Filler.
 - c. PPG: 16-90 Pitt-Glaze WB Int/Ext Block Filler Latex.
 - d. S-W: B42W46 Heavy Duty Interior/Exterior Block Filler.
 - 2. First and Second Coats: Two-component, semi-gloss water born polyamide epoxy enamel applied at a DFT of 1.5 to 4.0 mils per coat.
 - a. Moore: Corotech V400 Polyamide Epoxy Coating.
 - b. PPG: 98-100 Aquapon WB Water Base Epoxy – Semi-Gloss.
 - c. S-W: B73V300 Pro Industrial Water Based Catalyzed Epoxy Hardener.
- D. Gypsum Board Systems with Latex Finish: Satin (egg-shell) finish at walls and flat finish on ceilings except as indicated otherwise. Provide best commercial Low-VOC formulation with 0 VOC per EPA test method 24.
 - 1. Filler Coat: 0 VOC (per EPS test method 24) Latex Primer.
 - a. Moore: N534 Ultra Spec 500 Interior Latex Primer.
 - b. PPG: 6-4900 Speedhide Zero VOC Interior Latex Primer.
 - c. S-W: B28-2600 ProMar 200 Zero VOC Interior Latex Primer.
 - 2. First & Second Finish Coats: Interior Low-VOC Acrylic Satin Finish. (Low lustre/Satin = 25-45% @60°) Provide for wall finishes unless indicated otherwise.
 - a. Moore: N538 Ultra Spec 500 Interior Eggshell.
 - b. PPG: 6-4300 Speedhide Zero VOC Interior Eggshell Latex.

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- c. S-W: B20-2600 ProMar 200 Zero VOC Interior Latex Eg-Shell.
- d. S-W: B24-2600 ProMar 200 Zero VOC Interior Latex Low Sheen.
- 3. First & Second Finish Coats: Interior Low-VOC Acrylic Flat Finish. Provide for ceiling applications unless indicated otherwise.
 - a. Moore: N536 Ultra Spec 500 Interior Flat.
 - b. PPG: 6-4100 Speedhide Zero VOC Interior Latex Flat.
 - c. S-W: B30-2600 ProMar 200 Zero VOC Interior Latex Flat.
- E. Gypsum Board Systems with Water-Borne Polyamide Epoxy Finish ("EPX"):
 - 1. Filler Coat: Manufacturer's recommended primer.
 - a. Moore: 217 Fresh Start Alkyd Enamel Underbody.
 - b. PPG: 6-2 Speedhide Interior Latex Sealer.
 - c. S-W: B28W2600 ProMar 200 Zero VOC Primer.
 - 2. First and Second Coats: Two-component, water born polyamide epoxy enamel applied at a DFT of 1.5 to 4.0 mils per coat. Provide semi-gloss finish unless directed otherwise.
 - a. Moore: Corotech V440 Waterborne Amine Epoxy.
 - b. PPG: 98-100 Aquapon WB Water Base Epoxy – Semi-Gloss.
 - c. S-W: B70 Series B60V25 Water Based Catalyzed Epoxy.
- F. Ferrous Metal with Latex Dry Fog Finish: One finish coat over primed exposed construction. Provide nominal 50 square foot sample area to test for paint compatibility with substrates.
 - 1. Prime Coat: (Acrylic or recommended VOC-compliant metal primer for surfaces not pre-primed.) 2.0 mils DFT.
 - a. Moore: N110 Superkote 5000 DryFall latex Flat.
 - b. PPG: 90-712 Pitt-Tech Int/Ext Primer/Finish Industrial Enamel.
 - c. S-W: B66-310 Pro-Cryl Universal Primer.
 - 2. Top Coat: All exposed structure as scheduled. Acrylic Dry Fog 3.0 mils DFT. Provide color finish as selected by Architect from manufacturer's full range.
 - a. Moore: N110 Superkote 5000 DryFall Latex Flat.
 - b. PPG: 6-724XI Series Speedhide Super Tech WB Int. Dry-Fog Flat Latex Flat.
 - c. S-W: B42 BW3 Waterborne Acrylic Dry Fall, Flat.
- G. Ferrous Metal: Semi-Gloss Direct to Metal ("DTM") Acrylic Enamel Finish: 2 Coats over primer, with total DFT not less than 2.5 mils. Provide satin finish on hollow metal doors and frames, semi-gloss at other applications.
 - 1. Prime Coat: Lead-free, acrylic Base Primer. Not required on shop primed items.
 - a. Moore: HP29 Ultra Spec HP DTM Acrylic Semi-Gloss.
 - b. PPG: 90-712 Pitt-Tech Int/Ext Primer/Finish Industrial Enamel.
 - c. S-W: B66 W1 DTM Acrylic Primer/Finish (or B66 W200).
 - 2. Bonding Primer (previously painted): Acrylic bonding primer designed for previously painted ferrous metal to ensure secure bond. Brush, spray or roller apply and back roll.
 - a. Moore: SXA-110 Insl-X Waterborne Bonding Primer.
 - b. PPG: 90-912 Pitt-Tech Plus DTM Industrial Primer.
 - c. S-W: B66A50 DTM Bonding Primer.
 - 3. First and Second Coat: DTM Acrylic Semi-Gloss Enamel. (30-40 units @ 60°)
 - a. Moore: HP29 Ultra Spec HP DTM Acrylic Semi-Gloss.
 - b. PPG: 90-1210 Pitt-Tech Int/Ext Semi-Gloss DTM Industrial Enamel.
 - c. S-W: B66W1150 Series Pro Industrial DTM Acrylic Semi-Gloss Coating.
 - 4. First and Second Coat: DTM Acrylic Satin Enamel. (15-25 units @ 60°)

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- a. Moore: HP25 Ultra Spec HP DTM Acrylic Low Lustre.
 - b. PPG: 90-1110 Pitt-Tech Int/Ext Satin DTM Industrial Enamel.
 - c. S-W: B66W1250 Series Pro Industrial DTM. Acrylic Eg-Shel.
- H. Zinc-Coated Metal: Semi-Gloss Direct to Metal ("DTM") Acrylic Enamel Finish: 2 Coats over primer, with min. total DFT of 2.5 mils.
- 1. Prime Coat: Lead-free, acrylic base interior galvanized metal primer, premium grade.
 - a. Moore: HP04 Ultra Spec HP Acrylic Metal Primer.
 - b. PPG: 90-712 Pitt-Tech Int/Ext Primer/Finish Industrial Enamel.
 - c. S-W: B66W1150 Series Pro Industrial DTM Acrylic Semi-Gloss Coating.
 - 2. First and Second Coats: DTM Acrylic Semi-Gloss Enamel. Same as for ferrous metal.
- I. Stained woodwork with transparent finish is specified in Division 6 Sections by woodworker.

END OF SECTION 099100

**SECTION 101100
VISUAL DISPLAY UNITS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard 2016.
- B. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling 2018.
- C. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board 2022.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on porcelain enamel steel markerboard, tackboard, and tackboard surface covering.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.
- D. Samples: Color charts for selection of color and texture of porcelain enamel steel markerboard, glass markerboard, tackboard, tackboard surface covering, and trim.
- E. Test Reports: Show compliance to specified surface burning characteristics requirements.
- F. Maintenance Data: Include data on regular cleaning, stain removal .

1.03 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 VISUAL DISPLAY UNITS

- A. Porcelain Enamel Steel Markerboards:
 - 1. Color: White.
 - 2. Size: As indicated on drawings.
 - 3. Frame: Extruded aluminum, with concealed fasteners.
 - 4. Frame Profile: Manufacturer's standard.
 - 5. Frame Finish: Anodized, natural.
 - 6. Accessories: Provide marker tray and map rail.
 - 7. Special Markings: Provide markerboards with the following integral markings at locations indicated. Markings shall be factory-painted or fused to surface of porcelain enamel.
 - a. Music staff lines.
 - B. Tackboards: Fine-grained, homogeneous natural cork.
 - 1. Cork Thickness: 1/8 inch.
 - 2. Backing: Hardboard, 1/4 inch thick, laminated to tack surface.
 - 3. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
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4. Size: As indicated on drawings.
 5. Frame: Extruded aluminum, with concealed fasteners.
 6. Frame Profile: Manufacturer's standard.
 7. Frame Finish: Anodized, natural.
- C. Tackable Wall Panels: Fabric laminated to fiberboard; Factory-fabricated.
1. Fabric: Manufacturer's 100% polyester.
 2. Color, Pattern, and Texture: As selected from manufacturer's full range.
 3. Backing: Fiber board, 1/2 inch thick, laminated to tack surface.
 4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 5. Panel Width: by manufacturer's standard.
 6. Height: As indicated on drawings; No horizontal seams.
 7. Length: As indicated on drawings.
 8. Adhesives: Provide manufacturer's recommended adhesive, primer, and sealer, produced for use on substrate shown on drawings. Provide materials which are mildew-resistant and non staining to wallcovering.
 9. Manufacturers:
 - a. Basis of Design: Claridge; Tack Walls.
 - b. ADP Lemco, Inc
 - c. Nelson Adams NACO
- D. Tackstrips: Linoleum-modified cork (basis-of-design: Forbo Bulletin Board material).
1. Cork Thickness: 1/4 inch.
 2. Color: As selected from manufacturer's full range.
 3. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 4. Height: 1 inch.
 5. Length: As indicated on drawings, in one piece.
 6. Frame and End Stops: Extruded aluminum, with concealed fasteners.
 7. Frame Profile: Manufacturer's standard.
 8. Frame Finish: Anodized, natural.

2.02 MATERIALS

- A. Porcelain Enamelled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
 - B. Fabric: Roll stock, 100% polyester , complying with the following:
 1. Basis-of-Design: Guilford of Maine; FR701.
 2. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
 3. Total Weight: 16 oz/sq yd. nominal.
 4. Color & Pattern: Selected from manufacturer's full range.
 - C. Natural Cork: Natural ground cork, homogeneous and self-healing, laminated to manufacturer's standard backer with no additional resin or plastic additive.
 - D. Composition / Linoleum-Modified Cork: Natural ground cork mixed with resinous or polymeric binders, linseed oil, and color pigments laminated to manufacturer's standard backer to create a seamless, self-sealing sheet.
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- E. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
- F. Fiber Board: ASTM C208, cellulosic fiber board.
- G. Adhesives: Type used by manufacturer.

2.03 ACCESSORIES

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall , full width of frame.
- B. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
- C. Flag Holders: Cast aluminum bored to receive 1 inch diameter flag staff, bracketed to fit top rail of board. One per classroom.
- D. Marker Tray: Aluminum, box style, one piece full length of markerboard, closed ends, concealed fasteners, same finish as frame.
- E. Mounting Brackets: Concealed.
- F. Mounting Accessories and Fasteners: Provide concealed Z-clips and hangers, and stainless steel screws or anchors for mechanical attachment of visual display units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.
- C. Verify flat wall surface for frameless adhesive-applied boards.

3.02 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Install with top of marker tray at 36 inches above finished floor.
- C. Secure units level and plumb.
- D. Mechanical Fastening: Install all visual display units for secure attachment with manufacturer's recommended concealed clips, hangers, and mechanical fasteners. Installation with adhesive is not acceptable.
- E. Install porcelain markerboards and tackboards with backs mounted directly against wall surface.
- F. Butt Joints: Install with tight hairline joints.
- G. Install tackable wall panels in accordance with manufacturer's recommendations on specified substrates with concealed attachments.
 - 1. Fabricate re-wrapped edges where partial panels abut each other, or adjacent surfaces or trim.
 - 2. Re-wrap top, bottom or side edges for cutting panels around door or window openings, abutting trim, protruding objects, and at other openings, including x-cut at receptacles, light switches, and other openings.

3.04 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Cover with protective cover, taped to frame.
- C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION 101100

**SECTION 101200
DISPLAY CASES**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- F. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit complete printed data and installation details indicating products to be provided as specified.
- C. Shop Drawings: Submit complete installation details. Include dimensioned elevations.
- D. Selection Samples: Submit color charts indicating manufacturer's full range of available options for tackable fabric panels.
- E. Verification Samples: Submit physical samples, manufacturer's standard size, of each selected color of tackable fabric material, and of trim material, to illustrate finish, color, and texture.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing factory-fabricated display cases as specified in this section.
- B. Installer Qualifications: Installation crew directly employed by manufacturer of products, or a company approved by manufacturer for installation of specified products.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver display cases and materials to the Project site with manufacturer's protective crate covering and do not open until ready for use.
- B. Protect display cases before, during, and after installation. In case of damage, immediately provide necessary repairs and replacements.

1.05 FIELD CONDITIONS

- A. Field Measurements: Verify field measurements for recessed application for display cases before preparation of shop drawings and before fabrication to ensure proper installation.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty against defects and in materials, finish product and workmanship; beginning at the Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Claridge Products and Equipment, Inc.
- B. Platinum Visual Systems.
- C. Poblocki Sign Company, LLC.
- D. The Tablet & Ticket Co.

2.02 DISPLAY CASES

- A. General: Provide only factory-fabricated and factory-assembled display cases. Display cases that are "stick-built" at the Project site or that are shipped disassembled for assembly on site are not acceptable.
 - 1. Provide welded aluminum frames with tight mitered joints. Comply with AWS D1.2/D1.2M for welding aluminum. Clean and finish exposed welds to remove flux and blend surfaces smooth so that welded surface matches adjacent surface.
 - 2. Fabricate display cases with no visible fasteners.
- B. Recessed Display Case: Factory-fabricated aluminum-framed display case with adjustable glass shelves, finished interior, and aluminum trim on face to cover edge of recessed opening.
 - 1. Basis-of-Design Product: The Tablet & Ticket Co.; 900DC Series.
 - 2. Dimensions: As indicated on Drawings.
 - 3. Components:
 - a. Glazed Doors: Sliding.
 - 1) Number of Doors: One pair.
 - b. Side, Top, and Bottom Panels: Stained veneer plywood.
 - c. Back Panel: Tackable fabric over cork.
 - d. Lighting: LED.

2.03 COMPONENTS

- A. Aluminum Framed Case Construction: 1-1/2 inch by 2 inch extruded aluminum tube frame with tempered glass and stained veneer plywood (white maple) panels at top, bottom, and sides.
- B. Face Frame Trim for Recessed Installation: 2 inch flat face dimension extruded aluminum trim mitered with corner clips and mechanical fasteners.
- C. Glazed Sliding Doors:
 - 1. 3/8 inch clear tempered glass with plastic finger pulls.
 - 2. Door track: Extruded aluminum glass shoe with bottom rollers and top plastic guide.
 - 3. Lock: Glass door cylinder lock.
- D. Glass Shelves:
 - 1. 3/8 inch clear tempered glass with flat-polished edges.
 - 2. Shelf Depth: 12 inches.
 - 3. Shelves per Unit: Two.

- E. Shelf Standards and Brackets: Single-slotted channel standards for brackets adjustable in 1 inch increments along entire length of standard, drilled and countersunk for screws.
 - 1. Standards Mounting: Recess-mounted into back panel.
 - 2. Face Width: 5/8 inch.
 - 3. Material: Minimum 16 gauge, 0.0598 inch sheet steel.
 - 4. Standard Lengths: Extend all standards full height of display cases.
 - 5. Brackets: Boltless with lip front; minimum 16 gauge, 0.0598 inch sheet steel, reinforced, locking into slots; size to suit shelves; same finish as standards.
- F. Tackable Back Panel: Fabric laminated to cork on hardboard.
 - 1. Cork Thickness: 1/4 inch.
 - 2. Fabric: Vinyl fabric; minimum fabric weight: 13 oz/sq yd.
 - 3. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- G. Lighting: Manufacturer's standard LED light fixture housed at top of case with louvered aluminum access door with keyed lock.
 - 1. Surface Mounted: Under cabinet type fixture.
 - 2. Controls: On/Off using switch mounted on display case.

2.04 MATERIALS

- A. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper.
 - 1. Finish: Factory anodized; AAMA 611: Clear anodized.
- B. Heat-Strengthened and Fully Tempered Glass: ASTM C1048, Kind FT.
- C. Fasteners: Provide screws, bolts, and other fasteners as recommended by manufacturer for substrates indicated, and in sizes and lengths required for secure attachment of display case product to substrate.
 - 1. For fastening to masonry substrates, provide stainless steel or galvanized steel fasteners.

PART 3 EXECUTION

3.01 EXAMINATION PREPARATION

- A. Examination: Verify that rough openings match field measurements and that rough openings and conditions are acceptable for product installation.
- B. Verify that electrical conduit, wiring, and other work that will be concealed by display case is complete and ready for installation.
- C. Provide blocking, grounds, and shims as required for display cases to be mounted securely, plumb and level, within rough openings.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Locate fastening devices to secure cases securely to sides of rough opening.
 - 1. Locate at manufacturer's required spacing, but not more than 16 inches o.c.
 - 2. Fasteners shall be concealed in the final installation.
- C. Install recessed display cases plumb and level in wall openings.
- D. Refer to drawings for display case mounting heights.
- E. Provide mitered and wrapped hairline joints for all trims.

- F. Coordinate with electrical installer to ensure LED lighting is properly connected and operational.

3.03 ADJUSTING AND CLEANING

- A. Verify that all accessories are installed as detailed for each unit.
- B. Restore and touch up damaged or worn areas of factory finishes.
- C. At completion of work, clean glass surfaces, back panels and trim in accordance with manufacturer's recommendations leaving units ready for use.

END OF SECTION 101200

**SECTION 101400
SIGNAGE**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Selection Samples: Where colors are not specified, submit color selection charts or chips for each type of signage.
- D. Verification Samples: Submit samples, manufacturer's standard size, showing selected colors for each type of signage.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

1.04 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
 - 1. Sign Type: Flat signs with engraved panel media as specified.
 - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
 - 3. Office Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
 - 4. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
 - 5. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.

6. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille.

2.02 PANEL SIGNAGE TYPES

- A. General: Interior and exterior panel signage shall be provided via lump-sum allowance; refer to Division 1 Section "Allowances."
- B. Manufacturers:
 1. Allen Industries Architectural Signage.
 2. APCO Graphics, Inc.
 3. ASI-Modulex, Inc.
 4. Best Sign Systems, Inc.
 5. Gemini Incorporated.
 6. Innerface Sign Systems, Inc.
 7. InPro Corporation.
 8. Matthews International Corporation, Bronze Division.
 9. Mohawk Sign Systems.
 10. Nelson-Harkins Industries.
 11. Seton Identification Products.
 12. The Supersine Company.
 13. Substitutions: See Section 016000 - Product Requirements.
- C. Flat Signs: Signage media without frame.
 1. Edges: Square.
 2. Corners: Square.
 3. Wall Mounting of One-Sided Signs: Tape adhesive.
 - a. For signs mounted to glass, such as at door sidelights, provide a rear cover plate so the backside of sign will not be visible through the glass.
 4. Tactile Signage: Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
- D. Color and Font: Unless otherwise indicated, panel signage, font, and color shall be selected from manufacturer's full range.

2.03 TACTILE SIGNAGE MEDIA

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
 1. Total Thickness: 1/16 inch.

2.04 PLAQUES

- A. Manufacturers:
 1. Advance Corporation; Braille-Tac Division.
 2. A.R.K. Ramos.
 3. Gemini Incorporated.
 4. Matthews International Corporation, Bronze Division.
 5. Metal Arts; Division of L&H Manufacturing Co.
 6. Mills Manufacturing Company.
 7. Nelson-Harkins Industries.
 8. The Southwell Company.

9. Substitutions: See Section 016000 - Product Requirements.

B. Metal Plaques:

1. Metal: Bronze casting.
2. Size: For bid purposes assume one 36 inch by 24 inch plaque, with a 6 inch diameter graphic logo / county seal (image to be provided by Owner) and raised text. Confirm final size and desired information, text, and typeface, with Owner.
3. Surface Finish: Brushed, satin.
4. Painted Background Color: As selected by Architect from manufacturer's standard background colors.
5. Protective Coating: Manufacturer's standard clear coating.
6. Mounting: .
 - a. Rosette Style: As selected by Architect from manufacturer's standard rosettes.

2.05 DIMENSIONAL LETTERS

A. Manufacturers:

1. A.R.K. Ramos.
2. ASI-Modulex, Inc.
3. Charleston Industries, Inc.
4. Gemini Incorporated.
5. Innerface Sign Systems, Inc.
6. Matthews International Corporation, Bronze Division.
7. Metal Arts; Division of L&H Manufacturing Co.
8. Mills Manufacturing Company.
9. Mohawk Sign Systems.
10. Superior Signs.
11. Substitutions: See Section 016000 - Product Requirements.

B. Metal Letters:

1. Metal: Aluminum casting.
2. Metal Thickness: As indicated on drawings; if not indicated, provide 1/2-inch thick for letters less than 12 inch height and 1-inch thick for letters over 12 inch height.
3. Letter Height: As indicated on drawings.
4. Text and Typeface: As indicated; where not indicated, as selected by Architect from manufacturer's full range of fonts.
5. Finish: Painted; color as selected by Architect from manufacturer's full range.
6. Mounting: Cast studs into the back of each letter for mounting to face of wall where indicated. Provide for a 1/2-inch gap between back of letter and wall, do not mount directly flush to wall surface.

2.06 ACCESSORIES

- A. Concealed Screws: Stainless steel, or other non-corroding metal.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 PREPARATION

- A. Signage Schedule and Pre-Fabrication Meeting with Owner: The signage contractor shall meet with representatives of the Owner to develop a signage schedule, including signage style and layout, individual sign locations, including locations of code required signage and wayfinding signage, and final room naming and numbering. The Architect shall provide the signage contractor with floor plan drawings on request for use in determining signage locations.

3.02 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
 - 1. Room Signs: Mount on latch side, with a clear space of 18 inches by 18 inches beyond the door swing arc, centered on the tactile characters. At double doors, mount to the right of right-hand leaf or on nearest adjacent wall. Mount at height that is compliant with ADA Standards.
- D. Dimensional Letters (Face Mounted): Mount with 1/2-inch gap between rear face of letter and face of substrate.
- E. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

END OF SECTION 101400

**SECTION 102123
CUBICLE CURTAINS AND TRACK**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2019.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics and for curtain track.
 - 1. Fire Test Data: Provide data indicating fabric is identical to that which has passed NFPA 701 and is inherently and permanently flame resistant.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes. Include above ceiling blocking.
- D. Selection Samples: Manufacturer's pattern and color charts for curtain and mesh fabrics.
- E. Verification Samples: Submit 12 by 12 inch sample patches of curtain and mesh cloth with representative top, bottom, and edge hem stitch detail, heading with reinforcement and carrier attachment to curtain header.
- F. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cubicle Track and Curtains:
 - 1. A. R. Nelson Co; 1200 CT: www.arnelson.com/#sle.
 - 2. Construction Specialties, Inc; Track Systems: www.c-sgroup.com/#sle.
 - 3. Imperial Fastener Co., Inc; IFC 98 Cubicle Track System: www.imperialfastener.com/#sle.
 - 4. Inpro; Clickeze: www.inprocorp.com/#sle.

2.02 TRACKS AND TRACK COMPONENTS

- A. Tracks: Extruded aluminum sections; minimum 0.050-inch aluminum thickness; fabricated in one piece per track run, to greatest extent possible.
 - 1. Profile: Channel, nominal 1-1/4 inches wide by 3/4 inch high.
 - 2. Mounting: Surface.
 - 3. Structural Performance: Capable of supporting vertical test load of 50 lbs without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
 - 4. Track End Stop: To fit track section.
 - 5. Track Bends: Minimum 12 inch radius; fabricated without deformation of track section or impeding movement of carriers.
 - 6. Finish on Exposed Surfaces: Clear anodized.
 - 7. Products:
 - a. Construction Specialties; Traditional 6062 Track + 1062N carrier with ball chain/hook.
 - b. Inpro; Clickeze CE5000 track + CE5038 carrier with ball chain/hook.

- c. Imperial Fastener Co.; IFC-98 track + IFC-100 carrier with ball chain/hook.
 - d. Salsbury Industries; 19100 series track + 19103 carrier with ball chain/hook.
- B. Curtain Carriers: Nylon rollers and 6 inch long beaded chain with aluminum hooks, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.
- C. Installation Accessories: Types required for specified mounting method and substrate conditions.
- 1. Provide stainless steel fasteners for exposed locations, and hot-dip galvanized fasteners for concealed locations.

2.03 CURTAINS

- A. Cubicle Curtains:
- 1. Inherently flame resistant or flameproofed; capable of passing NFPA 701 test.
 - a. Fabric shall include identification markings from testing agency.
 - 2. Material: Close weave polyester; anti-bacterial, stain resistant, self deodorizing, sanitized, and preshrunk.
 - 3. Open Mesh Cloth: Open weave to permit air circulation; flameproof material: Color as selected by Architect from manufacturer's full range.
 - 4. Attachment of Curtain Fabric to Open Mesh Cloth: Manufacturer's standard sewn seam.
 - 5. Products:
 - a. Maharam: Carry 2.
 - b. Momentum: Aurora PC.
 - c. ArcCom: Canyon X.
 - 6. Color/Pattern: Selected by Architect from manufacturer's full range.
- B. Curtain Fabrication:
- 1. Width of curtain to be 10 percent wider than track length.
 - 2. Length of curtain to end 15 inches above finished floor.
 - 3. Pattern match fabric with vertical seams.
 - 4. Include open mesh cloth at top 20 inches of curtain for room air circulation, attached to curtain as specified above.
 - 5. Curtain Heading: Web reinforced band of open mesh cloth with metal grommet holes for carriers spaced 6 inches on center.
 - 6. Seams and Hems: Manufacturer's standard fabrication method for securely sewn and finished seams and hems.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.
- B. Verify that field measurements are as indicated.

3.02 INSTALLATION

- A. Install curtain track to be secure, rigid, and true to ceiling line, per manufacturer's installation instructions.
 - B. Secure track to ceiling system.
 - 1. Secure with mechanical fasteners to ceiling grids, not to exceed manufacturer's recommended spacing.
-

COLONIAL HEIGHTS HIGH SCHOOL RENOVATION/ADDITION
COLONIAL HEIGHTS, VIRGINIA
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- C. Install end caps and stop devices, and provide splices and connector accessories as required for layout indicated.
- D. Install curtains on carriers ensuring smooth operation.

END OF SECTION 102123

**SECTION 102600
WALL AND DOOR PROTECTION**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics 2010 (Reapproved 2018).
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- C. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies 2014.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.
- C. Shop Drawings: Include plans, elevation, sections, and attachment details. Show design and spacing of supports for protective corridor handrails, required to withstand structural loads.
- D. Selection Samples: Provide manufacturer's color charts for each product and material requiring color selection.
- E. Verification Samples: Submit physical samples, manufacturer's standard size, for each selected color.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Protect work from moisture damage.
- C. Protect work from UV light damage.
- D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.
- E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.04 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer and installer warranty for wall and door protection items.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, internal connection failures, and/or detachment of rail system from substrates.
 - b. Deterioration of materials beyond that expected of normal use, as intended by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Corner Guards and Metal Base; Available Manufacturers:
 - 1. Babcock-Davis.
 - 2. Construction Specialties, Inc.
 - 3. Inpro.
 - 4. Koroseal Interior Products.
 - 5. Nystrom, Inc.
 - 6. Trim-TEX, Inc.
 - 7. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE CRITERIA

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.

2.03 PRODUCT TYPES

- A. Metal Base: Factory- or shop-fabricated, with preformed end wall returns, and internal and external corners.
 - 1. Basis-of-Design Product: Inpro; Stainless Steel Wall Base w/ Toe.
 - 2. Location: Provide at locations indicated on Drawings.
 - 3. Provide 4-inch high metal wall base, with 1/4 inch cove toe and eased top edge.
 - 4. Material: Stainless steel, with #4 satin finish.
 - 5. Mounting: Surface.
 - 6. Length: Minimum one piece length not less than 96 inches; flush splicing.
- B. Corner Guards - Surface Mounted:
 - 1. Basis-of-Design Product: Construction Specialties; Acrovyn VA Series.
 - 2. Locations: Provide at all new gypsum board outside corners, unless otherwise indicated.
 - 3. Material: Polyethylene terephthalate (PET or PETG); PVC-free with full height extruded aluminum retainer.
 - 4. Surface Burning Characteristics: Provide assemblies with flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 5. Width of Wings: 1-1/2 inches.
 - 6. Corner: Square.
 - 7. Color: As selected from manufacturer's standard colors.
 - 8. Length: One piece, 6 feet (72 inches) in length.
- C. Adhesives and Primers: As recommended by manufacturer.

2.04 FABRICATION

- A. Fabricate components with tight joints, corners and seams.

2.05 SOURCE QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that field measurements are as indicated on drawings.
- C. Verify that substrate surfaces for adhered items are clean and smooth.
 - 1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer. Follow adhesive manufacturer's recommendations for remedial measures at locations and/or application conditions where adhesion test's results are unsatisfactory.
- D. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Position corner guard with bottom of corner guard immediately above top of wall base.

3.03 TOLERANCES

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

3.04 CLEANING

- A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.
- B. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION 102600

**SECTION 102800
TOILET AND BATH ACCESSORIES**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service 2015a (Reapproved 2019).
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- E. ASTM C1036 - Standard Specification for Flat Glass 2021.
- F. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror 2018.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- H. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.
- B. Work by Owner: Coordinate with Owner to provide access for installation of toilet and bath accessories indicated to be furnished and installed by Owner under separate contract.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Setting Drawings: For cutouts required in other work; include templates, substrate preparation instructions, and directions for preparing cutouts and installing anchoring devices.
- D. Maintenance Data: For each type of accessory, to include in maintenance manual per Section 017800 - Closeout Submittals. Include list of replacement parts and service recommendations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Commercial Toilet, Shower, and Bath Accessories:
 - 1. A&J Washroom Accessories, Inc.
 - 2. American Specialties, Inc.
 - 3. Bobrick Washroom Equipment.
 - 4. Bradley Corporation.
- B. Under-Lavatory Pipe Supply Covers:
 - 1. Plumberex Specialty Products, Inc.
 - 2. Truebro; IPS Corporation.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
- B. Keys: Provide 6 master/universal keys, minimum, to Owner.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
 - 1. Provide mechanical attachment of all accessories. Use of adhesive or double-side tape is not acceptable.

2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

2.04 TOILET ACCESSORIES SCHEDULE, GENERAL

- A. General: The following products make reference to the designations indicated on the Toilet Accessories Schedule, Toilet Assemblies, and toilet room plans on the drawings; herein designated as "TA-x".

2.05 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser (TA-D): Not in Contract. Owner shall furnish and install toilet paper dispensers under separate custodial contract.
- B. Sanitary Napkin Disposal Unit (TA-E): Not in Contract. Owner shall furnish and install sanitary napkin disposal units under separate custodial contract.
- C. Soap Dispenser (TA-F): Not in Contract. Owner shall furnish and install soap dispensers under separate custodial contract.
- D. Paper Towel Dispenser (TA-K): Not in Contract. Owner shall furnish and install paper towel dispensers under separate custodial contract.
- E. Mirrors (TA-G): Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
 - 1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
 - 2. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 - 3. Products:
 - a. A&J Washroom Accessories, Inc.; U700 Series.
 - b. American Specialties, Inc.; 0600 A Series.
 - c. Bobrick Washroom Equipment, Inc.; Model B-290.
 - d. Bradley Corporation; Model 780.
- F. Grab Bars (TA-A, B, & C): Stainless steel, smooth surface.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.

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- b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
 - c. Finish: Satin.
 - d. Length and Configuration: As indicated on drawings.
 - e. Products:
 - 1) A&J Washroom Accessories, Inc.; UG2 Series.
 - 2) American Specialties, Inc.; 3700 Series.
 - 3) Bobrick Washroom Equipment, Inc.; B-5806 Series.
 - 4) Bradley Corporation; 832 Series.
- G. Robe Hook: Heavy-duty stainless steel, double-prong, rectangular-shaped concealed mounting bracket and backplate for concealed attachment, satin finish. Provide one centered on interior face of door of all single-user toilet rooms and one adjacent to each shower; verify final mounting locations with Architect in field.
- 1. Products (Double-Prong):
 - a. A&J Washroom Accessories, Inc.; Model UX112.
 - b. American Specialties, Inc.; Model 7345.
 - c. Bobrick Washroom Equipment, Inc.; Model B-7672.
 - d. Bradley Corporation; Model 9124.

2.06 COMMERCIAL SHOWER AND BATH ACCESSORIES

- A. Shower Curtain Rod (TA-L): Stainless steel tube, 1 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for rectangular-shaped concealed mounting.
- 1. Products:
 - a. A&J Washroom Accessories, Inc.; Model UX2-C.
 - b. American Specialties, Inc.; Model 1204.
 - c. Bobrick Washroom Equipment, Inc.; Model B-6047.
 - d. Bradley Corporation; Model 9539.
- B. Shower Curtain (TA-L):
- 1. Material: Opaque vinyl, 0.008 inch thick, matte finish, with antibacterial treatment, flameproof and stain-resistant.
 - 2. Size: Provide curtain width 6 inches wider than shower opening dimension for 36 inch showers, and 12 inches wider than shower opening dimension for 48 inch and larger showers. Provide curtain height sized to 2 inches less than curtain rod mounting height.
 - 3. Grommets: Stainless steel; pierced through top hem on 6 inch centers.
 - 4. Color: White.
 - 5. Shower Curtain Hooks: Chrome-plated or stainless steel spring wire designed for snap closure.
- C. Folding Shower Seat (TA-J): Wall-mounted surface; welded tubular seat frame, structural support members, swing-down legs, hinges, and mechanical fasteners of Type 304 stainless steel, L-shaped seat.
- 1. Seat: Phenolic or polymeric composite one-piece seat or seat slats, of manufacturer's standard color.
 - 2. Size: ADA Standards compliant.
 - 3. Products:
 - a. A&J Washroom Accessories, Inc.; Model U929.
 - b. American Specialties, Inc.; Model 8206.

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- c. Bobrick Washroom Equipment, Inc.; Model B-5181.
 - d. Bradley Corporation; Model 9569.
- D. Corner Grab Bar Assembly (TA-H): Stainless steel, smooth surface.
- 1. Stainless-Steel Nominal Thickness: 0.05 inch.
 - 2. Finish: Satin.
 - 3. Mounting: Concealed with manufacturer's standard flanges and anchors.
 - 4. Outside Diameter: 1-1/4 inches unless otherwise indicated.
 - 5. Configuration: Single "L" shaped shower grab bar.
 - a. Length (Control Wall): 32 to 34 inches from wall to centerline of return.
 - b. Length (Back Wall): Nominal 18 inches from wall to centerline of return. Limit leg length so as not to interfere with folding shower seat.
 - 6. Products:
 - a. A&J Washroom Accessories, Inc.; Model UG20-G3016.
 - b. American Specialties, Inc.; Model 3774.
 - c. Bobrick Washroom Equipment, Inc.; Model B-6861 (1-1/2 inches OD).

2.07 UNDER-LAVATORY PIPE AND SUPPLY COVERS

- A. Under-Lavatory Pipe and Supply Covers:
- 1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
 - 2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
 - 3. Construction: 1/8 inch flexible PVC.
 - a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - b. Microbial and Fungal Resistance: Comply with ASTM G21.
 - 4. Color: White.
 - 5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.
 - 6. Products:
 - a. Plumberex Specialty Products, Inc; Plumberex Trap Gear.
 - b. Truebro; IPS Corporation; Lav Guard 2.

2.08 UTILITY ROOM ACCESSORIES

- A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
- 1. Drying rod: Stainless steel, 1/4 inch diameter.
 - 2. Hooks: Three, 0.06 inch stainless steel rag hooks at shelf front.
 - 3. Mop/broom holders: Four spring-loaded rubber cam holders at shelf front.
 - 4. Length: 36 inches.
 - 5. Products:
 - a. A&J Washroom Accessories, Inc.; Model UJ41A.
 - b. American Specialties, Inc.; Model 1315.
 - c. Bobrick Washroom Equipment, Inc.; Model B-224 x 36.
 - d. Bradley Corporation; Model 9983.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

3.02 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.03 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION 102800

**SECTION 104400
FIRE PROTECTION SPECIALTIES**

PART 1 GENERAL

1.01 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, anchorage details, and trim and door panel styles.
- C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- D. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.02 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.
- B. Coordinate rough opening sizes to ensure cabinet locations meet ADA mounting requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers and Cabinets:
 - 1. Activar Construction Products Group, Inc. - JL Industries.
 - 2. Amerex Corporation.
 - 3. Ansul, a Tyco Business.
 - 4. Babcock-Davis.
 - 5. Badger Fire Protection.
 - 6. Buckeye Fire Equipment Company.
 - 7. Fire-End & Croker Corporation.
 - 8. Kidde, a unit of United Technologies Corp.
 - 9. Modern Metal Products; Div of Technico.
 - 10. Larsen's Manufacturing Co.
 - 11. MOON American.
 - 12. Nystrom, Inc.
 - 13. Oval Brand Fire Products.
 - 14. Potter-Roemer.
 - 15. Pyro-Chem, a Tyco Business.
 - 16. Strike First Corporation of America.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: 4-A: 60-B:C.
 - 2. Size: 10 pound.

3. Finish: Baked polyester powder coat, color as selected.
 4. Temperature range: Minus 40 degrees F to 120 degrees F.
- C. Wet Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gauge.
1. Class: K type.
 2. Size: 1.6 gallons.
 3. Temperature range: Minus 20 degrees F to 120 degrees F.

2.03 FIRE EXTINGUISHER CABINETS

- A. Cabinet Construction: Non-fire rated.
1. Formed primed, ASTM A366 carbon steel sheet; 0.036 inch thick base metal.
 2. Available Products: One of the following, or comparable product by manufacturer from list above:
 - a. J.L. Industries/Activar; Ambassador 1017.
 - b. Larsen's Manufacturing Co.; Model 2409-6R.
 - c. Potter-Roemer; Model 1724.
- B. Cabinet Configuration: Semi-recessed type.
1. Size to accommodate extinguisher(s) and accessories indicated.
 2. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
 3. Trim Type: One piece trim and door frame, returned to wall surface. Rolled edge trim; 2-1/2- to 3-inch depth as standard with manufacturer.
 4. Door Glazing Style: Vertical duo, configuration as standard with manufacturer.
- C. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.
- D. Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
- E. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- F. Operating Hardware: Manufacturer's standard for cabinet type; continuous door hinge allowing 180 degree opening, with ADA-compliant door latch either surface mounted or flush inset into door panel, with cam or friction latch operation.
- G. Fabrication: Weld, fill, and grind components smooth.
- H. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.
- I. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated or baked-enamel finish.
- B. Lettering: "FIRE EXTINGUISHER" decal, or vinyl self-adhering, pre-spaced lettering in accordance with authorities having jurisdiction (AHJ).
1. Apply vertically to door of fire extinguisher cabinets, and apply to wall surface at bracket mounted extinguishers.

2.05 EMERGENCY KEY ACCESS BOX

- A. Commercial Door Key Access Box: Provide fire department emergency key access box manufactured by The Knox Company; as required by local Fire Marshal. Provide Knox Box recessed mount 3200 Series, nominal 4 inches by 5 inches by 3-1/4 inches deep, with tamper switch and recessed mounting kit. Provide manufacturer's standard polyester powder coat

finish in black color. No substitutions will be considered. Coordinate recessed installation with substrate construction, electrical connections as required for proper operation, and with requirements of local Fire Marshal. Contact Knox Company: www.knoxbox.com

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, no greater than 48 inches from finished floor to top of handle.
- C. Install mounting brackets at 44 inches above finish floor.
- D. Secure rigidly in place.
- E. Place extinguishers and accessories in cabinets and on wall brackets.
- F. Adjust cabinet doors after installation to ensure smooth operation.

3.03 PROTECTION AND CLEANING

- A. Protect fire extinguishers, fire extinguisher cabinets, and accessories from damage until Substantial Completion.
- B. Provide touchup to damaged finishes; replace items that cannot be satisfactorily repaired or refinished.

END OF SECTION 104400

**SECTION 105626
HIGH-DENSITY MOBILE STORAGE SHELVING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ISO 9001 - Quality management systems -- Requirements 2015.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
 - 1. System components.
 - 2. Accessories.
 - 3. Substrate preparation instructions and recommendations.
 - 4. Storage and handling requirements and recommendations.
- C. Shop Drawings: Indicate location, type, and layout of mobile storage shelving system, including lengths, heights, and aisle layout, and relationship to adjacent construction.
 - 1. Indicate location and configuration of rails.
 - 2. Indicate method of installation and configuration for shelving mounted on carriages.
 - 3. Provide location and details of anchorage devices to be embedded in or fastened to the structure.
- D. Selection Samples: For each finish product specified, provide color chips representing manufacturer's full range of available colors and finishes.
- E. Manufacturer's Qualification Statement.
- F. Installer's Qualification Statement.
- G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, ISO 9001 certified for quality control standards for design, production, and installation of complete high density storage system assemblies.
- B. Installer Qualifications: Company specializing in performing the work of this section; certified or authorized by manufacturer for installation of specified products.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Inspect for dents, scratches, or other damage. Replace damaged components.
- B. Store in manufacturer's unopened packaging until ready for installation.
- C. Store under cover and elevated above grade, in an enclosed, weatherproof location.

1.05 FIELD CONDITIONS

- A. Field Measurements: Verify field measurements for locations of mobile storage shelving before preparation of shop drawings and before fabrication to ensure proper dimensions, clearances, and installation.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty covering defects of manufacturing and workmanship and rust and corrosion.

PART 2 PRODUCTS

2.01 MOBILE STORAGE SHELVING SYSTEMS - GENERAL

- A. System Description: High-density movable shelving system consisting of shelving units mounted on rail-guided wheeled carriages.
 - 1. Carriage Operation: Mechanically assisted.
 - 2. Carriage Capacity: 1000 pounds per lineal foot.
 - 3. Rail Mounting: Recessed in concrete slab with finished floor flush with top of rails.
 - 4. System Layout: Refer to Drawings, and to Shelving Size Schedule below. Size carriages and system to manufacturer's standards to accommodate shelving units required.
 - 5. Overall System Height: Nominal 84 inches.
- B. Accessibility Requirements: Comply with ADA Standards.
- C. Components:
 - 1. Carriages: Rectangular steel frames of type and size required for selected system.
 - a. Provide one fixed end carriage and the remainder movable carriages at each system. Fixed end carriage shall be anchored to rails. Exposed back panel of fixed carriage shall match construction and finish of other exposed panels.
 - b. Carriage frames shall be steel and shall be welded or bolted. Galvanized components and riveted construction are unacceptable.
 - c. Finish: Powder coat paint; color to match shelving.
 - 2. Wheels: Cold rolled steel; dual flanged.
 - 3. Rails: Cold rolled steel; type and size to carry loads imposed by system.
 - 4. Subrails: Aluminum; provide as required by manufacturer for recessed rails.
 - 5. Anti-Tip Device: Provide manufacturer's standard rail device to prevent tipping of system.
 - 6. Shelving Units: Provide manufacturer's standard four-post steel shelving that integrally interlocks into carriage. Provide shelving with 6 levels (bottom shelf and 5 intermediate shelves) and dividers every 12 inches (provide one divider at 24- and 30-inch wide shelving units, and two dividers at 36-inch wide shelving units).
 - a. Shelving Size Schedule:
 - 1) Shelving at Fixed Carriage:
 - (a) 36 inch wide by 15 inch deep (single-sided) shelving.
 - 2) Shelving at Movable Carriages:
 - (a) 36 inch wide by 30 inch deep (two-sided) shelving.
 - 7. Face Panels: High pressure laminate over particleboard core; full height and width of shelving.
 - a. Color: To be selected from shelving manufacturer's full range of available options.
 - 8. Grout: Non-shrink hydraulic type cement.
- D. Accessories:
 - 1. Anchors and Leveling Screws: Types and sizes recommended by manufacturer for specified rail mounting and floor system.
 - 2. Bumpers: Manufacturer's standard rubber stops.

3. Label Holders: Manufacturer's standard type, attached to face panel at end of each shelving unit.

2.02 MECHANICALLY ASSISTED MOBILE STORAGE SHELVING SYSTEMS

- A. Basis of Design: Spacesaver; Mechanical Assist High Density Mobile Storage System.
- B. Other Acceptable Manufacturers:
 1. Borroughs Corporation; Aisle-Saver; Synergy Series.
 2. Montel; Mobilex Mechanical Assist Storage.
 3. Substitutions: See Section 016000 - Product Requirements.
- C. Drive System: Provide uniform movement of the carriage without drifting or jerking.
 1. Chain and sprocket system with full length torque resistant steel shaft.
 2. Provide two wheels per rail for each carriage, direct-driven on one side.
- D. Control: Three-spoke operating handle with manual locking latch.
 1. Minimum Gear Ratio: 1 lbf to move a load of 6000 lbs.
- E. Safety System: Mechanical safety brake at toe level the full length of the carriage. Light pressure of 1.5 lbf on aluminum bar activates safety mechanism to stop carriage movement.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated on shop drawings.
- B. Verify that substrate is in proper condition to install rails and flooring system per manufacturer's requirements.
 1. Do not begin installation until concrete floor slabs are fully cured and prepared, finishes in the space are complete, and the space is conditioned at occupancy levels.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. General: Install system components and accessories in accordance with manufacturer's printed instructions.
- B. Position system components level and plumb within manufacturer's specified tolerances.
- C. For recessed rail installation, grout rails the full length of the system.
- D. Maintain a minimum of 1/4 inch of grout between the high points of concrete subfloor and bottom of rails.
- E. Extend rails under stationary shelving units.
- F. Position carriages ensuring wheels align properly on rails. Fasten multiple carriages together forming a single movable base.
- G. Install shelving with shelf surfaces level and vertical supports plumb; fasten to carriage supports with vibration-proof fasteners.

3.03 ADJUSTING

- A. Adjust mobile storage shelving components and accessories to provide for smooth operation of system.

3.04 CLEANING

- A. Clean shelving and surrounding area after installation.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
- B. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Location: At project site.

3.06 PROTECTION

- A. Protect installed system from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 105626

**SECTION 107300
PROTECTIVE COVERS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2021, with Errata (2022).
- B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- E. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2020.
- F. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Metal Product Data: Product data sheets, including material descriptions and finishes, and preparation instructions and recommendations.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, footings, anchorage, size and type of fasteners, accessories and locations.
 - 1. Shop drawings shall be project specific; manufacturer's standard details are not acceptable.
 - 2. For protective covers indicated to attach to the building, include detail showing project-specific wall attachment detail that will transfer structural loads to the primary structural element of the exterior wall.
- D. Selection Samples: Manufacturer's color charts for metal components.
- E. Verification Samples: Manufacturer's standard size physical samples, representing actual material and finish of exposed metal, for each color selected by Architect.
- F. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.
- G. Designer's qualification statement.
- H. Specimen warranty.

1.03 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design under direct supervision of Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.04 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

- B. **Manufacturer's Warranty:** Provide standard 1-year warranty covering all material deterioration, structural failure, and installation defects.
- C. **Finish Warranty:** Provide 5-year manufacturer warranty against excessive degradation of factory-applied finishes. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. **Basis-of-Design (Building Mounted):** Mapes Architectural Products; Super Lumideck - Hanger Rod.
- B. **Basis-of-Design (Column Supported):** Mapes Architectural Products; Post Supported Walkway Canopy.
- C. **Acceptable Comparable Manufacturers:**
 - 1. Architectural Fabrication, Inc.
 - 2. Dittmer Architectural Aluminum.
 - 3. Mitchell Metals.
 - 4. Perfection Architectural Systems, Inc.
 - 5. Superior Mason Products, LLC.
 - 6. Tennessee Valley Metals.
 - 7. **Substitutions:** See Section 016000 - Product Requirements.

2.02 PROTECTIVE COVERS - GENERAL

- A. **Design Criteria:** Design and fabricate to resist gravity, wind, snow, ponding water, weather exposure, seismic, and other structural loads without failure, damage, or permanent deflection in accordance with ASCE 7, applicable building code, and as indicated on Drawings.
 - 1. **Structural Design:**
 - a. **Post-Supported:** Coordinate foundations and footing design with Division 3 Section "Cast-in-Place Concrete" and with Structural Drawings.
 - b. **Building-Mounted:** Provide engineered wall anchorage system capable of transferring structural loads to the structural CMU wythe or structural cold-formed steel framing (CFSF-S) of the exterior wall assembly. Do not support protective covers directly from brick veneer or other non-structural exterior claddings.
 - 2. **Thermal Movement:** Design protective covers to accommodate thermal movement caused by ambient temperature range of 120 degrees F and surface temperature range of 180 degrees F without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects on assembly components.
- B. **Configuration:** Column layout, dimensions, clearances, and design as indicated on drawings.
 - 1. **Drainage Concept (Post Supported):** Water collected in decking conducted into perimeter drain beams and discharged through columns. Discharge water either at grade level with diverter plates and column cutouts, or coordinate with subdrainage installer for connection into underground subdrainage system, as indicated on Drawings.
 - 2. **Drainage Concept (Building-Mounted):** Water collected in decking shall run to rear of protective cover into aluminum fascia/channel. Provide 2-inch diameter drain hole at one end of protective cover, with 3-inch by 3-inch downspout fabricated of smooth extruded aluminum. Downspout shall be fastened to wall with straps at minimum 60 inch on center. Downspouts shall drain on grade with splash block or into underground drainage, as indicated. Downspout and wall straps shall be finished to match protective cover.

- C. Provide a complete system ready for erection at project site.
- D. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.

2.03 PROTECTIVE COVERS - ASSEMBLY

- A. Description: Flat top metal framework with metal covering supported by metal columns or hanger-rod assembly, as indicated.
- B. Column Anchorage: Column embedded in concrete footing. Provide column sleeves or Styrofoam blockouts for presetting into concrete formwork.
- C. Framework: Aluminum.
- D. Covering Materials:
 - 1. Manufacturer's standard interlocking extruded aluminum decking modules.

2.04 COMPONENTS

- A. Components for Post-Supported Protective Covers:
 - 1. Columns: Extruded aluminum.
 - a. Type: Box tube column.
 - b. Cross-Section: 4 inches by 4 inches unless otherwise indicated, or unless larger column size is required due to structural engineering analysis. Minimum wall thickness of 0.125 inch.
 - c. Grout Key: Provide two 1-1/2 inch diameter holes on opposite sides in column base.
 - 2. Beams: Extruded aluminum; minimum wall thickness 0.125-inch.
 - a. Style: U-shaped drain beams.
 - b. Beam Depth: 7 inches (per basis-of-design).
 - 3. Extruded Aluminum Decking: Self-flashing, interlocking sections; minimum 0.078-inch thick.
 - a. Deck Profile: Manufacturer's standard deck section for corrugated soffit profile; size deck depth for structural spacing indicated.
 - 4. Fascia: Extruded aluminum; height per manufacturer's standard profile; minimum 0.125-inch thickness.
 - 5. Wall Attachment for Cantilever Type Post-Supported Canopies: Provide threaded rod anchors, extending fully through exterior wall. Provide integral eyebolt, "U" bracket, or manufacturer's standard clevis assembly at rod attachment anchors for hanger rod attachment. At all through anchors, provide galvanized steel compression sleeves, sized to wall cavity and cladding depth, and additional construction as needed to prevent transferring structural loads onto veneer/cladding. All loads shall transfer to structural "backup" wall.
 - a. The structural system above is per the Basis-of-Design product indicated. Manufacturer may submit an alternate pre-engineered structural system, provided the system complies with other requirements of this section and is capable of supporting loads from the primary wall structure.
- B. Components for Building-Mounted Protective Covers:
 - 1. Beams: Extruded aluminum.
 - a. Style: I-shaped beams; 3-1/4" x 3-1/4" x 1/4" nominal.
 - 2. Extruded Decking: Self-flashing, interlocking sections, minimum 0.078-inch thick.
 - a. Deck Profile: Manufacturer's standard deck section for soffit profile; size deck depth for depth of protective cover as indicated.

3. Fascia: Extruded aluminum; height per manufacturer's standard profile; minimum 0.125-inch thickness.
4. Hanger Rod Assembly: Manufacturer's standard 1-inch diameter hanger rod assembly, fabricated of schedule 40 galvanized steel. Provide aluminum clip angle bolted to aluminum I-beams for attachment of hanger rod assembly to canopy, with neoprene washers or other material standard to manufacturer for separation of dissimilar metals.
 - a. Wall Attachment: Provide threaded rod anchors, extending fully through exterior wall. Provide integral eyebolt, "U" bracket, or manufacturer's standard clevis assembly at rod attachment anchors for hanger rod attachment. At all through anchors, provide galvanized steel compression sleeves, sized to wall cavity and cladding depth, and additional construction as needed to prevent transferring structural loads onto veneer/cladding. All loads shall transfer to structural "backup" wall.
 - 1) The structural system above is per the Basis-of-Design product indicated. Manufacturer may submit an alternate pre-engineered structural system, provided the system complies with other requirements of this section and is capable of supporting loads from the primary wall structure.
- C. Exposed Framing Fasteners: Flush countersunk stainless steel screws or bolts; consistent with design of system and acceptable to manufacturer.
 1. Decking Fasteners: Stainless steel with neoprene washers.
 2. Finish exposed fasteners to match metal framing.
- D. Flashings: Metal and finish matching system framing components, with thickness as recommended by manufacturer for conditions encountered.

2.05 MATERIALS

- A. Aluminum:
 1. Aluminum Extrusions: Alloy and temper 6063-T5, 6063-T6, or 6061-T6 members complying with ASTM B221 (ASTM B221M), with minimum thickness 1/8 inch for structural members and 1/16 inch for nonstructural members.
- B. Concrete for Footings: Refer to Division 3 Section "Cast-in-Place Concrete."
- C. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 1. Grout: Comply with ASTM C1107/C1107M.
- D. Bituminous Coating: ASTM D 1187 asphaltic coating or comparable protective coating to prevent corrosion between materials. Building felt is not acceptable.

2.06 FABRICATION - METAL COMPONENTS

- A. Fit and shop assemble components in largest practical sizes, for delivery to site.
- B. Fabricate components with joints tightly fitted and secured.
- C. Provide notches, cut outs, and internal deflectors in members as noted to act as internal water drainage system.
- D. Weld aluminum members in accordance with AWS D1.2/D1.2M.
- E. Exposed Fastenings: Unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of framing. Fabricate anchors and related components of same material and finish as framing, except where specifically noted otherwise.
- G. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

- H. Accurately form components to suit each other and to building structure.

2.07 FINISHES

- A. High Performance Organic Coatings: AAMA 2604, multiple coats, thermally cured fluoropolymer system.
- B. Finish Color: As selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates and site area for conditions that might prevent satisfactory installation.
- B. Verify that foundation, electrical utilities, and placed anchors are in correct position.
- C. Verify that bearing surfaces are ready to receive this work.
- D. Do not proceed with installation until conditions are satisfactory.

3.02 PREPARATION

- A. Supply items required to be cast into concrete with setting templates for installation of work in other sections.
- B. Concrete Foundations/Footings: Coordinate with and provide column sleeves or Styrofoam blockouts to the concrete installer to ensure foundations comply with manufacturer's requirements.

3.03 INSTALLATION - FRAMING

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Post Supported Canopies: Anchor columns in concrete foundations with column sleeves or preset Styrofoam blockout locations. Insert columns into foundation space and fill remaining annular space between concrete and columns with non-shrink cementitious grout. Wipe off surplus anchoring material, provide 1/8-inch build up at column and slope smoothly away from column. Seal anchoring material when required by grout manufacturer's installation instructions.
- D. Building Mounted Canopies: Provide threaded anchor assemblies required for connecting framing to structure. Anchor framing to primary structural wall elements. Where primary structure of exterior wall is cold-formed steel framing (CFSF-S metal studs), provide additional fire-retardant treated wood blocking between metal stud members to accommodate hanger rod spacing.
- E. Protective Coating: Provide a protective coating to separate aluminum surfaces from masonry, concrete or cementitious materials, and dissimilar metals.

3.04 INSTALLATION - METAL COVERING

- A. Install in accordance with manufacturer's instructions.
- B. Fasten metal decking to metal support members, aligned level and plumb.
- C. Install fascia panels, trim, and flashing.
- D. Separate dissimilar metals using concealed bituminous paint.
- E. Touch-up damaged finish coating using material provided by manufacturer to match original coating.

3.05 TOLERANCES

- A. Maximum Variation from Plumb, Level, or Line: 1/8 inch per 10 feet, or 3/8 inch total in overall dimension.
- B. Alignment of Two Adjoining Members Abutting in Plane: Within 1/16 inches.

3.06 CLEANING

- A. See Section 017000 - Execution and Closeout Requirements for additional requirements.
- B. Clean all exposed surfaces after installation.

3.07 PROTECTION

- A. Touch-up, repair, or replace damaged components before Date of Substantial Completion.
- B. Protect protective covers after installation to prevent damage due to other work until Date of Substantial Completion.

END OF SECTION 107300

**SECTION 113013
RESIDENTIAL APPLIANCES**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. UL (DIR) - Online Certifications Directory Current Edition.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

1.03 QUALITY ASSURANCE

- A. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

PART 2 PRODUCTS

2.01 KITCHEN APPLIANCES

- A. Cooking Exhaust: Range hood.
 - 1. Size: 30 inches wide.
 - 2. Fan: Two-speed, 500 cfm
 - 3. Exhaust: Recirculating.
 - 4. Features: Include cooktop light, night light, backdraft damper, and removable grease filter.
 - 5. Provide wall mounted switch.
 - 6. Exterior Finish: Painted steel, color Stainless Steel.
 - 7. Manufacturers:
 - a. Broan-NuTone, LLC; BCDF130SS Under-Cabinet Range Hood
 - b. Frigidaire Home Products; FHWC3025MS
 - c. GE Appliances; PVX7300SJSS:
 - d. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify utility rough-ins are provided and correctly located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Anchor built-in equipment in place.

3.03 ADJUSTING

- A. Adjust equipment to provide efficient operation.

3.04 CLEANING

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

END OF SECTION 113013

**SECTION 116143
STAGE CURTAINS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM A391/A391M - Standard Specification for Grade 80 Alloy Steel Chain 2021.
- D. ASTM A413/A413M - Standard Specification for Carbon Steel Chain 2021.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- F. FM (AG) - FM Approval Guide current edition.
- G. ITS (DIR) - Directory of Listed Products current edition.
- H. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2019.
- J. UL (DIR) - Online Certifications Directory Current Edition.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide for each type of product as follows:
 - 1. Stage Curtains: Provide information on type of curtain, weight, location for use on project, and type of flame retardancy.
 - 2. Tracks: Provide capacity of each curtain track to support curtain weight and control curtain operation.
 - 3. Pipe Grid and Rigging: Provide product data for each component of pipe grid assembly, including load capacity of pipe grid components and rigging chain and cable.
- C. Shop Drawings: Indicate installation information for components not dimensioned or detailed in product data.
 - 1. Submit floor plans, elevations, sections, attachment details of curtains and operating clearances.
 - a. Submit layout of pipe grid and battens, including attachment locations to structure.
 - 2. Submit documentation indicating load capacity of pipe grid, battens, track, attachment, and rigging components.
 - 3. Submit attachment locations for each type of curtain, and corresponding loads imposed on structure.
- D. Selection Samples: Submit color chart for each type of stage curtain indicated that includes full range of colors, textures, and patterns available, along with 12-inch square fabric sample, in any color, of each fabric type and seam.

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- E. Verification Samples: Submit fabric full width by at least 12-inch long section of each selected fabric, with specified treatments applied and showing repeat of patterns; mark top and face of fabric.
- F. Certificate: Certify that products of this section meet or exceed specified requirements.
- G. Delegated Design Data: Indicate stage curtain system structural attachments, including analysis data signed and sealed by qualified designer responsible for their preparation.
- H. Designer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design of track support system under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Installer Qualifications: Company specializing in performing work of the type specified; certified installation representative of curtain fabricator/manufacturer.

1.05 FIELD CONDITIONS

- A. Ambient Conditions: Do not install stage curtains until spaces are fully enclosed and watertight, and the following:
 - 1. Wet work in adjacent areas is complete and surfaces are dry.
 - 2. Work at and above ceiling level has been completed.
 - 3. Ambient temperatures and humidity of adjacent areas are maintained at levels when occupied for intended use.
- B. Field Measurements: Confirm supporting structural element locations and adjacent construction for stage curtains and rigging, and complete field measurements prior to fabrication and include these dimensions on shop drawings.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
 - 1. Defective Work includes, but is not limited to, stage curtain support and rigging that is not operating properly.

PART 2 PRODUCTS

2.01 FABRICATORS

- A. Stage Curtain and Track/Rigging Assembly Fabricators:
 - 1. Beck Studios Inc.; Milford, OH; <https://www.beckstudios.net/>
 - 2. Georgia Stage; Duluth, GA; <https://www.gastage.com/>
 - 3. LuXout Stage Curtains; Richmond, VA; <https://www.luxout.com/>
 - 4. Janson Industries; Canton, OH; <http://www.jansonindustries.com/>
 - 5. J.R. Clancy, Inc; Syracuse, NY; <https://www.jrclancy.com/>
 - 6. Texas Scenic Company, Inc; San Antonio, TX; <https://www.texasscenic.com/>
 - 7. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Stage Curtain Systems Design: Engage qualified designer to develop design of stage curtain system, including comprehensive project specific analysis of necessary structural system attachments in compliance with performance requirements.
- B. Structural Performance: Ensure attachment of stage curtain system to structure withstands material weight and operational loads applicable for this project and in compliance with local building codes and authorities having jurisdiction.
 - 1. Design Loads: Weight of stage curtains and track system.
- C. Fire-Test Characteristics: Stage curtain fabrics in compliance with NFPA 701 flame propagation fire test requirements conducted by authorized testing agency, listed by UL (DIR), ITS (DIR), or FM (AG) and acceptable to authorities having jurisdiction.
 - 1. Permanently attach label to fabric of each curtain assembly indicating fabric treatment as follows:
 - a. Inherently Flame Retardant (IFR), fibers/yarns that are non-combustible for life of fabric.
- D. Electrical Components: Devices that are listed and labeled in compliance with NFPA 70, by a qualified testing agency, and marked for designated application.

2.03 STAGE CURTAIN FABRICS

- A. Provide curtains of matching fabric and color from single dye lot, and when size and quantity of curtains exceeds maximum dye lot size, provide curtain or adjacent pair of curtains from only one dye lot, and arrange curtain dye lots to minimize exposure of any differences.
- B. Polyester Velour: Weighing at least 22 oz/linear yd, napped fabric of 100 percent polyester with minimum pile height of 75 mil, 0.075 inch and minimum width of 54 inches.
 - 1. Application: Theatre Room cyclorama curtains.
 - 2. Color: As selected by Architect from manufacturer's full range.
 - 3. Texture: As selected by Architect from manufacturer's full range.
 - 4. Pattern: As selected by Architect from manufacturer's full range.
 - 5. Products:
 - a. Fred Krieger & Company; IFR Prism Velour 22 oz.
 - b. KM Fabrics, Inc; Prestige.
 - c. LuXout; Prologue 22 oz.
 - d. Rose Brand; Encore..
 - e. Substitutions: See Section 016000 - Product Requirements.

2.04 CURTAIN TRACK

- A. Steel Track: Commercial quality, roll-formed, galvanized steel sheet, ASTM A653/A653M, with G60 coating designation; with continuous bottom slot and each half of track in single continuous piece; black paint finish; including support and operation accessories.
 - 1. Thickness: As recommended by manufacturer for curtain loads and operation.
 - a. Heavy-Duty: 14-gauge, 0.0747-inch minimum thickness.
 - 2. Products:
 - a. Automatic Devices Company; Silent Steel 280 series.
 - b. H & H Specialties, Inc.; 200 series.
 - c. Substitutions: See Section 016000 - Product Requirements.
 - B. Curved Track: Shop fabricate curved portions of curtain track.
-

1. Curved Track Cable Guides: Provide outside idlers, mule pulleys, spindles, and guides as required for curve configuration and track length.
- C. Curtain Rails: Provide single or double curtain capacity as indicated on drawings, and end stops.
- D. Curved-Suspended-Track Stiffener: Steel pipe, 1-1/2-inch nominal diameter, Grade A, Schedule 40 in accordance with ASTM A53/A53M; support both sections of curved suspended tracks, with curve to match track.
- E. Clamp and Bracket Hangers: Steel clamps and brackets of required strength to support loads for attaching track to overhead support.
- F. Track-Lap Clamp: Clamp that matches track channel finish as necessary for attaching two tracks at center overlap.
- G. Operation:
 1. Manual Walk-Along Operation: Curtain track without a cord, cable, pulleys, or floor pulley; must walk with curtain to open and close.
- H. Track System: Provide heavy-duty curtain track with components as recommended by manufacturer for loads and operation, including track end stops.
 1. Carriers: Standard plated-steel carriers with a pair of polyethylene tired ball-bearing wheels riveted parallel to body, and equip carriers with rubber or neoprene bumpers to reduce noise and plated-steel swivel eye and trim chain for attaching curtain snap or S-hook, and required number of curtain carriers for track length and curtain fabrication.
 - a. Master Curtain Carriers: One plated-steel master carrier for each leading curtain edge, with two pairs of nylon tired ball-bearing wheels and with two line guides per carrier.
 2. Pulleys: One dead-end, single-wheel pulley; one live-end, double-wheel pulley; and one adjustable pulley to maintain proper tension on operating line; each with molded-nylon-tired ball-bearing sheaves enclosed in steel housings; pulleys with steel housing finished to match track and with bracket for securing off-stage end of curtain.

2.05 FABRICATION - CURTAINS

- A. General: Provide vertical seams unless otherwise indicated, locate vertical seams so they do not fall on faces of pleats, and only use fabric that is cut greater than half the width of fabric.
 - B. Vertical and Top Hems: Machine sew hems as follows, unless otherwise indicated:
 1. Vertical Hems: Fabricate at least 2 inches wide, and at least 4 inches wide at borders, valances, teasers, and tormentors with at least 1-inch tuck and without visible selvedge material from front of curtain; sew open ends of hems closed.
 2. Turnbacks: Fabricate leading-edge and trailing-edge turnbacks for traveler curtains by folding back at least 12 inches of face fabric, with at least 1-inch tuck, and vertically secured by sewing.
 3. Top Hems: Fabricate by double-stitching 3-1/2-inch wide heavy jute or laminated synthetic webbing to top edge at back side of curtain, and with at least 2 inches of face fabric turned under.
 - C. Fullness:
 1. 50 Percent Fullness: Provide this fullness, exclusive of turnbacks and hems, and spaced at 12 inches on center along top hem reinforcement as follows:
 - a. Sewing additional material into 3-inch double-stitched, flat, box pleats.
 - D. Grommets:
 1. Black Colored Curtains: No. 3 brass or No. 4 brass grommets with black finish.
-

2. Pleated Curtains: Provide grommets centered on each box pleat and placed 1 inch from corner of curtain; for snap hooks or S-hooks.
- E. Bottom Hems: Machine sew hems as follows, unless otherwise indicated:
1. For Curtains With Fullness:
 - a. Floor Length Curtains: Provide hems at least 6 inches deep, with individual weights in individual closed pockets sewn above finished bottom edge of curtain, and open ends of hems sewn closed.

2.06 PIPE GRID

- A. General: Fabricate pipe grid in configuration indicated on Drawings from steel pipe battens, trim and support cable and chain, clamps, and anchors, as specified in Accessories article below.
1. Clamps: At pipe grid, provide a cross grid connection clamp at each intersection of battens.
 2. Suspend stage curtain track from pipe grid batten with manufacturer's recommended clamp and hanger assembly.

2.07 ACCESSORIES

- A. S-Hooks: Manufacturer's standard heavy-duty plated wire hooks, at least 2 inches long.
- B. Tie Lines: No. 4 or No. 4-1/2 cord or braided soft cotton tape, colored to best match curtain; at least 5/8 inch wide by 36 inches long and threaded through grommets.
- C. Battens: Fabricate using steel pipe and minimize the number of joints; connect pipe at joints using 18-inch long internal splice sleeve secured with four flush rivets, plug welds, threaded couplings, or equally strong method.
1. Steel Pipe: 1-1/4-inch nominal diameter, Grade A, Schedule 40 in accordance with ASTM A53/A53M.
 2. Finish: Matte black with 1-inch wide yellow-colored stripe along center of each batten.
- D. Support, Clamps, and Anchors: Galvanized after fabrication sheet steel, Class B in accordance with ASTM A153/A153M; manufacturer's standard thickness.
- E. Trim and Support Cable: 1/4-inch diameter, 7x19 galvanized steel cable with minimum breaking load (MBL) of 7,000 lb.
1. Provide fittings in accordance with cable manufacturer's written instructions for size, number, and method of installation, including a drop-forged galvanized turnbuckle to allow for leveling.
- F. Trim and Support Chain: Hardened alloy steel chain rated for overhead lifting, Grade 80 in accordance with ASTM A391/A391M.
1. Trim Chain: Proof coil chain, No. 8, zinc plated, 1/4-inch diameter, Grade 30 in accordance with ASTM A413/A413M.
 - a. Trim Chain shall have a minimum working load of 750 lbs.
 - b. Connection between end link and lifting cable shall be made with a thimble and copper Nicopress sleeve.
 - c. Trim chains shall be wrapped one and one half turns around batten and attached back to thimble at the end of the lift line with a 1/4 inch forged shackle. Adjustment is made by connecting the shackle into a link along the return side of the chain.
- G. Inserts, Bolts, Rivets, and Fasteners: Manufacturer's standard and corrosion-resistant.
- H. Individual Curtain Bottom Weights: Curtain manufacturer's standard segmented weights in compliance with requirements for curtain type and location.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with installer present, for compliance with requirements for supporting structural members, blocking, clearances, installation tolerances, and other conditions that may impact performance of stage curtain assembly.
- B. Examine placement and condition of inserts, clips, blocking, or other supports installed by others and for use in supporting track and battens of stage curtain assembly.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Install stage curtain assembly in accordance with curtain and track manufacturers written instructions.

3.03 INSTALLATION - CURTAIN

- A. Track Hung: Secure curtains to track carriers with S-hooks.

3.04 INSTALLATION - BATTENS (PIPE GRID)

- A. Install battens by suspending at heights as indicated with trim and supports spaced as required to support loads; do not exceed 10 feet between supports.
 - 1. Cable Trim and Support:
 - a. Fasten cables securely to either structure or to inserts, eye screws, or other applicable devices that are appropriate for substrate and not subject to deterioration or failure with time or elevated temperatures.
 - b. Attach other end of cable to pipe clamps with turnbuckles, housed or fixed securely after adjustment to prevent loosening.
 - 2. Chain Support: Secure chain as required for application with load-rated terminations.

3.05 INSTALLATION - TRACK

- A. Mounting of Track Assembly:
 - 1. Batten Mounted: Install track by suspending from pipe batten with manufacturer's acceptable track clamp hangers securely attached to batten pipe clamps and within intervals indicated in manufacturer's written instructions for on center spacing.
- B. Track Support Spacing: Comply with manufacturer's recommendations for applied loads, and not to exceed the following dimensions between track supports:
 - 1. Heavy-Duty Track: 6 feet, maximum.
- C. Install track for center-parting curtains with at least 24-inch overlap of track sections at center-line, and supported with track lap clamps.

3.06 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate operation of system to Owner's personnel.
 - 1. Use operation and maintenance data as reference during demonstration.
 - 2. Briefly describe function, operation, and maintenance of each component.
- B. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours of training.

3.07 PROTECTION

- A. Protect installed stage curtain assembly from subsequent construction operations until Date of Substantial Completion.

END OF SECTION 116143

**SECTION 117300
PATIENT CARE EQUIPMENT**

PART 1 GENERAL

1.01 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets for each type of equipment specified. Indicate dimensions, performance requirements, service and electrical requirements, materials, finishes, and options.
- C. Operation Data: Include description of equipment operation and required adjusting and testing.
- D. Maintenance Data: Identify system maintenance requirements, servicing cycles, lubrication types required and local spare part sources.

1.02 DELIVERY, STORAGE, AND HANDLING

- A. Package equipment to project site in protective packaging.
- B. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

1.03 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 EXAM/TREATMENT/CHANGING TABLE

- A. Exam / Treatment / Changing Table Manufacturers:
 - 1. Basis of Design Product: Midmark; Ritter 244 Barrier-Free Exam Table.
 - 2. Other Acceptable Manufacturers:
 - a. Armedica Manufacturing.
 - b. Clinton Industries, Inc.
 - c. Substitutions: See Section 016000 - Product Requirements.
- B. Description: Freestanding mobile unit with locking casters, minimum 80 inches long by 30 inches wide, height adjustable, with multi-position adjustable-angle back and seat sections.
 - 1. Exam table shall be bariatric-grade and shall be engineered to support a minimum of 500-lb static load when opened.
 - 2. Conform to ADA accessibility requirements.
 - 3. Operation: Foot-operated electrical (120V); operates a pneumatic or hydraulic mechanism to raise and lower the entire unit and operate the back and seat sections.
 - 4. Material and Finish: Manufacturer's standard vinyl upholstered finish; color selected by Architect from manufacturer's standard range.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine areas and conditions, with installer present, for compliance with requirements of supporting structural members, installation tolerances, and other

conditions that may impact performance of equipment.

1. Do not install equipment until finishes in the space are complete and space is conditioned at occupancy conditions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions and approved shop drawings.

3.03 ADJUSTING

- A. Adjust operating equipment for smooth and efficient operation throughout full operating cycle.

3.04 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate operation of equipment to Owner's personnel.
1. Use operation and maintenance data as reference during demonstration.
 2. Briefly describe function, operation, and maintenance of each component.
- B. Training: Train Owner's personnel on operation and maintenance of system.
1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 2. Location: At project site.
- C. Final Acceptance: Remove labels, fingerprints; clean surfaces. Repair any marred or damaged surfaces that effect appearance in manner not acceptable to Owner. Replace any parts that cannot be repaired in such a manner.

3.05 PROTECTION

- A. Protect installed equipment from subsequent construction operations.

END OF SECTION 117300

**SECTION 119500
PAINT SPRAY BOOTHS**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. 29 CFR 1910.107 - Spray finishing using flammable and combustible materials current edition.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2022.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- D. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021a.
- E. NFPA 33 - Standard for Spray Application Using Flammable or Combustible Materials 2021.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide paint spray booth exterior and interior dimensions and construction, utility and service requirements and locations.
- C. Shop Drawings: Indicate locations, large scale plans, elevations, cross sections, rough-in and anchor placement dimensions and tolerances, clearances required, locations and types of service fittings.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements. Provide documentation of compliance with both 29 CFR 1910.107 and NFPA 33.
- E. Operation Data: Include description of equipment operation and required adjusting and testing.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- G. Project Record Documents: Record actual locations of concealed utility connections.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

1.05 FIELD CONDITIONS

- A. Ambient Conditions: Maintain temperature and relative humidity at occupancy levels during and after installation of paint spray booths.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work for the following periods after Date of Substantial Completion:

1. Provide ten year limited warranty on fabricated sheet metal spray booth housing.
2. Provide two year warranty covering materials and workmanship of fans and lighting.
3. Provide one year manufacturer warranty for the remaining balance of manufacturer's standard items and components.

PART 2 PRODUCTS

2.01 DRY FILTER PAINT SPRAY BOOTHS

- A. General Requirements:
 1. Rough in and pre-wire spray booths for light fixtures, fan switches, and other electrical components.
 - a. Terminate all wiring in a junction box on top of hood.
- B. Dry Filter Paint Spray Booths:
 1. Basis-of-Design Product: Diversified Air Systems, Inc.; Open Front Bench Booth; Model FBB-06-07-03.
 2. Configuration: Floor mounted.
 3. Total Outside Dimensions: 6' - 4" wide by 7' - 2" high by 5' - 2" deep.
 4. Height to Worksurface: 36 inches.
 5. Nominal Interior Height: 48 inches.
 6. Steel Panel: Fabricated from steel sheet, 0.048 inch thick (18 gauge), with component parts screwed together to allow removal of panels and fascia, to allow access to service fittings. Provide with manufacturer's standard chemical-resistant finish applied to interior and exterior surfaces of component parts before assembly.
 7. Ventilation: 18-inch diameter, top mounted exhaust fan.
 - a. Fan Motor: 208/240V, 3/4 HP, 60 Hz, 1 Phase.
 8. Differential Pressure Gauge: Provide direct-reading manometer that measures the difference in static pressure across the filter during operation.
 9. Access Panels: Provide removable panels for access to filters, fan, motor, and other concealed components, as required.
 10. Work Surface: Manufacturer's standard, steel.
- C. Light Fixtures: Manufacturer's standard, UL labeled, vaporproof, fluorescent light fixtures. Number and length of fixtures as necessary for spray booth width. White baked-enamel finish on fixture interior.

2.02 FABRICATION

- A. General: Assemble paint spray booths in factory to greatest extent possible. Disassemble only as necessary for shipping and handling limitations, or as necessary to permit movement through a 35 inches by 79 inches clear door opening.
- B. Comply with requirements of other sections for factory installation of water and laboratory gas service fittings, piping, electrical devices, and wiring. Securely anchor fittings, piping, and conduit to spray booths, unless otherwise indicated.

2.03 MATERIALS

- A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008/A1008M; matte finish; suitable for exposed applications.
- 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. Fasteners: Stainless-steel, where exposed to fumes.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Locate concealed framing, blocking, and reinforcements that support paint spray booths by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- B. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of paint spray booths.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General: Install paint spray booths as a complete assembly according to manufacturer's written instructions. Install level, plumb, and true; shim as required, using concealed shims, and securely anchor to building structure. Securely attach access panels where required, and provide for easy removal and secure reattachment.
- B. Where spray booths abut other finished work, coordinate with installers
- C. Large Components: Ensure that large components can be moved into final position without damage to other construction.
- D. Coordinate with Mechanical Documents for ventilation and exhaust connections and with Electrical Documents for power and lighting connections.

3.03 FIELD QUALITY CONTROL

- A. Engage paint spray booth manufacturer's technical representative to inspect and field test installed paint spray booth.
- B. Field test paint spray booths as specified below.
 - 1. Preparation:
 - a. Inspect each paint spray booth to confirm its installation complies with drawings and specifications.
 - b. Do not proceed with spray booth testing until mechanical system is fully operational and an acceptable TAB report has been received.
 - 2. Operating Conditions Tests:
 - a. Conduct airflow tests to confirm acceptable exhaust/ventilation. Calibrate and adjust device to function within specified accuracy parameters.
 - b. Conduct tests of individual controls and safeties provided at the spray booth to verify they operate in specified manner.

3.04 ADJUSTING

- A. Adjust moving parts for smooth and safe operation. Verify that paint booth operates within the intended operating range without interference.

3.05 CLEANING

- A. Clean finished surfaces; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

3.06 DEMONSTRATION

- A. Engage paint spray booth manufacturer's technical representative to demonstrate paint spray booth. Demonstration may be performed at the same time as field testing and inspection.

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- B. Demonstrate proper operation of paint spray booths and their accessories to Owner's designated representative.

END OF SECTION 119500

**SECTION 119513
KILNS**

PART 1 GENERAL

1.01 SCOPE

- A. Contractor shall remove and reinstall existing kiln in location indicated on Drawings. Contractor shall provide required electrical and mechanical connections, wiring, and components as required for a complete, operational system
- B. Contractor shall provide new overhead ventilation hood and all required accessories, fasteners, and electrical and mechanical connections, wiring, ductwork, and other components necessary for a complete, operational ventilation system.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: For ventilation system and accessories. Include product data, installation instructions, and manufacturer's recommendations.
- C. Shop Drawings: Indicate space required, clearances, and relationship to adjacent construction. Provide ventilation duct layout and routing.
- D. Operation and Maintenance Data: For ventilation system, to include in operation and maintenance manual.
- E. Specimen warranty.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Deliver ventilation systems and accessories to project site in manufacturer's original packaging, with protective coverings intact.
- B. Store under cover and elevated above grade. Do not stack items on top of kilns.
- C. Protect from damage due to weather, excessive temperature, and construction operations.

1.04 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide two-year manufacturer warranty for kiln components, including, ventilation, accessories, and workmanship.

PART 2 PRODUCTS

2.01 ELECTRIC KILNS

- A. Existing Kiln: Contractor shall remove existing kiln, including kiln base, accessories, and other components, store in a secure location, and reinstall in new location indicated.
- B. Electrical Components and Devices: Shall be listed and labeled by UL or other qualified testing agency, and as required by NFPA 70.
 - 1. Electrical Requirements (Verify with existing kiln model in field): 208 V, 1 Ph, 48 A

2.02 OVERHEAD VENTILATION SYSTEM

- A. Overhead Ventilation System: Negative-pressure system capable of removing heat in addition to fumes and odors. Provide properly sized system for specified kiln. Basis-of-Design is Vent-A-Kiln Corporation "Vent-A-Kiln" system. System shall consist of the following components:

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1. Blower motor with six-foot power cord and in-line switch.
2. Wall bracket, sized to blower motor, for motor mounting.
3. Aluminum hood, sized for kiln.
4. Overhead mounting bar of 1 inch square structural steel tube, and counter-weighted pulley lifting system, with 3/16" plastic-coated steel cable and 3" diameter steel counterweight.
5. Flexible aluminum duct. Provide additional lengths of duct beyond what is provided standard, as required to vent the system to exterior as indicated.

2.03 ACCESSORIES

- A. Fasteners and Anchors: Provide mechanical fasteners and anchors in type and quantity as required by manufacturer's installation instructions to provide secure attachment to in-place construction.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Verify that all finishes have been completed in installation locations, and verify that clearances to adjacent construction are adequate for proper and safe operation of equipment.
- B. Examine roughing-in of electrical and ventilation systems to verify location of connections is acceptable prior to installation of kilns.

3.02 PREPARATION

- A. Protection of In-Place Conditions: Protect adjacent finishes from damage or wear due to handling and installation of kilns and accessories.

3.03 INSTALLATION

- A. Install kilns and accessories in accordance with manufacturer's written instructions.
- B. Coordinate installation with adjacent construction to ensure proper clearances.
- C. Install units in final locations after finishes have been completed in each area.
- D. Install units level, plumb, properly aligned, and securely in place, with control units facing toward clear, open floor space.
- E. Verify that final installation clearances are adequate to properly and safely operate equipment.
- F. Refer to Division 26 for electrical requirements.
- G. Overhead Ventilation System:
 1. Assemble and install system components centered above kiln, in accordance with manufacturer's written instructions.
 2. Secure assembled pulley and counterweight system to building structure. Do not fasten overhead mounting bar/pulley counterweight system directly to the ceiling.

3.04 STARTUP, DEMONSTRATION, AND TRAINING

- A. See Section 017900 - Demonstration and Training for additional requirements.
- B. Demonstrate proper operation of equipment to Owner's designated personnel.
- C. Training: Train Owner's personnel on operation and maintenance of system.
 1. Software: Coordinate with Owner's personnel to ensure that kiln control software is properly installed on Owner's computer hardware. Training shall include the use of control

software.

3.05 ADJUSTING, CLEANING, AND PROTECTION

- A. After startup and demonstration, verify proper operation and make any necessary adjustments.
- B. Protect installed kilns from subsequent construction operations. Do not stack or place any materials on or against kilns.
- C. Provide final cleaning of kiln and leave kiln ready for operation.

END OF SECTION 119513

**SECTION 122400
WINDOW SHADES**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2019.
- C. UL (GGG) - GREENGUARD Gold Certified Products Current Edition.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.
- B. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- D. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- E. Selection Samples: Include fabric samples in full range of available colors and patterns.
- F. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.
- G. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized installation representative of fabricator/manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.06 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following minimum terms:
 - 1. Electric Motors and Components: 5 years, minimum.
 - 2. Manual Operating Mechanism / Clutch: 10 years, minimum (excludes bead chain).
 - 3. Fabric: 10 years, minimum.
 - 4. Balance of Shade Hardware and Non-Operating Materials and Components: 25 years, minimum.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Interior Manually Operated Roller Shades:
 - 1. Basis of Design: WT Shade; HeliaRise.
 - 2. Draper, Inc; Clutch Operated FlexShade.
 - 3. Hunter Douglas Architectural; RB500 Manual Roller Shades.
 - 4. Lutron Electronics Co., Inc; Contract Roller Manual Roller Shades.
 - 5. MechoShade Systems LLC; Mecho/5 System.
- B. Interior Motorized Roller Shades, Motors and Motor Controls:
 - 1. Basis of Design: WT Shade; MotoRise.
 - 2. Draper, Inc; Motorized FlexShade.
 - 3. Hunter Douglas Architectural; RB500 Motorized Roller Shades.
 - 4. Lutron Electronics Co., Inc; Contract Roller Motorized Roller Shades.
 - 5. MechoShade Systems LLC; Electroshade.
- C. Source Limitations: Provide products produced by a single manufacturer and obtained from a single supplier.

2.02 ROLLER SHADES

- A. General:
 - 1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
 - 2. Provide shade system that operates smoothly when shades are raised or lowered.
- B. Roller Shades:
 - 1. Description - Interior Roller Shades: Single- and dual-roller as indicated, fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories. Provide both manual and motorized operation, per locations indicated on Drawings.
 - a. Drop Position: Regular roll.
 - b. Roll Direction: Roll down, closed position is at window sill.
 - c. Mounting: Window jamb mounted - inside, between jambs.
 - d. Size: As indicated on drawings for rough opening sizes; field verify rough openings prior to fabrication.
 - 2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.

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- a. Double Roller Brackets: Configured for light-filtering and room-darkening shades in one opening.
 - 1) Light-Filtering Fabric: Room-side of opening.
 - 2) Room-Darkening Fabric: Glass-side of opening.
3. Roller Tubes: As required for type of shade operation.
 - a. Material: Extruded aluminum, clear anodized finish or electrogalvanized/epoxy primed steel, as standard with manufacturer.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge.
4. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
5. Manual Operation for Interior Shades:
 - a. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
 - b. Drive Chain: Continuous loop beaded ball chain, 95 pounds minimum breaking strength. Provide upper and lower limit stops.
6. Accessories:
 - a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; clear anodized finish.
 - b. End Caps: Provide manufacturer's standard end caps to cover exposed ends of brackets.
 - c. Ceiling Pockets with Prewired Raceway: UL 325 listed, extruded aluminum shade pocket with removable closure panel and ceiling tile support, for recess mounting in acoustical tile or drywall ceilings; size and configuration as indicated on drawings.
 - 1) Designed to accommodate installation of motor control and wiring accessories within pocket.
 - d. Fasteners: Noncorrosive, and as recommended by shade manufacturer.

2.03 SHADE FABRIC

- A. Fabric: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 1. Manufacturers:
 - a. Basis of Design: EcoFabrix 253 for 3% fabric and EcoFabrix 770GC for blackout, or comparable products by one of the following.
 - b. Lutron Electronics Co., Inc.
 - c. Mermet Corporation.
 - d. Phifer, Inc.
 2. Material: Vinyl coated fiberglass.
 3. Material Certificates and Product Disclosures:
 - a. Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
 4. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large and small tests.
 - b. Fungal Resistance: No growth when tested according to ASTM G21.
 5. Openness Factor: 3% and blackout as required.
 6. Color: As selected by Architect from manufacturer's full range of colors.
-

7. Fabrication:
 - a. Fabric Orientation: Railroaded, fabric is turned 90 degrees off the roll.
 - b. If height of opening requires multiple panels of railroaded fabric, use manufacturer's standard sewn seams.

2.04 MOTOR CONTROLS

- A. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
- B. Provide all components and connections necessary to interface with other systems as indicated.
- C. Manual Controls:
 1. Control Functions:
 - a. Open: Automatically open controlled shade(s) to fully open position when button is pressed.
 - b. Close: Automatically close controlled shade(s) to fully closed position when button is pressed.
 2. Wall Controls: Provided by shade manufacturer.
 - a. Finish: Match other cover and switch plates in same room.

2.05 ROLLER SHADE FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
 1. Vertical Dimensions: Fill openings from head to sill with 1/4 inch maximum space between bottom bar and window stool.
 2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb, with maximum 1/4 inch gap at each edge of jamb.
- C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.
- B. Training: Train Owner's personnel on operation and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the Owner.

3.06 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION 122400

**SECTION 123583
MUSIC EQUIPMENT STORAGE CASEWORK & ACCESSORIES**

PART 1 GENERAL

1.01 DEFINITIONS

- A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches above finished floor, tops of cases less than 72 inches above finished floor and all members visible in open cases or behind glass doors.
- B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches above finished floor and bottoms of cabinets more than 30 inches but less than 42 inches above finished floor.
- C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches above finished floor.

1.02 REFERENCE STANDARDS

- A. BHMA A156.9 - Cabinet Hardware 2020.
- B. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; California Air Resources Board current edition.
- C. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Component dimensions, configurations, construction details, joint details, attachments.
- C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors, reinforcements, and blocking, placement dimensions and tolerances, clearances required, and keying information.
 - 1. Include utility locations and connection requirements.
- D. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- E. Finish touch-up kit for each type and color of materials provided.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

- B. Acceptance at Site:
 - 1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.
- C. Storage:
 - 1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Instrument cabinetry and shelving shall have a ten year factory warranty from Date of Substantial Completion. Cover defects in materials and workmanship. Defects include, but are not limited to:
 - 1. Ruptured, cracked, or stained finish coating.
 - 2. Discoloration or lack of finish integrity.
 - 3. Cracking or peeling of finish.
 - 4. Delamination of components.
 - 5. Failure of adhesives.
 - 6. Failure of hardware.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Wenger Corp.; AcoustiCabinets and UltraStor cabinets; models as indicated on Music Casework Schedule.
- B. Subject to conformance with specifications, including features not standard to the manufacturer, the following manufacturers may provide products for this project, subject to submittal and approval by Owner and Architect of samples of materials, construction features, and finishes as stipulated in the Design Requirements paragraph below.
 - 1. Corilam.
 - 2. Melhart Storage Solutions.
 - 3. Stevens Industries, Inc.
 - 4. TMI Systems Corporation.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- C. Obtain casework from single source and manufacturer, unless otherwise indicated.

2.02 THERMALLY FUSED LAMINATE MUSIC CASEWORK

- A. Quality Standard: AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Thermally Fused Laminate Music Casework: Custom Grade.
- C. Design Requirements:
 - 1. Provide music storage cabinets specifically designed and intended for use with musical instruments. Storage units shall be chip and abrasion resistant under heavy usage and shall protect instruments and cases from damage under normal use.
 - 2. Construction, General: Thermally fused laminate panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes

necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base and tall cabinets. Include integral toe-kick, finished to match adjacent paneling.

- a. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on Drawings and Music Casework Schedule, and per Basis-of-Design models indicated.
3. Shelving: Provide minimum 3/4-inch thick high strength instrument shelving with scuff-resistant plastic surface, with integral profiled surface for ventilation, with radiused (bullnose) front edge, designed and engineered to withstand continuous use without surface or front edge breakdown.
 - a. Loading: Each shelf shall be able to independently and safely support 200 lbs minimum, uniformly distributed, with maximum deflection of L/144.
4. Paneling: Manufacture instrument cabinet with 3/4-inch composite panels finished with thermally-fused laminate (melamine) or polyester laminate, meeting performance requirements of NEMA LD 3 for VGS grade, both faces; and edge banded with 3 mm radiused PVC. Factory jig and drill end panels to accept unit-to-unit through bolting; wood screw attachment is not acceptable.
 - a. Rear Panels: Provide rear panels fabricated of minimum 1/4-inch MDF, fully captured all four sides, or 1/2-inch particleboard full overlay. For all cabinets with wire grille doors or open interior (no doors), provide acoustically absorptive material on inside face of rear panels.
 - b. Panel Colors: Exterior panel colors and edge bandings shall be selected from manufacturer's full range. Interior panel shall be manufacturer's standard white melamine.
5. Wire Grille Doors: Provide inset style, wire grille doors as indicated; reveal or full overlay style doors are not acceptable. All hinges shall be structurally attached to vertical cabinet panels with engineered and tested through-bolt hardware, and integrally welded to wire grille doors. Screw mounted hinges are not acceptable.
 - a. Loading: Wire-grille door hinge welded connections shall be tested and shall resist 400 lbf pull test without visible damage or permanent deformation.
6. Panel Doors: Provide inset style doors, fabricated of 3/4-inch composite panels, finished with thermally-fused laminate (melamine) or polyester laminate. Finish edges with 3 mm radiused PVC edge banding. Finish colors to match adjacent cabinet panels. Factory jig and drill for through bolt hinge attachment.

2.03 FABRICATION

- A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
- B. Construction: As required for selected grade.
- C. Hardware Application: Factory-machine casework members for hardware.
- D. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- E. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.

2.04 SPECIAL PURPOSE UNITS

- A. Music Library (Sheet Music) Storage: Manufacturer's standard, high-density, slide out type. Fabricate with 1-inch tube steel framing, powder-coated black color, with polyester laminate faced front and end panels, and with manufacturer's standard white melamine interior finish. Provide with manufacturer's standard casters. Provide 7-shelf units, with four adjustable

shelves and three fixed shelves. Basis-of-Design is Wenger; Music Library System.

2.05 CABINET HARDWARE

- A. Comply with BHMA A156.9 requirements.
- B. Label Holders: Manufacturer's standard, sized to hold standard label cards, bright chromium plated over nickel on base material.
- C. Swinging Doors: Hinges, latches, and joinery.
 - 1. Hinges: Number as required by manufacturer and by referenced standards for width, height, and weight of door.
 - a. Hinges: BHMA A156.9, Grade 1 butt hinges; powder coated to match grille door.
 - 1) Hinges shall be installed with through-bolts to cabinet side panels; five-knuckle, projecting barrel, minimum 2-1/2 inches long.
 - 2) At wire-grille doors, weld hinges to door panels.
 - 3) At solid composite wood doors, through-bolt hinges to door panels.
 - 2. Latch and Locks: Provide manufacturer's standard slide or gravity latch, steel construction, with integral padlock eye and powder-coat finish. All doors shall latch securely without padlock; doors with padlock hasp only are not acceptable.
 - a. Padlocks: NIC. Shall be provided by Owner.

2.06 MATERIALS

- A. Composite Wood: Tested and certified to CARB (ATCM) requirements for ultra-low emitting formaldehyde (ULEF) resins.
- B. Thermally Fused Laminate (TFL): Melamine or polyester resin, NEMA LD 3, Type VGS laminate panels.

2.07 ACCESSORIES

- A. Plastic Edge Banding: Extruded 3mm PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
 - 1. Color: Match adjacent laminate.
 - 2. Use at exposed edges.
- B. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- C. Concealed Joint Fasteners: Corrosion-resistant, standard with manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

- A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

3.02 EXAMINATION

- A. Site Verification of Environmental Conditions:
 - 1. Do not deliver casework until the following conditions have been met:
 - a. Building has been enclosed (windows and doors sealed and weather-tight).
 - b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
 - c. Ceiling, overhead ductwork, piping, and lighting have been installed.
-

- d. Installation areas do not require further "wet work" construction.
- B. For Cabinet Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.
- C. Verify adequacy of support framing and anchors.
- D. Verify that service connections are correctly located and of proper characteristics.

3.03 INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- C. Set casework items plumb and square, securely anchored to building structure.
- D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.
- E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch. In addition, do not exceed the following tolerances:
 - 1. Variation of Tops of Cabinets from Level: 1/16 inch in 10 feet.
 - 2. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
 - 3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch.
 - 4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.
- F. Secure cabinets to concealed reinforcement and blocking where installed to gypsum board partition assemblies.
- G. Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
 - 1. Where base cabinets are installed away from walls or service space framing, anchor to floor at toe space at not more than 24 inches on center, and at sides of cabinets with not less than two fasteners per side.
- H. Install hardware uniformly and precisely.
- I. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.
- J. Replace units that are damaged, including those that have damaged finishes.

3.04 ADJUSTING

- A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.05 CLEANING

- A. Clean casework and other installed surfaces thoroughly.

3.06 PROTECTION

- A. Do not permit finished casework to be exposed to continued construction activity.
- B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.

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- C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

END OF SECTION 123583