



# PROJECT MANUAL

## West Chester Area School District

BHA Nº: 22-114

## Renovations & Additions to the Mary C. Howse Elementary School

641 Boot Road  
West Chester, PA 19380

### **VOLUME 1**

Procurement Requirements  
General Requirements  
Facility Construction

**ISSUED FOR BID SET**  
**10/31/2023**

DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. Blackney Hayes Architects.
2. Darin Jellison.
3. License No. RA403157.
4. Responsible for Divisions 02-49 Sections except where indicated as prepared by other design professionals of record.

B. Civil Engineer:

1. Stantec Consulting Services.
2. Charles J. Olivo, PE.
3. License No. PE-26200E.
4. Responsible for Sections:
  - a. 024119.
  - b. 311000.
  - c. 312000.
  - d. 313200.
  - e. 315000.
  - f. 321216.
  - g. 321373.
  - h. 321600.
  - i. 329100.
  - j. 329200.
  - k. 329300.
  - l. 331000.
  - m. 333000.
  - n. 334100.

C. Structural Engineer:

1. Baker, Ingram & Associates.
2. Brian D. McGlade, PE
3. License No. 035277.
4. Responsible for the following Sections:
  - a. 031000.
  - b. 032000.
  - c. 033000.
  - d. 051200.
  - e. 053100.
  - f. 054000.

D. Fire-Protection Engineer:

1. Snyder Hoffman Associates, Inc.
2. Jeff Machik, PE.
3. PA – PE 083135.
4. Responsible for Sections in Division 21.

E. Plumbing Engineer:

1. Snyder Hoffman Associates, Inc.
2. Jeff Machik, PE.
3. PA – PE 083135
4. Responsible for Sections in Division 22.

F. HVAC Engineer:

1. Snyder Hoffman Associates, Inc.
2. Jeff Machik, PE.
3. PA – PE 083135.
4. Responsible for Sections in Division 23:

G. Electrical Engineer:

1. Snyder Hoffman Associates, Inc.
2. Jeff Machik, PE.
3. PA – PE 083135.
4. Responsible for Sections
  - a. In Division 26.
  - b. In Division 27.
  - c. In Division 28.
  - d. Section 312316.13.
  - e. Section 337119.

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DOCUMENT 001113 ADVERTISEMENT - FOR BIDS

NOTICE TO BIDDERS

The West Chester Area School District, Chester County, Pennsylvania, solicits sealed bids for the Mary C. Howse Elementary School in West Chester, PA for the following contracts:

Contract No. GC-1 – General Construction

Contract No. MC-1 – Mechanical

Contract No. PC-1 – Plumbing

Contract No. EC-1 – Electrical

Contract No. SPC-1 – Sprinkler

Contract No. SC-1 – Sitework

Contract No. RC-1 – Roofing

Sealed bids, addressed to Ms Lynnette Scott, Purchasing Agent, must be clearly marked on the outside with bidder's name and name of project bid, and are due at the Spellman Education Building, 782 Springdale Drive, Exton, PA 19341 by 5:00 pm on December 15, 2023, at which time they will be publicly opened and read. Faxed bids will not be accepted.

Sealed bids shall be accompanied by a certified check or bid bond in the amount of ten percent (10) of the amount of the bid, made payable to the West Chester Area School District. Checks or bonds will be returned to unsuccessful bidders after the contract has been awarded, or the bids rejected. The successful bidder's check or bond will be returned when his contract has been properly completed. In case the successful bidder fails to enter into contract within ten (10) days after notification of acceptance of bid, said check or bond shall be forfeited to the School District. All bids must be accompanied by Non-Collusion Affidavit, Contractor's Qualification Statement, and Bid Security in accordance with the Bid Documents. Bids must remain in force for sixty (60) days after the date of the bid opening and may be rejected any time prior to the expiration of said date.

The successful bidder will be required to furnish a Performance and Payment Bonds in amounts equal to 100% of the contract price. Surety shall be satisfactory to the School District and shall be included in the contractor's bid amount.

Bid Documents will be available starting November 6, 2023 after 9:00 am at the Facilities and Operations Building, 1181 McDermott Drive, West Chester, PA 19380, telephone (484) 266-1253, and at the Mandatory Pre-Bid Meeting. A \$100.00 non-refundable fee is required for the Bid Documents, made payable to West Chester Area School District. All substitution requests must be submitted to the Owner/Architect at least five (5) days prior to receipt of bids.

A Mandatory Pre-Bid Meeting will be held on November 15, 2023 at 4:00 pm at Mary C. Howse Elementary School, 641 Boot Road, West Chester, PA 19380. All visitors are required to follow the WCSD Health and Safety policy.

Recommendation for Award of Bids will be made to the School Directors at a School Board Meeting. The School Board reserves the right to accept or reject any or all Bids, and to make or not make awards in the best interest of the West Chester Area School District.

Ms. Linda Cherashore  
Board Secretary

Mary C. Howse ES Additions and Renovations  
West Chester Area School District

Issued for Bid October 31, 2023  
BHA Project No. 22-114

END OF DOCUMENT 001113



DOCUMENT 002113 - INSTRUCTIONS TO BIDDERS

FORM OF INSTRUCTIONS TO BIDDERS

1.01 SEE AIA A701, INSTRUCTIONS TO BIDDERS FOLLOWING THIS DOCUMENT.

END OF DOCUMENT 002113

# DRAFT AIA® Document A701™ – 2018

## Instructions to Bidders

for the following Project:

(Name, location, and detailed description)

«Renovations and Additions to Mary C. Howse Elementary School»  
«641 Boot Road, West Chester, PA 19380»  
« »

### THE OWNER:

(Name, legal status, address, and other information)

«West Chester Area School District»«»  
«782 Springdale Drive»  
«Exton, PA 19341»  
«»

### THE ARCHITECT:

(Name, legal status, address, and other information)

«Blackney Hayes Architects»«», Professional Corporation»  
«150 S. Independence Mall West  
Suite 1200  
Philadelphia, PA 19106»  
«Telephone Number: (215) 829-0922»  
«Fax Number: (215) 829-0596»

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### ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

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

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

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## ARTICLE 1 DEFINITIONS

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

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents. Firm-Bid period is defined as the amount of time that the Bidder guarantees to hold his Bid or forfeit their Bid Bond. The firm-bid period starts with the opening of the Bid and ends when one of the following occurs:

- a. Owner rejects bids,
- b. An Agreement is executed, or
- c. Time period, and extensions of time periods, described in Subparagraph 6.2 expire.

§ 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. The words Bid(s) and Proposal(s) have the same meaning when used in the Invitation to Bid and Instructions to Bidders.

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

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

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

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

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

§ 1.10 Timely Manner: Timely Manner shall mean within the time limits defined in the Bidding or Contract Documents, or in the absence thereof, within the days or by the date directed by the Owner in writing. As time is of the essence to this Project, failure to submit, perform, or complete a task in a timely manner may be sufficient reason for the Owner (at his sole discretion) to declare a Bidder as non-responsive, or declare that a Contractor is in breach of Contract. Unless specifically stated otherwise, the term day(s) shall refer to calendar day(s).

## 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.

§ 2.1.1 The Bidder is required to examine carefully in detail the character of the Site of the Project, the Contract Documents and all other matters pertinent to the Work contemplated. By submitting a Bid, the Bidder indicates that he has satisfied himself as to the conditions to be encountered, the character, quality, and quantities of Work to be done and materials as to be furnished, and the requirements of the Contract Documents. No allowance or concession will be made for the lack of such information on the part of the Contractor.

.1 Bidder shall ascertain all governmental and utility requirements with respect to wage scales and rates, trench and structure excavations, tunnel construction, blasting equipment, materials, labor, safety and sanitation and shall base his bid prices on full compliance therewith.

§ 2.1.2 Each Bidder, prior to submission of a proposal, shall have satisfied himself that the necessary labor and equipment can be secured and that the materials he proposes to use will comply with the requirements and can be obtained by him in the quantities and at the time required. He shall familiarize himself with labor conditions which may affect or influence the performance of the Work.

§ 2.1.3 The failure or omission of any Bidder to receive or examine any form, instrument, document, or visit the site and acquaint himself with existing conditions, shall in no way relieve any Bidder from obligation with respect to his Bid. By submitting a Bid, the Bidder agrees and warrants that he has examined the site and the Specifications and Drawings, and, where Specifications require in any part of the Work a given result to be produced, that the Specifications and Drawings are adequate and the required result can be produced under the Specifications and Drawings. The Drawings and Specifications are to provide for the complete construction of the Project and are intended to complement and supplement each other. Any work required by either of them and not by the other shall be performed as if denoted both ways. Should any work be required which is not denoted in the Specifications or on the Drawings because of an obvious omission but which is nevertheless necessary for the proper performance of the Project, such work shall be performed as fully as if it were described and delineated. Should any Bidder find discrepancies, duplications or omissions in the documents or have doubt as to the meaning expressed by the documents, he shall make inquiry at once, in writing to the Owner.

§ 2.1.4 Review Meeting: Upon receipt and opening of the bids, the apparent low Bidder for each contract may be required to attend a separate review meeting; at a time and location designated by the Owner to review the Project.

§ 2.1.5 Bidder's Qualifications – Bidders are required to meet the following minimum requirements in order to bid this Project:

- .1 Bidder must have a minimum of three (3) years' experience in public school construction.
- .2 Bidder shall not have any school project within the last 3 years that was completed more than three months beyond the contract required Substantial Completion Date, or remains incomplete more than three months beyond the contract required Substantial Completion Date.
- .3 Bidder must have completed a project of at least 75% of the value bid for this project.
- .4 Bidder must not have been terminated from a previous project for any reason.

## 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.)*

« »The Owner will provide thumbdrives containing all the bidding documents in PDF format at the mandatory pre-bid meeting. The same bidding documents in PDF format will also be made available to attendees of the mandatory pre-bid meeting through the Architect's/Engineer's FTP Site. Hard copies of bidding documents will not be available to the Bidders.

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

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

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

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

### § 3.2 Modification or Interpretation of Bidding Documents

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

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids. Bids, or in accordance with the last date for questions stipulated in the Contract Documents.

*(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)*

« »All questions or requests for clarification must be submitted in writing by email or fax to the Architect/Engineer.

§ 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 Bidders are responsible for providing bids based upon named manufacturers, model numbers, system descriptions and basis of design materials named in the Contract Documents. Substitutions will only be accepted after review and approval by the Owner and Architect/Engineer.

§ 3.3.1.2 After award of contract, if a substitution request is submitted for consideration, the Prime Contractor shall be responsible for coordinating that substitution request with each of the other Prime Contractors verifying that the substitution request will have no impact on the other Prime Contractors' scopes of work. The Prime Contractor shall be responsible for verifying what impact the substitution request will have on the contract time and sum. The Prime Contractor shall be responsible for the Architect/Engineer's and Owner's costs for the following, but not limited to redesign, updating permits, coordination with the Owner's vendors, personnel or separate contracts.

§ 3.3.1.3 Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

### § 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. Refer to Specification section 01 60 00.

§ 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.

§ 3.3.6 The Bidder shall comply with the Procedures of Section 01 60 00 for submitting requests for substitutions prior to receipt of Bids.

§ 3.3.7 Where proprietary items are specified for a material in this Project, Bidders will not be permitted to bid alternative manufacturers. Such proprietary items will be marked with "No Alternates Accepted".

#### § 3.4 Addenda

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

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

« »Addenda will be emailed to official planholders.

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

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

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt on the Bid Form. Failure to acknowledge addenda shall not release Bidder from the obligation of his proposal.

§ 3.4.5 The Architect/Engineer does not assume any responsibility for issuing addenda to Bidders purchasing additional drawings and specifications beyond the first set. Addenda will only be sent only to those who are official planholders.

#### ARTICLE 4 BIDDING PROCEDURES

##### § 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms identical to the form included with or identified in the Bidding Documents. Documents, in triplicate.

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

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

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

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

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated

by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

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

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

#### § 4.2 Bid Security

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

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

« »Every bid for each contract for which bids are invited by the Invitation for Bids must be accompanied by Bid Security in the amount of 10% of the base bid. Bid Security shall be in the form of a certified bank cashier's or certified treasurer's check payable to the Owner, or a Bid Bond in the form included in these Contract Documents naming the Owner as Obligee.

§ 4.2.1.1 The Owner may declare the Bid Security forfeited to the Owner as liquidated damages if, after Notice of Intent to Award and within the firm bid period, the Bidder, as the apparent lowest responsible Bidder, fails to:

- a) Deliver to the Owner within 10 days the completed Performance Bond and Payment Bond as required by these Contract Documents or,
- b) Deliver to the Owner within the prescribed time the properly executed counterparts of the construction agreement and all evidences of insurance as required by these Contract Documents.

§ 4.2.1.2 The Bid Security for the three (3) lowest responsible Bidders will be retained until the Owner executes the Agreement for the Prime Contract on which the Bidder submitted a Bid. The Bid Security of three (3) lowest responsible Bidders for each Contract will be returned unless forfeited as mentioned above when one of the following occurs:

An Agreement is executed by Owner.

- a) An Agreement is executed by the Owner.
- b) The rejection by the Owner of all Bids.
- c) The expiration of the firm bid period, unless extended by the Bidder in writing.

§ 4.2.1.3 Surety Bond is used for the Bid Security. It shall be written on the enclosed Bid Bond form only, and the Attorney-in-fact who executes the Bond on behalf of the Surety shall affix to the Bond a certified and current copy of his power of attorney. Surety Bonds in any other form will be rejected.

.1 The Bid Bonds shall be obtained from a company having a minimum rating of "A-" or above in the **Best Key Rating Guide**, latest edition.

.2 Failure to submit the enclosed Payment and Performance Bonds in the time frame stipulated may cause the Bidder's Bid to be rejected and the Bid Security forfeited.

§ 4.2.1.4 Bidders are required to submit their requests to the Owner for the return of their bonds.

§ 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.)*

~~« »~~In accordance with the rest of this Section.

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

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

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

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

**§ 4.3.6** Each Bidder shall furnish along with the Bid Form a statement from Surety certifying that Surety Company shall provide the Bidder with Performance Bond and Payment Bond, in the full amount (100%) of the awarded contract amount, should the Bidder be awarded the Work. The Agreement of Surety shall be dated, signed, and sealed by an authorized officer of the company. Surety shall be licensed to transact business in the Commonwealth of Pennsylvania and appear on the Treasury Department's most current list (Circular 570).

**§ 4.3.7 BID INCLUSIONS:** Each Bidder shall furnish along with the Bid Form the following documents completed in their entirety, signed and notarized at the time of bid:

- a) Bid Security
- b) Non-Collusion Affidavit
- c) Certification from Surety guaranteeing issuance of Performance Bond (in accordance with 7.1.1 of this Document)
- d) Certification from Surety guaranteeing issuance of Payment Bond (in accordance with 7.1.1 of this document)
- e) Contractor's Qualification Statement

### **§ 4.4 Modification or Withdrawal of Bid**

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

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

**§ 4.4.3** After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within ~~two days~~ 48 hours, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:



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

« »The Bid Security will be returned.

## **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.~~ Unless stated otherwise in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Base Bids and Alternates may be made available to Bidders at a later date.

### **§ 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 irregular is subject to rejection.

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

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

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

### **§ 5.4 Lowest Responsive and Responsible Bidder**

**§ 5.4.1** The Contract, if awarded, will be awarded to the "lowest responsive and responsible Bidder" and in accordance with statute. The Owner shall have the right to determine which alternates, if any, shall be included in the final determination. The add or deduct amounts of any alternates selected by the Owner shall be included in a consistent manner in all bid tabulations.

**§ 5.4.2** In the event two or more bids are equal, the Owner has the absolute discretion to award the Contract to either Bidder. The Owner reserves the right to award the Work in any manner deemed to his best interest, to accept any Bid, to reject any or all Bids, to accept or reject any or all alternates, and to waive informalities in Bids if it is in the Owner's best interest to do so. The Owner reserves the right to reject the Bid of any Bidder who in the judgment of the Owner is not in position to perform the Contract.

**§ 5.4.3** The Bids are to include all labor, materials, accessories, equipment, incidentals, supervision and all other costs of any nature as shown, specified, indicated, and required to complete the Project, as well as alternate bid items as may be requested for full and total completion of the Work. These prices are important and must be carefully stated when Bids are submitted on the bid forms such as included in these Specifications.

## **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.~~

**§ 6.1.1** In determining the lowest responsible Bidder, the Owner will consider the Bidder's integrity, efficiency, financial responsibility, experience, and ability to successfully, fully and promptly complete the Project. Each Bidder is required to submit a current Contractor's Qualification Statement (AIA Document A305), and the additional qualifying information requested in this document for the purpose of such qualification process. The Bidder's qualifications shall be submitted with the bid or prior thereto.

**§ 6.1.2** The Owner may make such investigation as is deemed necessary to determine the ability of the Bidder to perform the Work according to the requirements of the Contract Documents. The Owner reserves the right to reject any

Bid if the evidence submitted by, or as a result of investigation of, such Bidder fails to satisfy the Owner that the Bidder is properly qualified to carry out the obligations of the Contract. Conditional or provisional bids will not be accepted.

§ 6.1.3 Minimum qualifications for bidding this Project include those listed in subparagraph 2.1.5.

§ 6.1.4 Provide information required under Specification Section 00 3500 – Certification of Contractor's Qualifications.

#### **§ 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.~~

#### **§ 6.2 Contract Award Procedure, Submission of Bonds, and Execution of Agreement**

§ 6.2.1 ANTICIPATED SCHEDULE: The following is the anticipated time schedule for the execution of the agreements: Bids Received: On the date stated in the Invitation to Bid. Notice of Intent to Award: Within 30 days after bid receipt. Submit Insurance certificates, bonds, agreements executed and returned within 10 days after notice of Intent to Award. Notice to Proceed: Within 10 days of returning executed agreements with bonds and insurances. Begin Construction: In accordance with the Phasing Plans. Complete Construction: By the Date Stated in Specification Section 01 1100 – Summary of the Work.

§ 6.2.2 Contractors are to expedite the signature of all agreements and the satisfactory provisions of all Bonds and Insurances to meet this schedule. Time is of the essence in this project. If the Owner is unable to meet the above schedule for whatever reason, then the following procedures will apply:

- .1 The Owner may, at any time during the 60 day firm-bid period, unless extended as provided by law following the opening of Bids, give Notice of Intent to Award any Contract to the Bidder designated by the Owner as the apparently lowest responsible Bidder for such contract. The Bidder so designated shall furnish to the Owner (by delivery to the Architect/Engineer unless the Owner's Notice of Intent to Award designated a different place of delivery) within 10 days after the date of the Notice of Intent to Award a properly executed Performance Bond and Payment Bond in the respective forms set forth in these Contract Documents.
- .2 If the Bidder fails to deliver such Bonds within 10 days the Owner may declare the Bidder's Bid Security forfeited and issue a Notice of Intent to Award to the next lowest responsible Bidder.
- .3 The Owner may, in its sole discretion, award the Contract to said Bidder following receipt of said properly executed Bonds, at any time before the expiration of the aforesaid firm-bid period.

§ 6.2.3 Neither the designation of an apparently lowest responsible Bidder, the Notice of Intent to Award given to the Bidder so designated shall operate to release the next two lowest Bidders from their Bid for such contract. Each such other Bidder (unless earlier released from his Bid by specific action of the Owner) shall remain bound by his Bid until either (i) the Owner has actually executed the construction Agreement with another Bidder or, (ii) the firm-bid period has expired without the Owner having, prior to such expiration, given notice of intent to award such Contract to him.

§ 6.2.4 If Notice of Intent to Award the Contract is given to any Bidder (whether said Bidder be the Bidder first designated as the apparently lowest responsible Bidder or a Bidder subsequently so designated) within firm-bid period, the Bid of said Bidder shall remain subject to acceptance by the Owner (and said Bidder's Bid Security shall remain subject to forfeiture) notwithstanding the subsequent expiration of said firm-bid period.

§ 6.2.5 Extensions of the firm bid period for the lowest responsible Bidder may be made by the mutual written consent of the Owner and lowest responsible Bidder.

#### **§ 6.3 Submittals**

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

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and

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

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

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

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

#### § 6.4 Certificates of Insurance

§ 6.4.1 Insurance certificates shall be submitted in the amounts listed in the Owner and Contractor Agreement, and in a form acceptable to the Owner in a timely manner.

§ 6.4.2 The Contractor's Insurance carrier shall have a financial rating of A-, or better. Submit evidence from an independent source such as A.M. Best of the insurance carriers rating in a timely manner.

§ 6.4.3 Failure to submit insurance certificates, or evidence of the insurance carrier's rating, in a timely manner may be sufficient reason for the Owner to declare the Bidder non-responsive and award the Contract to the next lowest responsible Bidder.

§ 6.4.4 Failure of the insurance carrier to meet the financial rating specified above may be sufficient reason for the Owner to declare the Bidder non-responsive and award the Contract to the next lowest responsible Bidder.

### ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

#### § 7.1 Bond Requirements

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

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

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

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

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

«»

#### § 7.2 Time of Delivery and Form of Bonds

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

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

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

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

§ 7.2.5 Performance and Payment Bonds: A Bidder who is designated by the Owner as an apparent lowest responsible Bidder shall, in the manner and within the time specified in Article 6, Paragraph 6.2, deliver to the Owner a properly executed Performance Bond and Payment Bond.

§ 7.2.6 Performance and Payment Bonds for the project shall be written on the forms bound within the Specifications, no other forms of bonds will be acceptable. The use of AIA Document A312, Performance Bond; Labor and Material Payment Bond **will not** be permitted. Each such Bond shall be executed by a surety company legally authorized to do business in the Commonwealth of Pennsylvania. The Bidder shall pay all premiums in respect of such Bonds. The date of the Agreement of the Bond form shall be left blank and will be filled in when the Owner executes the Agreement. The Performance and Payment bonds shall be obtained from a company having a minimum rating of "A-" or above in the Best Key Rating Guide, latest edition. The amount of the bond shall be exclusively for this project and not part of a shared pool with other projects.

§ 7.2.7 Performance and Labor and Material Payment Bonds: The Contractor shall provide a Performance Bond and a Labor and Material Payment Bond, each in the amount of 100% of the Contract price, no later than 3 days following execution of the Contract. (Sections 756 and 757 of the Public School Code of 1949 as amended, and the Public Works Contractors Bond Law of 1967).

§ 7.2.8 The surety company executing any such Bond must be included in the listing of acceptable sureties contained in Treasury Department Circular 570, as most-currently revised, and the amount of the Bond must not exceed the underwriting risk for such surety set forth in said Circular or revision thereof.

§ 7.2.9 If the Owner terminates the Contract with the Contractor and it is determined that the Contractor has forfeited the Performance Bond, the Owner **will not approve** the bonding company's use of the terminated contractor to complete the Project.

§ 7.2.10 The obligations of the Contractor and surety under the Performance Bond and the Payment Bond will include a one (1) year correction period obligation from the Approval of Final Certificate of Payment as contained in Subparagraph 18.2 of the Owner and Contractor Agreement.

## ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

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

« »

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

« » See Specifications Section 00 6113.13 – Performance Bond Form, Section 00 6113.16 – Payment Bond Form, AIA Document A101™-2017, Standard Form of Agreement Between Owner and Contractor Article 8, Subparagraph 8.5, and AIA Document A201™-2017, General Conditions of the Contract for Construction Article 11.

- .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.)

« »N/A

- .5 Drawings

**Number**

CS through SE1.2

As listed in Specification Section 000115 “List of Drawings”.

**Title**

**Date**

- .6 Specifications

**Section**

Volume 1 and Volume 2

As listed in Specification Section 000110 “Table of Contents”.

**Title**

**Date**

**Pages**

- .7 Addenda:

**Number**

As Issued

**Date**

**Pages**

- .8 Other Exhibits:

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

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

« »N/A

- [ ☐ ] The Sustainability Plan:

**Title**

N/A

**Date**

**Pages**

- [ ☐ ] Supplementary and other Conditions of the Contract:

**Document**

N/A

**Title**

**Date**

**Pages**

- .9 Other documents listed below:

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

« »

## ARTICLE 9 MISCELLANEOUS PROVISIONS

### § 9.1 Examination of Site

§ 9.1.1 Each bidder shall visit the site of the proposed work and shall be responsible to observe and ascertain, to his satisfaction, all local conditions which may be encountered or affect the performance of the Work. The building/site will be available for inspection at the time of the Prebid and as arranged with the Owner. **Contact the West Chester Area School District Capital Programs Department at 484-266-1250 for additional site visits.** Site inspections shall be scheduled at the convenience of the Owner.

DOCUMENT 003119 - EXISTING CONDITION INFORMATION

1.1 EXISTING CONDITION INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. Stormwater Infiltration Testing Investigation Letter is available for viewing appended to this Document.
- C. Related Requirements:
  - 1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
  - 2. Document 003126 "Existing Hazardous Material Information" for hazardous materials reports that are made available to bidders.
  - 3. Document 003132 "Geotechnical Data" for reports and soil-boring data from geotechnical investigations that are made available to bidders.

END OF DOCUMENT 003119



April 14, 2023  
EEI Project No: 35810.00

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Phone (Office): 215-829-0922 x129  
Email: [nmoran@blackneyhayes.com](mailto:nmoran@blackneyhayes.com)

**Re: Stormwater Infiltration Testing Investigation Letter  
Mary C. Howse Elementary School,  
641 Boot Road, West Chester  
Chester County, Pennsylvania 19380**

Dear Mr. Moran:

Earth Engineering Incorporated (EEI) has completed infiltration testing to provide data for the design of the proposed stormwater management system at the above-referenced project. The data consists of soil descriptions and infiltration rates within the proposed stormwater management areas, as designated on the plans provided by Stantec Consulting Services, Inc. The scope of work for this project included an exploratory test pit operation, infiltration testing, and an evaluation of the subsurface conditions. This work was conducted in general accordance with EEI proposal number BB-21471R dated March 14, 2023. This letter presents the results of the infiltration testing using double ring infiltration methods.

#### **SITE DESCRIPTION AND EXISTING FEATURES**

The subject site is located at Mary C. Howse Elementary School at 641 Boot Rd, West Chester, Chester County, Pennsylvania. More specifically, the investigated project area is bordered to the west by residential properties, to the north and east by wooded area, and to south by Boot Road. The site generally slopes downward from west to east. The area of investigation for stormwater testing was mostly open land areas and/or schoolyard.

According to the topographic information depicted on the plans provided to EEI, the maximum relief across the study area is approximately 18 feet. This relief corresponds to elevations across the proposed development area ranging from approximately 88.0 to 106.0 feet.

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## **FIELD INVESTIGATION**

### **Test Pits**

Eight (8) locations within the site were evaluated for potential infiltration utilizing test pit exploration and are designated as TP-1 through TP-8. The test locations and depths were chosen by the project team. The test pits were excavated on April 6 and 7, 2023, by Wayne Carmint Landscaping, Inc of King of Prussia, Pennsylvania utilizing a Volvo ECR145EL Trackhoe. The test pits were field located by a representative of EEI based upon existing site features shown on site plans provided by the Civil Engineer (Stantec Consulting Services, Inc.). The ground surface elevations at the test pit locations were estimated according to topographic contours shown on the provided plans. Supervision and monitoring of the excavations were performed by a representative of EEI. The approximate locations of the test pits are indicated on the *Testing Location Plan*, EEI Drawing Number: 35810.00-B-101, which is included as an attachment to this letter report.

As coordinated prior to the field investigation, the Civil Engineer provided EEI with infiltration test elevations. Test pits were evaluated for limiting zones during the field investigation and testing was subsequently performed where feasible. All test pits and borings extended to depths adequate for investigating potential limiting zones. A limiting zone is defined as a horizon or condition of the soil or underlying strata which includes:

- A seasonal high water table, whether perched or regional, determined by direct observation of the water table or soil mottling;
- Rock with open joints, fractures or solution channels, masses of loose rock fragments including gravel, with insufficient fine soil to fill the voids between the fragments;
- Rock formation, other stratum, or soil condition which is so slowly permeable that it effectively limits the downward passage of effluent. This includes soils horizons with measured infiltration rates of 0.10 inches per hour or less.

Limiting zones were observed in TP-5, TP-6, TP-7 and TP-8 test pit locations in the form of weathered rock or/and bedrock. In addition, it was determined that in TP-1 and TP-4 locations with infiltration test results of 0.0 inches per hour, there may be limiting zone areas thought to be caused by fine-grained soils that cannot be clearly observed. Double ring infiltration test could not be made in some locations because shallow depth of limiting zones. Groundwater was not observed at any test pit locations. *Test Pit Logs*, containing descriptions and depths of the materials encountered, are enclosed with this letter report.

### **Double Ring Infiltration Tests**

Based upon visual observations of the encountered subsurface conditions, as well as monitoring of the excavation rates, evidence of limiting zones was found to exist at all test pit locations. Consequently, infiltration tests were conducted as discussed with the civil engineer to confirm the presence of restrictive and non-infiltrating soils.

Following completion of the test pit program, infiltration testing was performed utilizing double ring infiltrometers with inner and outer rings measuring 4.0 and 8.0 inches, respectively. Testing locations, depths and conditions were discussed with the project civil engineer prior to





the start of testing. Procedures used for the infiltration testing are in general accordance with the *Pennsylvania Stormwater Best Management Practices (PA BMP) Manual, Appendix C*. The tests took two (2) days in total. At the time of the testing, the ambient temperatures were approximately ranged 55°F to 81°F. Less than 0.50 inches of precipitation was observed within 24 hours prior to testing. The locations of the infiltration test holes are shown on the enclosed *Testing Location Plan*. An *Infiltration Testing Log*, containing details of the double ring infiltrometer tests, is also included with this letter report.

## **SUBSURFACE STRATIGRAPHY**

### **Soil**

As per the Natural Resources and Conservation Service (NRCS) online *Web Soil Survey*, the soil series mapped within the work area is *Manor loam*, 3 to 8 percent slopes soil series (MaB), *Manor loam*, 8 to 15 percent slopes soil series (MaC), and *Urban land-Udorthents*, schist and gneiss complex, 0 to 8 percent slopes soil series (UugB). The referenced soil map is attached. The soils were generally consistent with the soil mapping.

Specific information regarding the soil morphological features as well as other information pertinent to the design of stormwater management facilities is provided on the enclosed *Test Pit Logs*. For reference, a summary of the type and depths of limiting zones and infiltration test data is provided in Table I and Table II in the *Summary and Conclusions* section of this letter.

### **Bedrock**

Bedrock was encountered at TP-5 and TP-6 locations. Bedrock is defined herein as bucket refusal (an inability to advance the excavating equipment deeper) within residual materials where the excavating equipment encounters the moderately weathered to fresh bedrock surface.

### **Groundwater**

Groundwater, considered a limiting zone for infiltration, was not encountered at any location. It should be noted that these observations are short term and were conducted at the time of the test pit investigation. Groundwater observations may fluctuate with daily, seasonal, and climatic variations.

## **SUMMARY AND CONCLUSIONS**

Eight (8) locations were investigated within the proposed development area, but double ring infiltration test could not be made at 2 locations (TP-5 and TP-6) because of the shallow depth of limiting zones. Twelve (12) double ring infiltrometer tests were conducted within six (6) areas identified by the Civil Engineer on the provided plans. The following table summarizes the types and depths of the limiting zones observed during the field investigation. Additional details regarding the soils and limiting zones are provided on the enclosed *Test Pit Logs*.

TABLE I COMPARISON OF INFILTRATION DEPTHS AND LIMITING ZONES					
Test Pit No.	<sup>1.)</sup> Ground Surface Elevation (ft)	Limiting Zone Condition	<sup>3.)</sup> Limiting Zone Depth (ft)	Limiting Zone Elevation (ft)	<sup>2.)</sup> Infiltration Test Depth (ft)
<sup>5.)</sup> TP-1	99.3	Fine grained soils	7.3	92.0	7.3
TP-2	101.7	No Limiting Zone	-	-	9.7
TP-3	99.0	No Limiting Zone	-	-	7.0
<sup>5.)</sup> TP-4	99.0	Fine grained soils	7.0	92.0	7.0
<sup>4.)</sup> TP-5	100.0	Weathered Rock	0.8 – 6.0	99.2 – 94.0	Not Tested
		Bedrock	6.0	94.0	
<sup>4.)</sup> TP-6	102.0	Weathered Rock	0.9 – 6.7	101.1 – 95.3	Not Tested
		Bedrock	6.7	95.3	
TP-7	92.0	Weathered Rock	3.8 – 8.9	88.2 – 83.1	1.8
TP-8	92.0	Weathered Rock	4.0 – 8.3	88.0 – 83.7	2.0

<sup>1.)</sup> Ground surface elevations were approximated using provided plan titled 'Overall Existing Conditions Plan' by Stantec Consulting Services Inc.

<sup>2.)</sup> Infiltration test depths were measured from existing site grades at the time of the investigation.

<sup>3.)</sup> Depths of limiting zones and infiltration tests were measured from existing site grades at the time of the investigation.

<sup>4.)</sup> Test eliminated due to shallow depth of limiting zones.

<sup>5.)</sup> No limiting zone was observed but inferred from testing results.

All testing procedures were performed according to *Appendix C* of the *Pennsylvania Stormwater Best Management Practices (PA BMP) Manual*. The following tables summarize the infiltration data obtained during this investigation for each test location. Further detailed field testing data is provided on the *Infiltration Testing Logs* included with this letter report.

<b>TABLE II</b> <b>INFILTRATION RATES AT TEST LOCATIONS</b> <b>DOUBLE RING INFILTROMETER METHOD</b>						
Test Pit No. / Infiltration Test Designation	<sup>1.)</sup> Ground Surface Elevation (ft)	Infiltration Test Depth (ft)	<sup>2.)</sup> Infiltration Test Elevation (ft)	Test Interval (min)	Final Drop in Water Level (in)	<sup>3.)</sup> Infiltration Rate (in/hr)
TP-1/ DR-1A	99.3	7.3	92.0	30	0.000	0.000
TP-1/ DR-1B	99.3	7.3	92.0	30	0.000	0.000
TP-2/ DR-2A	101.7	9.7	92.0	30	0.375	0.750
TP-2 /DR-2B	101.7	9.7	92.0	30	0.125	0.250
TP-3/ DR-3A	99.0	7.0	92.0	30	0.125	0.250
TP-3/ DR-3B	99.0	7.0	92.0	30	0.125	0.250
TP-4/ DR-4A	99.0	7.0	92.0	30	0.000	0.000
TP-4/ DR-4B	99.0	7.0	92.0	30	0.000	0.000
TP-7/ DR-7A	92.0	1.8	90.2	30	0.875	1.750
TP-7/ DR-7B	92.0	1.8	90.2	30	0.500	1.000
TP-8/ DR-8A	92.0	2.0	90.0	30	0.000	0.000
TP-8/ DR-8B	92.0	2.0	90.0	30	0.375	0.750

<sup>1.)</sup> Ground surface elevations were approximated using provided plan titled 'Overall Existing Conditions Plan' by Stantec Consulting Services Inc.

<sup>2.)</sup> Infiltration test elevations were provided by Civil Engineer and adjusted according to limiting zone depths.

<sup>3.)</sup> The infiltration rates are field measured values and do not include a factor of safety for design purposes. Infiltration rates calculated in accordance with Pennsylvania Stormwater Best Management Practices (PA BMP) Manual, Appendix C.

The infiltration tests were situated within residual soils and decomposed schist which primarily consist of sandy silt to silty sand. As indicated in the previous table, the measured infiltration rates, which ranged from 0.00 to 1.75 inches/hour, were observed at the infiltration depths at the locations investigated. It must be noted that in some of the test pits, limiting zones were encountered within 2.0 feet of the test depths. In accordance with the referenced PA BMP Manual, the required range of measured infiltration rates for soils to be suitable for stormwater infiltration spans from 0.10 to 10.00 inches per hour. Additionally, stormwater management facilities should typically maintain a minimum buffer of 2.0 feet above the underlying limiting zone.

Based upon the materials observed and the data acquired at the site, subsurface conditions at all test pit locations have limiting zones at elevations ranging from 101.1 to 83.1



feet. Consequently, the favorability for infiltration in the vicinity of the above-referenced locations according to the preliminary design criteria in relation to the recommended guidelines is variable.

It is emphasized that the rates shown in the preceding table are field measured values and do not include a safety factor for design purposes. The determination of appropriate design values and factors of safety for the stormwater management system is the responsibility of the Civil Engineer. According to the referenced PA BMP Manual, a minimum factor of safety of 2.0 is recommended for most cases.

### **Limitations**

The information contained in this letter is based upon the subsurface data collected and on details stated in this letter. Should conditions arise which differ from those specifically stated herein, our office should be notified immediately so that our conclusions can be reviewed and revised, if necessary.

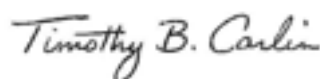
The scope of work regarding the stormwater infiltration aspects of this project was limited to data acquisition and recommendations regarding the suitability of the existing soils for infiltration. This report offers no facts or opinions related to potential impacts resulting from infiltrating stormwater at this location on surrounding areas. Unless specifically indicated to the contrary in this report, the scope of work for this project does not include any considerations of potential site pollution, contamination, or other environmental issues. This report offers no facts or opinions related to potential pollution or contamination of the site. Furthermore, no recommendations or conclusions related to geotechnical conditions at the site are discussed or inferred herein.

It is emphasized that this analysis was conducted for the stormwater management system associated with the proposed development located at 641 Boot Rd, West Chester, Pennsylvania. EEI does not assume any responsibility in using this report for drainage system consideration or designs other than at the specific site addressed.

Respectfully submitted,  
**EARTH ENGINEERING INCORPORATED**



Bulut S. Yildiz  
Project Manager – Geotechnical Investigations



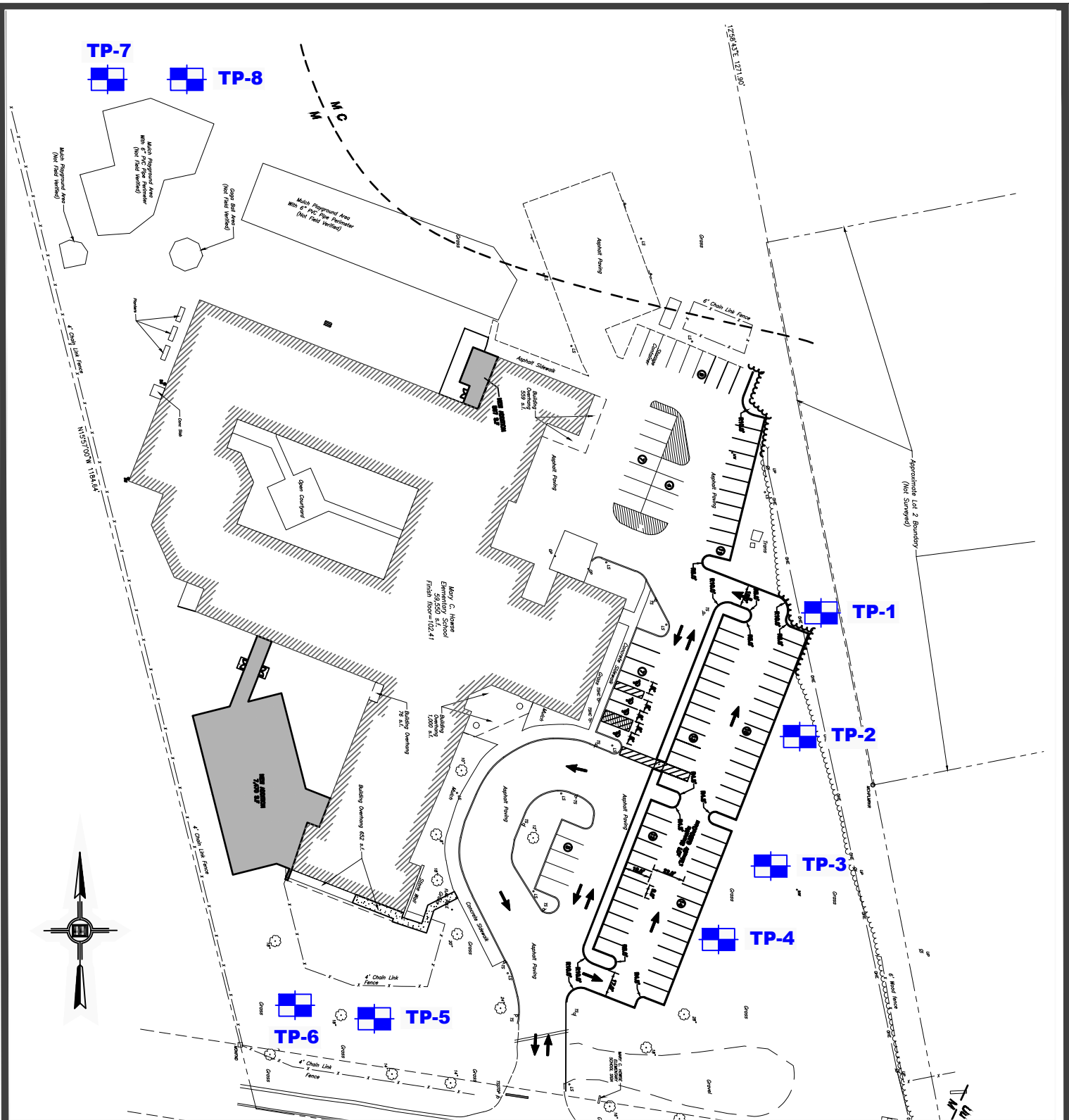
Timothy B. Carlin, P.E.  
Assistant Director - Geotechnical Investigations

Mary C. Howse Elementary School  
Stormwater Infiltration Testing  
EEI Project No: 35810.00  
April 14, 2023  
Page 7 of 7

## Enclosures

Testing Location Plan  
NRCS *Web Soil Survey*  
DRI Test Results  
Test Pit Logs

<https://engineering.sharepoint.com/sites/EarthEngineeringInc/Shared Documents/Projects/35000/35810.00 - Mary C. Howse Elementary School - EN GEO DRI/REPORT/35810.00 - Mary C. Howse Elementary School - Infiltration Testing Letter.docx>



BASE PLAN PROVIDED BY: Stantec Consulting Services, Inc.

**LEGEND:**

 APPROXIMATE TEST PIT LOCATION



**EARTH  
ENGINEERING  
INCORPORATED**

*Geotechnical Engineers & Geologists*

115 W. Germantown Pike  
East Norriton, PA 19401  
(610)277-0880  
FAX (610)277-0878  
[www.earthengineering.com](http://www.earthengineering.com)

## TESTING LOCATION PLAN

PREPARED FOR

**MARY C. HOWSE ELEMENTARY SCHOOL**

WEST CHESTER

CHESTER COUNTY

PENNSYLVANIA

Scale:

No Scale

Date:

04/10/2023

Drawn By:

BY

Checked By:

TBC

Drawing Number:

35810.00-B-101

Approved By:

---

Soil Map—Chester County, Pennsylvania





## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Chester County, Pennsylvania

Survey Area Data: Version 15, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 5, 2022—Jul 4, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MaB	Manor loam, 3 to 8 percent slopes	8.8	76.8%
MaC	Manor loam, 8 to 15 percent slopes	2.6	22.5%
UugB	Urban land-Udorthents, schist and gneiss complex, 0 to 8 percent slopes	0.1	0.7%
<b>Totals for Area of Interest</b>		<b>11.5</b>	<b>100.0%</b>



## Double Ring Infiltrometer Test Results - 1

Test Hole Number	*Surface Elevation (ft.)	**Infiltration Depth (ft.)	Drop in Water within Inner Ring during Presoak Period (in.)		Drop in Water within Inner Ring at Time (in.)								***Infiltration Rate
			30 min.	60 min.	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min	Inches/Hour
DR-1A	99.3	7.3	0.000	0.125	0.000	0.125	0.000	0.000					0.000
DR-1B	99.3	7.3	0.000	0.125	0.000	0.125	0.000	0.000					0.000
DR-2A	101.7	9.7	1.000	0.500	0.750	0.500	0.500	0.375					0.750
DR-2B	101.7	9.7	0.625	0.250	0.125	0.125	0.125	0.125					0.250

Test Hole Number	*Surface Elevation (ft.)	**Infiltration Depth (ft.)	Drop in Water within Inner Ring during Presoak Period (in.)		Drop in Water within Inner Ring at Time (in.)								***Infiltration Rate
			30 min.	60 min.	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min	Inches/Hour
DR-3A	99.0	7.0	0.750	0.625	0.625	0.250	0.250	0.000	0.125	0.125			0.250
DR-3B	99.0	7.0	0.375	0.250	0.125	0.125	0.125	0.125	0.125	0.125			0.250
DR-4A	99.0	7.0	0.000	0.000	0.000	0.000	0.000	0.000					0.000
DR-4B	99.0	7.0	0.125	0.000	0.000	0.000	0.000	0.000					0.000

\* Ground surface elevations interpolated using topographic contours on provided plans.

\*\*Infiltration depths were measured from existing site grades at the time of the investigation.

\*\*\*Measured infiltration rates do not include a factor of safety for the design infiltration rate.

Indicates the final reading that was used to determine the infiltration rate at the corresponding location.



115 West Germantown Pike      East Norriton, PA 19401  
 PHONE 610-277-0880      FAX 610-277-0878

### INFILTRATION TESTING LOG

**Project Name:** Mary C. Howse Elementary School

**Project Number:** 35810.00

**Date of Testing:** 4/6/2023

**EEI Representative:** B. Yildiz

**Drawn/ Compiled by:** B. Yildiz

**Date Compiled:** 4/10/2023

**Weather/ Precipitation:** 81°F, Mostly Sunny / less than 0.5"

## Double Ring Infiltrometer Test Results - 2

Test Hole Number	*Surface Elevation (ft.)	**Infiltration Depth (ft.)	Drop in Water within Inner Ring during Presoak Period (in.)		Drop in Water within Inner Ring at Time (in.)								***Infiltration Rate
			30 min.	60 min.	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min	Inches/Hour
DR-7A	92.0	1.8	1.125	1.000	1.000	0.875	0.875	0.875					1.750
DR-7B	92.0	1.8	0.750	0.625	0.750	0.625	0.750	0.500					1.000
DR-8A	92.0	2.0	0.125	0.125	0.000	0.000	0.000	0.000					0.000
DR-8B	92.0	2.0	0.500	0.500	0.250	0.375	0.375	0.375					0.750

Test Hole Number	*Surface Elevation (ft.)	**Infiltration Depth (ft.)	Drop in Water within Inner Ring during Presoak Period (in.)		Drop in Water within Inner Ring at Time (in.)								***Infiltration Rate
			30 min.	60 min.	30 min	30 min	30 min	30 min	30 min	30 min	30 min	30 min	Inches/Hour

\* Ground surface elevations interpolated using topographic contours on provided plans.

\*\*Infiltration depths were measured from existing site grades at the time of the investigation.

\*\*\*Measured infiltration rates do not include a factor of safety for the design infiltration rate.

Indicates the final reading that was used to determine the infiltration rate at the corresponding location.



115 West Germantown Pike East Norriton, PA 19401  
PHONE 610-277-0880 FAX 610-277-0878

### INFILTRATION TESTING LOG

**Project Name:** Mary C. Howse Elementary School

**Project Number:** 35810.00

**Date of Testing:** 4/7/2023

**EEI Representative:** B. Yildiz

**Drawn/ Compiled by:** B. Yildiz

**Date Compiled:** 4/10/2023

**Weather/ Precipitation:** 55°F, Cloudy / less than 0.5"

# TEST PIT LOG

PIT NO.	TP-1
SHEET	1 OF 1
DATE: START	4/6/23
END	4/6/23
SURFACE ELEV. (FT)	99.3

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00


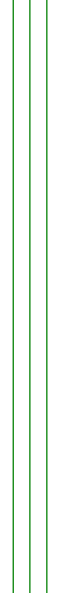
INSPECTOR NAME B.Yildiz

EQUIPMENT USED Volvo ECR145EL - Trackhoe

EXCAVATING COMPANY C. Carmint/Wayne Carmint Landscaping, Inc.

WATER: DEPTH: dry TIME: 0.25 hr.

WATER: DEPTH: dry TIME: 4 hr.

DEPTH (FT)	USCS	H <sub>2</sub> O CONTENT **	GRAPHIC LOG	DESCRIPTION	REMARKS
0.0				DEPTH ELEVATION	
0.8		m		Topsoil 0.8 98.5	Easy to Moderate Excavation 0 - 10.2'
				Sandy silt with gravel and some clay; light brown, brown (Residual)	
	ML	m			No Limiting Zone observed
					DRI test at 7.3'
10.2				10.2 89.1	End of Test Pit at 10.2'

\*\* D = DRY, M = MOIST, W = WET

# TEST PIT LOG

PIT NO.	TP-2
SHEET	1 OF 1
DATE: START	4/6/23
END	4/6/23
SURFACE ELEV. (FT)	101.7

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00


INSPECTOR NAME B.Yildiz

EQUIPMENT USED Volvo ECR145EL - Trackhoe

EXCAVATING COMPANY C. Carmint/Wayne Carmint Landscaping, Inc.

WATER: DEPTH: dry TIME: 0.25 hr.

WATER: DEPTH: dry TIME: 4 hr.

DEPTH (FT)	USCS	H <sub>2</sub> O CONTENT **	GRAPHIC LOG	DESCRIPTION	REMARKS
0.0				DEPTH ELEVATION	
0.8		m		Topsoil 0.8 100.9	Easy to Moderate Excavation 0 - 12.0'
				Sandy silt with gravel and clay; light brown, brown (Residual)	
					No Limiting Zone observed
	CL-ML	m			
					DRI test at 9.7'
12.0				12.0 89.7	End of Test Pit at 12.0'

\*\* D = DRY, M = MOIST, W = WET



# TEST PIT LOG

PIT NO.	<b>TP-3</b>	
SHEET	<b>1</b>	OF <b>1</b>
DATE: START	<b>4/6/23</b>	
END	<b>4/6/23</b>	
SURFACE		
ELEV. (FT)	<b>99.0</b>	

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00

INSPECTOR NAME **B.Yildiz**EQUIPMENT USED Volvo ECR145EL - TrackhoeEXCAVATING COMPANY C. Carmint/Wayne Carmint Landscaping, Inc.

WATER:      DEPTH: dry      TIME: 0.25 hr.

WATER: DEPTH: dry TIME: 4 hr.

DEPTH (FT)	USCS	H <sub>2</sub> O CONTENT **	GRAPHIC LOG	DESCRIPTION	REMARKS
0.0				Topsoil	
0.6				Sandy silt with gravel and clay; light brown, brown (Residual)	Easy to Moderate Excavation 0 - 10.0'
	ML	m			No Limiting Zone observed
					DRI test at 7.0'
10.0					End of Test Pit at 10.0'

\* D = DRY, M = MOIST, W = WET



# TEST PIT LOG

PIT NO.	<b>TP-4</b>	
SHEET	<b>1</b>	OF <b>1</b>
DATE: START	<b>4/6/23</b>	
END	<b>4/6/23</b>	
SURFACE ELEV. (FT)	<b>99.0</b>	

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00

INSPECTOR NAME **B.Yildiz**EQUIPMENT USED Volvo ECR145EL - TrackhoeEXCAVATING COMPANY C. Carmint/Wayne Carmint Landscaping, Inc.

WATER: DEPTH: dry TIME: 0.25 hr.

WATER: DEPTH: dry TIME: 4 hr.

DEPTH (FT)	USCS	H <sub>2</sub> O CONTENT **	GRAPHIC LOG	DESCRIPTION		REMARKS	
				DEPTH	ELEVATION		
0.0		m		0.5	Topsoil	98.5	Easy to Moderate Excavation 0 - 9.8'
0.5	ML	m		7.8	Sandy silt with gravel and some clay; light brown, brown (Residual)	91.2	
7.8	SM	m		9.8	Silty sand with gravel and some clay; red brown, brown (Decomposed Schist)	89.2	DRI test at 7.0'
9.8							
							End of Test Pit at 9.8'

\* D = DRY, M = MOIST, W = WET

\*\* D = DRY, M = MOIST, W = WET

# TEST PIT LOG

PIT NO.	<b>TP-5</b>
SHEET	<b>1</b> OF <b>1</b>
DATE: START	<b>4/7/23</b>
END	<b>4/7/23</b>
SURFACE ELEV. (FT)	<b>100.0</b>

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00



INSPECTOR NAME B.Yildiz

EQUIPMENT USED Volvo ECR145EL - Trackhoe

EXCAVATING COMPANY C. Carmint/Wayne Carmint Landscaping, Inc.

WATER: DEPTH: dry TIME: 0.25 hr.

WATER: DEPTH: dry TIME: 4 hr.

DEPTH (FT)	USCS	H <sub>2</sub> O CONTENT **	GRAPHIC LOG	DESCRIPTION	REMARKS
0.0				DEPTH ELEVATION	
0.8		m		Topsoil	Hard Excavation 0 - 6.0'
				0.8 99.2	
	GP	d		Sandy gravel with silt; red brown, grey (Weathered Schist)	Limiting Zones; Weathered rock 0.8' - 6.0' Bedrock at 6.0'
6.0				6.0 94.0	Test eliminated due to shallow depth of limiting zones
					Bucket refusal at 6.0' End of Test Pit at 6.0'

\*\* D = DRY, M = MOIST, W = WET



# TEST PIT LOG

PIT NO.	<b>TP-6</b>
SHEET	<b>1</b> OF <b>1</b>
DATE: START	<b>4/7/23</b>
END	<b>4/7/23</b>
SURFACE ELEV. (FT)	<b>102.0</b>

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00



INSPECTOR NAME B.Yildiz

EQUIPMENT USED Volvo ECR145EL - Trackhoe

EXCAVATING COMPANY C. Carmint/Wayne Carmint Landscaping, Inc.

WATER: DEPTH: dry TIME: 0.25 hr.

WATER: DEPTH: dry TIME: 4 hr.

DEPTH (FT)	USCS	H <sub>2</sub> O CONTENT **	GRAPHIC LOG	DESCRIPTION	REMARKS
0.0				DEPTH ELEVATION	
0.9		m		Topsoil	Hard Excavation 0 - 6.7'
				Sandy gravel with silt; red brown, grey (Weathered Schist)	Limiting Zones; Weathered rock 0.9' - 6.7' Bedrock at 6.7'
6.7	GP	d			Test eliminated due to shallow depth of limiting zones
					Bucket refusal at 6.7' End of Test Pit at 6.7'

\*\* D = DRY, M = MOIST, W = WET

# TEST PIT LOG

PIT NO.	<b>TP-7</b>
SHEET	<b>1</b> OF <b>1</b>
DATE: START	<b>4/7/23</b>
END	<b>4/7/23</b>
SURFACE ELEV. (FT)	<b>92.0</b>

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00





INSPECTOR NAME B.Yildiz

EQUIPMENT USED Volvo ECR145EL - Trackhoe

EXCAVATING COMPANY C. Carmint/Wayne Carmint Landscaping, Inc.

WATER: DEPTH: dry TIME: 0.25 hr.

WATER: DEPTH: dry TIME: 4 hr.

DEPTH (FT)	USCS	H <sub>2</sub> O CONTENT **	GRAPHIC LOG	DEPTH	ELEVATION	REMARKS
0.0		m		0.5	91.5	Easy to Moderate Excavation 0 - 3.8'
0.5	ML	m		1.7	90.3	
1.7	SM	d		3.8	88.2	DRI test at 1.8'  Limiting Zones; Weathered Rock 3.8' - 8.9'
3.8	GP	d		8.9	83.1	
8.9						End of Test Pit at 8.9'

\*\* D = DRY, M = MOIST, W = WET

# TEST PIT LOG

PIT NO.	<b>TP-8</b>
SHEET	<b>1</b> OF <b>1</b>
DATE: START	<b>4/7/23</b>
END	<b>4/7/23</b>
SURFACE ELEV. (FT)	<b>92.0</b>

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00






INSPECTOR NAME B.Yildiz

EQUIPMENT USED Volvo ECR145EL - Trackhoe

EXCAVATING COMPANY C. Carmint/Wayne Carmint Landscaping, Inc.

WATER: DEPTH: dry TIME: 0.25 hr.

WATER: DEPTH: dry TIME: 4 hr.

DEPTH (FT)	USCS	H <sub>2</sub> O CONTENT **	GRAPHIC LOG	DEPTH	ELEVATION	DESCRIPTION	REMARKS
0.0		m		0.5	91.5	Topsoil	Easy to Moderate Excavation 0 - 4.0'
0.5	ML	m		1.5	90.5	Sandy silt with clay and some gravel; light brown, brown (Residual)	
1.5		d		4.0	88.0	Silty sand with gravel; red brown, brown (Decomposed Schist)	
4.0	SM	d		8.3	83.7	Sandy gravel with silt; red brown, grey (Weathered Schist)	
8.3	GP	d					End of Test Pit at 8.3'

\*\* D = DRY, M = MOIST, W = WET

DOCUMENT 003126 - EXISTING HAZARDOUS MATERIAL INFORMATION

1.1 EXISTING HAZARDOUS MATERIAL INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. An existing Asbestos Containing Material Survey, prepared by Criterion Laboratories, Inc., dated July 12, 2023, is available for viewing as appended to this Document.
- C. An existing Lead-Based Paint Inspection report, prepared by Criterion Laboratories, Inc., dated July 11, 2023, is available for viewing as appended to this Document.
- D. An existing AHERA 3-Year Reinspection report, prepared by Criterion Laboratories, Inc., dated September 15, 2020, is available for viewing as appended to this Document.
- E. An existing asbestos bulk sampling report, prepared by Criterion Laboratories, Inc., dated August 28, 2020, is available for viewing as appended to this Document.
- F. Related Requirements:
  - 1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
  - 2. Document 003132 "Geotechnical Data" for reports and soil-boring data from geotechnical investigations that are made available to bidders.
  - 3. Section 024119 "Selective Demolition" for notification requirements if materials suspected of containing hazardous materials are encountered.

END OF DOCUMENT 003126



# ***ASBESTOS- CONTAINING MATERIALS SURVEY***



***Field  
Services***

**At:**

**Mary C. Howse Elementary School  
641 Boot Road  
West Chester, PA 19380**



***Lab  
Services***

**For:**

**Mr. Nate Moran, RA  
Blackney Hayes Architects  
600 Chestnut Street, Suite 1200  
Philadelphia, PA 19106**

**Prepared By:**

**Mr. Craig Gratz, CHMM  
Project Manager**

**Report Date:**

**July 12, 2023**

**Project Number:**

**231799**

**Date of Project:**

**July 5, 2023**



***Training  
Services***

## **TABLE OF CONTENTS**

### **Section Number**

- 1.0** Narratives
- 2.0** Laboratory Results
- 3.0** Suspect Materials Testing Negative for Asbestos Content
- 4.0** Sampling Methodology
- 5.0** Certifications
- 6.0** Sample Location Drawings

## **1.0 NARRATIVE**

## **1.0 NARRATIVES**

### **1.1 Purpose:**

Criterion Laboratories, Inc. (Criterion) was retained by Mr. Nate Moran of Blackney Hayes Architects, to perform an asbestos survey of Mary C. Howse Elementary School located at 641 Boot Road in West Chester, PA.

The purpose of the survey was to identify and document asbestos-containing materials (ACM) prior to renovations. The EPA's National Emission Standard for Hazardous Air Pollutants (NESHAP) regulation requires that buildings scheduled for renovations/demolition have an inspection identifying asbestos materials. OSHA's Construction Standard for Asbestos (29 CFR 1926.1101) requires that building materials installed prior to 1981 be inspected for asbestos or they must be classified as presumed asbestos-containing materials (PACM).

### **1.2 Personnel:**

Ms. Erika Barron of Criterion performed the building inspection on July 5, 2023. Ms. Barron is an EPA-accredited building inspector and is licensed by the State of Pennsylvania.

### **1.3 Discussion and Survey Results:**

A total of twenty-two (22) samples were collected from the school. All samples were analyzed by Polarized Light Microscopy (PLM), which classifies a material as asbestos-containing if it contains greater than one percent (>1%).

**No asbestos** has been identified at Mary C. Howse Elementary School.

Those materials that were observed, sampled, submitted for analysis and found not to be asbestos-containing materials are identified in Section 4.0 of this report.

### **1.4 Disclaimer:**

Information contained herein was obtained by means of onsite observations, a detailed materials survey, and analytical data. Conclusions will be based upon the data obtained. This is not to imply that the data gathered is all the information that exists which may be pertinent to the site. Any areas inaccessible to the survey team due to reasons beyond the control of Criterion (i.e., structural issues, hidden pipe chases, behind hard walls, above hard ceilings, secured spaces, etc.) will not be included in this survey. Roofing materials and building exteriors were not inspected as part of this survey.



## **1.5 Conclusions and Recommendations:**

No asbestos containing materials have been identified in Mary C. Howse Elementary School.

There was no access to areas which would allow us to sample or confirm the presence of the following materials:

1. Glue dots associated with Chalkboards.
2. Insulation A/W Unit ventilators.
3. Floor tile/mastic located underneath casework.

There is the potential for these materials to exist inside of the school. If these materials are discovered during renovations, they should be sampled to confirm the presence of asbestos.

Section 2.0, Laboratory Results, contains certificates of analyses for all bulk samples collected and analyzed.

Section 5.0, Certifications, lists asbestos accreditation for all Criterion employees who worked on this project.

This report is intended to strictly comply with EPA, OSHA and State of Pennsylvania regulations governing asbestos. This report should be referenced prior to disturbing any materials that may contain asbestos.

Criterion appreciates the opportunity to provide you with an asbestos-containing materials survey. Should you have any questions, please do not hesitate to call me at (215) 244-1300, extension 1039.



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Craig Gratz, CHMM  
Project Manager

## **2.0 LABORATORY RESULTS**



## Results of Polarized Light Microscopy

Client	<u>Blackney Hayes Architects</u>	Site Address	<u>Mary C. Howse Elementary School, 641 Boot Road, West Chester, PA 19380</u>	Sample Date	<u>7/5/2023</u>
Project #	<u>231799</u>			Sample Received Date	<u>7/6/2023</u>
Collected By	<u>Criterion Laboratories, Inc.</u>	Analyzed By	<u>Somershoe, Zackary</u>	Sample Analysis Date(s)	<u>7/11/2023</u>

Sample Number Material Description Location	Appearance	Layer	Non-Asbestos		Asbestos	
			Fibrous - %	Non-Fibrous %	Asbestos Type	Percent
<b>231799-02-002-01-01</b> White 12x12 floor tile w/ yellow mastic and grey leveling compound Room 6	White Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-01</b> White 12x12 floor tile w/ yellow mastic and grey leveling compound Room 6	Yellow Mastic	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-01</b> White 12x12 floor tile w/ yellow mastic and grey leveling compound Room 6	Gray Leveling Compound	3	Cellulose - 4%	96%	None Detected	---
<b>231799-02-002-01-02</b> White 12x12 floor tile w/ yellow mastic and grey leveling compound Room 36	White Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-02</b> White 12x12 floor tile w/ yellow mastic and grey leveling compound Room 36	Gray/Yellow Leveling Compound and Mastic 1	2	Cellulose - 6%	94%	None Detected	---
<b>231799-02-002-01-03</b> White 12x12 floor tile w/ yellow mastic Room 26	White Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-03</b> White 12x12 floor tile w/ yellow mastic Room 26	Yellow Mastic	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-03</b> White 12x12 floor tile w/ yellow mastic Room 26	Gray Leveling Compound	3	Cellulose - 6%	94%	None Detected	---
<b>231799-02-002-01-04</b> White 12x12 floor tile w/ yellow mastic Room 23	White Floor Tile	1	Cellulose - 1%	99%	None Detected	---



## Results of Polarized Light Microscopy

Client	<u>Blackney Hayes Architects</u>	Site Address	<u>Mary C. Howse Elementary School, 641 Boot Road, West Chester, PA 19380</u>	Sample Date	<u>7/5/2023</u>
Project #	<u>231799</u>			Sample Received Date	<u>7/6/2023</u>
Collected By	<u>Criterion Laboratories, Inc.</u>	Analyzed By	<u>Somershoe, Zackary</u>	Sample Analysis Date(s)	<u>7/11/2023</u>

Sample Number Material Description Location	Appearance	Layer	Non-Asbestos		Asbestos	
			Fibrous - %	Non-Fibrous %	Asbestos Type	Percent
<b>231799-02-002-01-04</b> White 12x12 floor tile w/ yellow mastic Room 23	Yellow Mastic	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-04</b> White 12x12 floor tile w/ yellow mastic Room 23	Gray Leveling Compound	3	Cellulose - 5%	95%	None Detected	---
<b>231799-02-002-01-05</b> White 12x12 floor tile w/ yellow mastic Room 19	White Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-05</b> White 12x12 floor tile w/ yellow mastic Room 19	Yellow Mastic	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-06</b> Grey mastic on sinks Room 4	Gray Mastic	1	Cellulose - 15%	85%	None Detected	---
<b>231799-02-002-01-07</b> Grey mastic on sinks Room 27	Gray Mastic	1	Cellulose - 15%	85%	None Detected	---
<b>231799-02-002-01-08</b> Grey mastic on sinks Room 12	Gray Mastic	1	Cellulose - 15%	85%	None Detected	---
<b>231799-02-002-01-09</b> Transite window sills Library	Black Transite	1	None Detected	100%	None Detected	---
<b>231799-02-002-01-10</b> Transite window sills Hall outside library	Black Transite	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-11</b> Transite window sills Room 4	Black Transite	1	Cellulose - 3%	97%	None Detected	---



## Results of Polarized Light Microscopy

Client	<u>Blackney Hayes Architects</u>	Site Address	<u>Mary C. Howse Elementary School, 641 Boot Road, West Chester, PA 19380</u>	Sample Date	<u>7/5/2023</u>
Project #	<u>231799</u>			Sample Received Date	<u>7/6/2023</u>
Collected By	<u>Criterion Laboratories, Inc.</u>	Analyzed By	<u>Somershoe, Zackary</u>	Sample Analysis Date(s)	<u>7/11/2023</u>

Sample Number Material Description Location	Appearance	Layer	Non-Asbestos		Asbestos	
			Fibrous - %	Non-Fibrous %	Asbestos Type	Percent
<b>231799-02-002-01-12</b> Tan 12x12 floor tile w/ black mastic Janitor closet by nurse's office	Tan Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-12</b> Tan 12x12 floor tile w/ black mastic Janitor closet by nurse's office	Black Mastic	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-13</b> Tan 12x12 floor tile w/ black mastic Hall outside library	Tan Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-13</b> Tan 12x12 floor tile w/ black mastic Hall outside library	Black Mastic	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-14</b> Tan 12x12 floor tile w/ black mastic Nurse's office	Tan Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-14</b> Tan 12x12 floor tile w/ black mastic Nurse's office	Black Mastic	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-15</b> Blue 12x12 floor tile w/ yellow mastic Faculty lounge	Blue Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-15</b> Blue 12x12 floor tile w/ yellow mastic Faculty lounge	Yellow Mastic	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-15</b> Blue 12x12 floor tile w/ yellow mastic Faculty lounge	Gray Leveler	3	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-16</b> Blue 12x12 floor tile w/ yellow mastic Faculty lounge	Blue Floor Tile	1	Cellulose - 1%	99%	None Detected	---



## Results of Polarized Light Microscopy

Client	<u>Blackney Hayes Architects</u>	Site Address	<u>Mary C. Howse Elementary School, 641 Boot Road, West Chester, PA 19380</u>	Sample Date	<u>7/5/2023</u>
Project #	<u>231799</u>			Sample Received Date	<u>7/6/2023</u>
Collected By	<u>Criterion Laboratories, Inc.</u>	Analyzed By	<u>Somershoe, Zackary</u>	Sample Analysis Date(s)	<u>7/11/2023</u>

Sample Number Material Description Location	Appearance	Layer	Non-Asbestos		Asbestos	
			Fibrous - %	Non-Fibrous %	Asbestos Type	Percent
<b>231799-02-002-01-16</b> Blue 12x12 floor tile w/ yellow mastic Faculty lounge	Yellow Mastic	2	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-17</b> Tan linoleum w/ yellow glue Room 4	Tan Linoleum	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-17</b> Tan linoleum w/ yellow glue Room 4	Yellow Glue	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-18</b> Tan linoleum w/ yellow glue Room 38	Tan Linoleum	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-18</b> Tan linoleum w/ yellow glue Room 38	Yellow Glue	2	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-19</b> Red 12x12 floor tile w/ black mastic Gym/cafeteria	Red Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-19</b> Red 12x12 floor tile w/ black mastic Gym/cafeteria	Black Mastic	2	None Detected	100%	None Detected	---
<b>231799-02-002-01-20</b> Red 12x12 floor tile w/ black mastic Gym/cafeteria	Red Floor Tile	1	Cellulose - 1%	99%	None Detected	---
<b>231799-02-002-01-20</b> Red 12x12 floor tile w/ black mastic Gym/cafeteria	Black Mastic	2	None Detected	100%	None Detected	---
<b>231799-02-002-01-21</b> Brown 12x12 floor tile w/ yellow mastic Lobby/main entrance	Brown Floor Tile	1	Cellulose - 2%	98%	None Detected	---



## Results of Polarized Light Microscopy

Client	<u>Blackney Hayes Architects</u>	Site Address	<u>Mary C. Howse Elementary School, 641 Boot Road, West Chester, PA 19380</u>	Sample Date	<u>7/5/2023</u>
Project #	<u>231799</u>			Sample Received Date	<u>7/6/2023</u>
Collected By	<u>Criterion Laboratories, Inc.</u>	Analyzed By	<u>Somershoe, Zackary</u>	Sample Analysis Date(s)	<u>7/11/2023</u>

Sample Number Material Description Location	Appearance	Layer	Non-Asbestos		Asbestos	
			Fibrous - %	Non-Fibrous %	Asbestos Type	Percent
<b>231799-02-002-01-21</b> Brown 12x12 floor tile w/ yellow mastic Lobby/main entrance	Black Mastic	2	Cellulose - 3%	97%	None Detected	---
<b>231799-02-002-01-22</b> Brown 12x12 floor tile w/ yellow mastic Main office	Brown Floor Tile	1	Cellulose - 2%	98%	None Detected	---
<b>231799-02-002-01-22</b> Brown 12x12 floor tile w/ yellow mastic Main office	Black Mastic	2	Cellulose - 3%	97%	None Detected	---

Sample Count 22 1 - Inseparable

James A. Weltz, CIH, Technical Director

Criterion Laboratories, Inc. bears no responsibility for sample collection activities of non-Criterion personnel. Results apply to sample(s) as received. This report relates only to the samples reported above, and when reproduced, must be in its entirety. Estimated accuracy, precision and uncertainty data available on request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting Limit is 1%. QC data associated with this sample set is within acceptable limits. Samples were received in good condition, unless otherwise noted.

Note: If your project number ends with an "R", it is a revised report and replaces the original document in full. The above results represent the analysis of bulk sample(s) by Criterion Laboratories, Inc. according to EPA 40 CFR Part 763 Appendix E to Subpart E - Polarized Light Microscopy. The concentration of asbestos is determined by visual estimation.



Criterion Laboratories, Inc. (ID 100424) is accredited by the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC in the IHLAP; EMLAP and ELLAP accreditation programs for Polarized Light Microscopy (PLM), Phase Contrast Microscopy (PCM); Air-Direct Examination; and Airborne Dust, Paint, Settled Dust by Wipe and Soil for Fields of Testing as documented by the Scope of Accreditation Certificate and associated Scope. Additionally, Criterion Laboratories, Inc. is certified by the Center for Disease Control (CDC) Environmental Legionella Isolation Techniques Evaluation (ELITE) Program for the determination of Legionella in water by culture and holds accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP ID 102046-0) for the determination of asbestos in bulk samples by Polarized Light Microscopy (PLM). This test report must not be used to claim product endorsement by NVLAP, NIST, AIHA or any agency of the US Government. Unless specifically listed as above, these test results are not covered under AIHA-LAP, LLC, 100424 accreditation.

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# Chain of Custody

**Matrix** Bulk/Building Material  
**Analyte** Asbestos  
**Analysis Type** PLM  
**Container** Bag  
**Project** 231799  
**Client** Blackney Hayes Architects  
**Site Address** Mary C. Howse Elementary School, 641 Boot Road,  
West Chester, PA 19380  
**Location**  
**Turnaround** 48 Hour  
**Field Tech** Erika Barron  
**Sample Notes**  
**Chain of Custody Notes**

## Additional Analytes

Sample Number	Location	Material Description	Received Condition	Date	Notes
231799-02-002-01-01	Room 6	White 12x12 floor tile w/ yellow mastic and grey leveling compound	Good	7/6/2023	
231799-02-002-01-02	Room 36	White 12x12 floor tile w/ yellow mastic and grey leveling compound	Good	7/6/2023	
231799-02-002-01-03	Room 26	White 12x12 floor tile w/ yellow mastic	Good	7/6/2023	
231799-02-002-01-04	Room 23	White 12x12 floor tile w/ yellow mastic	Good	7/6/2023	
231799-02-002-01-05	Room 19	White 12x12 floor tile w/ yellow mastic	Good	7/6/2023	
231799-02-002-01-06	Room 4	Grey mastic on sinks	Good	7/6/2023	
231799-02-002-01-07	Room 27	Grey mastic on sinks	Good	7/6/2023	
231799-02-002-01-08	Room 12	Grey mastic on sinks	Good	7/6/2023	
231799-02-002-01-09	Library	Transite window sills	Good	7/6/2023	
231799-02-002-01-10	Hall outside library	Transite window sills	Good	7/6/2023	
231799-02-002-01-11	Room 4	Transite window sills	Good	7/6/2023	
231799-02-002-01-12	Janitor closet by nurse's office	Tan 12x12 floor tile w/ black mastic	Good	7/6/2023	
231799-02-002-01-13	Hall outside library	Tan 12x12 floor tile w/ black mastic	Good	7/6/2023	
231799-02-002-01-14	Nurse's office	Tan 12x12 floor tile w/ black mastic	Good	7/6/2023	
231799-02-002-01-15	Faculty lounge	Blue 12x12 floor tile w/ yellow mastic	Good	7/6/2023	
231799-02-002-01-16	Faculty lounge	Blue 12x12 floor tile w/ yellow mastic	Good	7/6/2023	





# Chain of Custody

231799-02-002-01-17	Room 4	Tan linoleum w/ yellow glue	Good	7/6/2023
231799-02-002-01-18	Room 38	Tan linoleum w/ yellow glue	Good	7/6/2023
231799-02-002-01-19	Gym/cafeteria	Red 12x12 floor tile w/ black mastic	Good	7/6/2023
231799-02-002-01-20	Gym/cafeteria	Red 12x12 floor tile w/ black mastic	Good	7/6/2023
231799-02-002-01-21	Lobby/main entrance	Brown 12x12 floor tile w/ yellow mastic	Good	7/6/2023
231799-02-002-01-22	Main office	Brown 12x12 floor tile w/ yellow mastic	Good	7/6/2023

**Sample Count**   22

Handling Chain Type	Handled By	Date	Time	Notes
Report Results To	Craig Gratz	7/5/2023		
Send Reports To	Blackney Hayes Architects	7/5/2023		
Samples Taken By	Erika Barron	7/5/2023	12:30	
Transported By	Erika Barron	7/5/2023	15:00	
Relinquished By	Erika Barron	7/5/2023	16:00	
Received By	Lauren Mitchell	7/6/2023	08:00	
Analyzed By	Zack Somershoe	7/11/2023	15:53	
Reviewed By	Andrew Schwab	7/11/2023	15:58	



# Samples

**Sample Date** 7/5/2023  
**Sample Day** Wednesday  
**Sample Number** 231799-02-002-01  
**Matrix** Bulk/Building Material  
**Analyte** Asbestos  
**Analysis Type** PLM  
**Container** Bag  
**Project** 231799  
**Client** Blackney Hayes Architects  
**Site Address** Mary C. Howse Elementary School, 641 Boot Road,  
West Chester, PA 19380  
**Location**  
**Field Tech** Erika Barron  
**Notes**  
**Status** Complete  
**Created** 7/5/2023  
**Created By** ebarron

## Additional Analytes

## Chain Of Custody

07/05/2023 12:00:00 am EDT Complete

Sample Number	Hid Number	Material Description	Location	Quantity	Units	Friable	Damaged	No Sample
231799-02-002-01-01	2000/2500/2600	White 12x12 floor tile w/ yellow mastic and grey leveling compound	Room 6	925	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>

# Samples

231799-02-002-01-02	2000/2500/	White 12x12 floor tile w/ yellow mastic and grey leveling compound	Room 36	800	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-03	2000/2500	White 12x12 floor tile w/ yellow mastic	Room 26	800	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-04	2000/2500	White 12x12 floor tile w/ yellow mastic	Room 23	800	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-05	2000/2500	White 12x12 floor tile w/ yellow mastic	Room 19	250	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-06	2601	Grey mastic on sinks	Room 4	5	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-07	2601	Grey mastic on sinks	Room 27	5	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-08	2601	Grey mastic on sinks	Room 12	5	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-09	2300	Transite window sills	Library	24	LF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-10	2300	Transite window sills	Hall outside library	6	LF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-11	2300	Transite window sills	Room 4	12	LF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-12	2001/2501	Tan 12x12 floor tile w/ black mastic	Janitor closet by nurse's office	30	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-13	2001/2501	Tan 12x12 floor tile w/ black mastic	Hall outside library	1370	SF	<input type="checkbox"/>	Damaged	<input type="checkbox"/>
231799-02-002-01-14	2001/2501	Tan 12x12 floor tile w/ black mastic	Nurse's office	530	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-15	2002/2502	Blue 12x12 floor tile w/ yellow mastic	Faculty lounge	350	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-16	2002/2502	Blue 12x12 floor tile w/ yellow mastic	Faculty lounge			<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-17	2200/2602	Tan linoleum w/ yellow glue	Room 4	15	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-18	2200/2602	Tan linoleum w/ yellow glue	Room 38	15	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-19	2003/2503	Red 12x12 floor tile w/ black mastic	Gym/cafeteria	250	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-20	2003/2503	Red 12x12 floor tile w/ black mastic	Gym/cafeteria			<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
231799-02-002-01-21	2004/2504	Brown 12x12 floor tile w/ yellow mastic	Lobby/main entrance	625	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>



# Samples

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231799-02-002-01-22	2004/2504	Brown 12x12 floor tile w/ yellow mastic	Main office	325	SF	<input type="checkbox"/>	Not Damaged	<input type="checkbox"/>
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Sample Count    22

### **3.0 SUSPECT MATERIALS TESTING NEGATIVE FOR ASBESTOS CONTENT**

### **3.0 Suspect Materials Testing Negative for Asbestos Content**

The following materials were observed, sampled, submitted for analysis and found not to be asbestos-containing materials. For more specific information concerning the location of these materials, see Section 2.0 of this report.

- White 12"x12" Floor Tile and Yellow Mastic and Gray Leveling Compound
- White 12"x12" Floor Tile and Yellow Mastic
- Gray Sink Mastic
- Transite Window Sills
- Tan 12"x12" Floor Tile and Black Mastic
- Blue 12"x12" Floor Tile and Yellow Mastic
- Tan Linoleum and Yellow Glue
- Red 12"x12" Floor Tile and Black Mastic
- Brown 12"x12" Floor Tile and Yellow Mastic

## **4.0 SAMPLING METHODOLOGY**

## **4.0 Sample Methodology**

Bulk samples of suspected asbestos-containing material (ACM) were collected in accordance with guidelines set forth by the Environmental Protection Agency (EPA) and the National Institute for Occupational Safety and Health (NIOSH). The procedures for obtaining a bulk sample of suspected ACM are:

1. "Functional Spaces" in the Property were identified. A Functional Space is a spatially distinct unit within a building, which contains identifiable populations of building occupants (i.e. corridor, office space, mechanical area, etc.).
2. The total amount and location of each type of suspected ACM was tabulated.
3. The types of suspected ACM were then grouped as homogeneous materials. Each homogeneous material is defined as being uniform in texture and appearance. Based on these parameters, each homogeneous material was assigned a specific identification number as listed below.

### **Homogeneous Material I.D. #Reference List**

#### **Surfacing**

0100 to 0199 - Sprayed-On  
0200 to 0299 - Troweled-On  
0300 to 0399 - Blown-In  
0400 to 0499 - Other Surfacing  
1900 to 1999 - Plaster Walls and Ceilings

#### **Thermal**

0500 to 0599 - Lagging  
0600 to 0699 - Breeching  
0700 to 0799 - Duct Insulation  
0800 to 0899 - Tank Insulation  
0900 to 0999 - Block Pipe Insulation  
1000 to 1099 - Joints associated with Block Pipe Insulation  
1100 to 1199 - Corrugated/Air Cell Pipe Insulation  
1200 to 1299 - Joints associated with Corrugated Pipe Insulation  
1300 to 1399 - Compressed Pipe Insulation  
1400 to 1499 - Joints associated with Compressed Pipe Insulation  
1500 to 1599 - Joints associated with Fibrous Glass Pipe Insulation  
1600 to 1699 - Other Thermal



## 4.0 Sampling Methodology (Continued)

### Miscellaneous

- 1700 to 1799 - Lay-In Ceiling Tiles
  - 1800 to 1899 - Spline Ceiling Tiles
  - 2000 to 2099 - Floor Tiles
  - 2100 to 2199 - Drywall
  - 2200 to 2299 - Linoleum
  - 2300 to 2399 - Transite
  - 2400 to 2499 - Expansion Joints
  - 2500 to 2599 - Mastic Floor Tiles
  - 2600 to 2699 - Other Miscellaneous
  - 2700 to 2799 - Mastic Linoleum
4. A sampling scheme was devised based upon the amounts and locations of the different homogeneous materials in order to obtain representative samples.
  5. Trained personnel using an appropriate sampling tool and a leak-tight, labeled sample container took the actual bulk samples. The sampling was conducted in areas of the building that are not readily visible to the building occupants. These areas included above lay-in ceiling tiles and beneath cabinets and desks, etc.
  6. The personnel employed proper decontamination procedures to prevent contamination of the building environment and possible exposure to themselves and others.
  7. Each location of suspicious asbestos-containing material (ACM) was documented on the Asbestos Bulk Sample Log. This documentation included the location of suspicious materials, type of material located, square footage of suspicious ACM, as well as the square footage of damaged suspicious ACM. All bulk samples taken were documented on the Sample Log form and a Chain of Custody form. Each was completed for all samples taken by the inspector and handler.
  8. The samples were then taken to the laboratory for analysis. The Certificates of Analysis and Chain of Custody relative to each sample are included in this report.
  9. The inspector assessed the condition of the suspicious ACM using the eight EPA factors.
  10. On the Asbestos Bulk Sample Log, "NS" in the Sample # box means "not sampled". This homogeneous material was sampled elsewhere or assumed to contain asbestos. The purpose of the "NS" listing is to quantify the material for its inclusion in the Asbestos Inventory should similar material sampled elsewhere test positive for asbestos.

## **5.0 CERTIFICATIONS**

# *Certificate of Training*

**CRITERION LABORATORIES, INC.**

**HEREBY CERTIFIES THAT**

**Erika R. Barron**

**HAS SUCCESSFULLY COMPLETED A 4 HOUR TELECONFERENCE COURSE ENTITLED**

**Asbestos Building Inspector Refresher**

**INCLUDING CLASSROOM INSTRUCTION**

**on this 2nd day of May 2023**

**Approved for AHERA Accreditation Under TSCA Title II**

400 Street Road  
Bensalem, PA 19020  
(215) 244-1300 - Phone  
(215) 244-4349 - Fax  
[www.criterionlabs.com](http://www.criterionlabs.com)

Rev. 20230216  
Course is conducted in English

**DIRECTOR:** *Adam Wetz*

*Adam Wetz, President*



# ***LEAD-BASED PAINT INSPECTION***



***Field  
Services***

**At:**

**Mary C. Howse Elementary School  
641 Boot Road  
West Chester, PA 19380**



***Lab  
Services***

**For:**

**Mr. Nate Moran, RA  
Blackney Hayes Architects  
600 Chestnut Street, Suite 1200  
Philadelphia, PA 19106**

**Prepared By:**

**Mr. Craig Gratz, CHMM  
Project Manager**

**Report Date:**

**July 11, 2023**

**Project Number:**

**231799**

**Date of Project:**

**July 5, 2023**



***Training  
Services***

## **TABLE OF CONTENTS**

### **1.0 Executive Summary**

### **2.0 Findings And Recommendations**

#### **Attachments**

- ◆ Testing Report Legend
- ◆ Calibration Check Test Results
- ◆ XRF Testing Report Sheets
- ◆ License Documentation

## 1.0 EXECUTIVE SUMMARY

Criterion Laboratories, Inc. (Criterion) was requested to perform a Lead-Based Paint Inspection of Mary C. Howse Elementary School located at 641 Boot Road in West Chester, Pennsylvania (the "Property"). The purpose of the inspection was to explore the presence of painted surfaces for lead-based paint in renovation areas throughout the school.

Ms. Alex Forlenza, a PA-licensed Risk Assessor for Criterion, performed the inspection on July 5, 2023.

Painted surfaces were analyzed for lead using an X-ray Fluorescence Spectrometer (XRF) manufactured by Thermo Scientific-NITON.

The U.S. Department of Housing and Urban Development (HUD) considers 1.0 milligrams of lead per square centimeter of painted surface, or greater, to be lead based paint ( $\geq 1.0 \text{ mg/c m}^2$ ).

## 2.0 FINDINGS AND RECOMMENDATIONS

During the inspection, the presence of lead-based paint was detected in various locations of the Property, (refer to Attachments). Listed on the attached sheets (Attachments) are location and components for the areas where painted surfaces were sampled. **A summary of the locations/components testing positive for lead-based paint is included in the following table. You will find a legend in the Attachments Section, which will explain the codes used in this table.**

The Environmental Protection Agency's (EPA) Renovation, Repair, and Painting Program Final Rule (40 CFR Part 745) (RRP Rule) mandates that if lead-based paint is disturbed during renovation or painting activity then the work should be completed using lead-safe work practices as defined in the RRP Rule. In addition, the individual disturbing the lead-based paint has to be certified as well as the firm with whom he/she is employed.

Any painted surface that has lead content should not be sanded, demolished or disturbed without the proper engineering controls and work methods, as spelled out under the OSHA's 29 CFR Part 1926.62 Lead Exposure in Construction, Interim Rule. Improper disturbance of any paint with lead content can cause lead to become airborne. The emphasis on controlling lead dust derives from the conclusion that lead dust appears to be the primary route of exposure to lead, especially of low-level exposure.

It is therefore important that occupants of the building and any contractors be made aware of the presence of the lead-based paint and the potential health risks associated with the ingestion of lead-based paint or the associated dust that results from the damaging of the painted surfaces.

Occupants and/or contractors should also be made aware of the importance of not damaging the painted surfaces and creating loose and flaking paint or the creation of dust. If the painted surfaces are damaged this should be reported to the proper building representative/maintenance personnel to properly correct the problem to prevent an increased exposure potential.

The following is a list of paints that tested positive for lead content throughout the areas tested.

**Mary C. Howse Elementary School- 641 Boot Road, West Chester, PA**

	Color/Substrate/		
<u>Location</u>	<u>Component</u>	<u>Surface/Condition</u>	<u>Recommendation</u>
Classroom 6 Hallway- above door to playground	White/Concrete/Wall	Non-Friction/Intact	HR/OSHA
Library Hallway/Room 38 Hallway Connector	Red/Concrete/Beam Over Door	Non-Friction/Intact	HR/OSHA
Room 17	White/Metal/Ladder	Friction/Fair	HR/AENCP/AR/OSHA
Cafeteria-above stage entrance	White/Concrete/Header Beam	Non-Friction/Fair	HR/AENCP/OSHA
Exterior	Tan/Metal/Triangular Roof Beams	Non-Friction/Poor	HR/AENCP/AR/OSHA

## **ATTACHMENTS**



## **Testing Report Legend**

### **Recommendations**

#### **HR – Hazard Reduction**

It is recommended that these surfaces be periodically observed for chalking, peeling or cracking.

If the surface is chalking, it can be cleaned with Trisodium Phosphate and repainted. If it is peeling or cracking, it should be repaired or abated.

#### **AR – Abatement Replacement**

A strategy of abatement that entails the removal of building components coated with lead-based paint and installation of new components free of lead-based paint.

#### **A Encp – Abatement Encapsulation**

“Encapsulant” means a coating or rigid material that relies on adhesion to a lead-based paint surface and is not mechanically fastened to the substrate with a 20-year warranty.

“Encapsulation” means a process to make lead-based paint inaccessible by providing a barrier between the lead-based paint and the environment, where the primary means of attachment for the encapsulant is bonding of a product to the surface covered either by the product itself or through the use of an adhesive.

#### **A Encl – Abatement Enclosure**

“Enclosure” means the installation of a rigid, durable barrier that is mechanically attached to building components, with all edges and seams sealed with caulk or other sealant and having a design life of at least 20 years.

#### **CA – Complete Abatement**

A process designed either to permanently eliminate lead-based paint hazards on a component and includes, but is not limited to: the removal of lead-based paint and lead-contaminated dust.

#### **OSHA**

Any painted surface that has lead content should not be sanded, demolished or disturbed without the proper engineering controls and work methods. As spelled out under OSHA’s CFR Part 1926 Lead Exposure in Construction, Interim Rule. Improper disturbance of any paint with lead content can cause lead to become airborne.

## **NA – Non-applicable**

X-ray Fluorescence Spectrometer (XRF) results indicated 0.0 or below, which indicates no lead detected by the XRF Spectrometer.

## **Surface/Condition**

### **Surface**

- ◆ A determination of whether a painted surface is considered friction/impact surface or non-friction impact surface.
- ◆ Friction/Impact Surface – any interior or exterior surface subject to abrasion, friction or damage by repeated impact or contact.
- ◆ Non-friction/Impact Surface – any interior or exterior surface not subject to abrasion, friction or damage by repeated impact or contact.

### **Condition**

- ◆ An intact good paint surface is smooth, continuous and free of surface defect, which would result in the release of paint dust or chips.
- ◆ Large surfaces such as walls, floors and ceilings should be rated as follows:
  - ◆ Good or intact condition shall indicate a surface that is entirely intact;
  - ◆ Fair condition shall indicate a surface where less than or equal to two square feet of surface are not intact;
  - ◆ Poor condition shall indicate a surface where more than two square feet of surface are not intact.
- ◆ Components without large surfaces, such as window sills, baseboards, or other small areas, shall be rated as follows:
  - ◆ Good or intact condition shall indicate that the surface is entirely intact;
  - ◆ Fair condition shall indicate that less than or equal to 10 percent of the surface is not intact;
  - ◆ Poor condition shall indicate that more than 10 percent of the surface is not intact.

- ◆ Exterior components with large surface areas shall be rated as follows:
  - ◆ Good or intact condition shall indicate that the surface is entirely intact;
  - ◆ Fair condition shall indicate that less than or equal to ten square feet of surface is not intact;
  - ◆ Poor condition shall indicate that more than ten square feet of surface is not intact.

## **Wall**

When entering a room the wall that is the address side of the room is labeled as “A” Wall. The walls are then labeled in a clockwise fashion as “B” Wall and “D” Wall.



SCIAPS X-550 Pb  
Calibration Check Test Results

Client: Blackney Hayes Architects  
Address: 600 Chestnut St Suite 1200 Philadelphia PA  
Site Address: Mary C House ES - 641 Boot Rd West Chester, PA  
Date: 7/5/23 XRF Serial #: 01566  
Project Number: 231799  
Inspector: Alex Forlenza  
Inspector Signature: [Signature]

NIST SRM2573 Lead Paint Standards	Start of Job		2 <sup>nd</sup> Calibration		3 <sup>rd</sup> Calibration		4 <sup>th</sup> Calibration	
	1 <sup>st</sup> Calibration Check		Check		Check		Check	
Surface Lead mg/cm <sup>2</sup>	Reading #	Result	Reading #	Result	Reading #	Result	Reading #	Result
1.03 ± 0.03	01	1.1	181	1.1	436	1.0		
1.03 ± 0.03	02	1.1	182	1.1	437	1.0		
1.03 ± 0.03	03	1.1	183	1.1	438	1.1		
<0.01	04	0.0	184	0.0	439	0.0		
<0.01	05	0.0	185	0.0	440	0.0		
<0.01	06	0.0	186	0.0	441	0.0		
Clip Calibration (Pass/Fail)	PASS		PASS		PASS			

Note: At least three (3) calibration samples should be taken before and after the inspection has been complete. In addition three (3) calibration samples should be taken at four (4) hour intervals.



1.1 x 3, 0:0 x 3

## XRF Testing Report

Page 1 of 47

Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. Houder ESSignature: [Signature]Room Equivalent: 641 Boat Rd, West Chester PAProject No.: 231799Room #: Classroom 4XRF Serial No.: 01506

XRF Serial No.: 01306

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wh	Wood Brick Sheetrock Plaster Metal Concrete	walls	7	A	Classroom 4	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			8	B	↓	0.0		NEG		
			9	C		0.0				
			10	D		0.0				
wh	Wood Brick Sheetrock Plaster Metal Concrete	walls	11	A	Classroom 4	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
red	Wood Brick Sheetrock Plaster Metal Concrete	doors	12	A	Classroom 4 - entrance door casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			13	A	4 - entrance door jamb	0.1		NEG		
			14	A	4 - closet door casing	0.0				
			15	A	4 - closet door jamb	0.0				
red	Wood Brick Sheetrock Plaster Metal Concrete	windows	16	C	4 - Frame	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			17	C	4 - Casing	0.0		NEG		
			18	C	4 - Lift	0.0				
wh	Wood Brick Sheetrock Plaster Metal Concrete	radiator supply line	19	C	4 - Under windows	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		





Criterion

## XRF Testing Report

Page 2 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. Howse ESSignature: [Signature]Room Equivalent: 641 Boat Rd, West Chester PAProject No.: 231799Room #: Classroom 4XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
tan	Wood Brick Sheetrock Plaster Metal Concrete	unident	20	C	Classroom 4 - under windows	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
								NEG		
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	windows stool	21	C	4 - under windows	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	22	A	4 - girls bathroom	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
			23	B	↓	0.0		NEG		
			24	C		0.0		INC		
			25	D		0.0				
whk	Wood Brick Sheetrock Plaster Metal Concrete	toilet supply pipe	26	C	4 - girls bathroom	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	door	27	A	4 - girls bathroom - casing	0.1	0.1	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
			28	A	4 - girls bathroom - jamb	0.1		NEG		
								INC		



# XRF Testing Report

Page 3 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. Hawse ES  
64N Boat Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Classroom 4XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
wh	Wood Brick Sheetrock Plaster Metal Concrete	pipe riser	29	C	4 - boys bathroom	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		





# XRF Testing Report

Page 4 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary C House Es

Signature: [Signature]

Room Equivalent: 641 Boat Rd West Chester PA

Project No.: 231799

Room #: Main office - Classroom 6 Hallway

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition		Recommendation		
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	30	B	outside classroom 5	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA	
			31	B	outside classroom 1	0.0		NEG					
			32	D	outside classroom 6	0.0		INC					
			33	D	outside nurse office	0.0							
red	Wood Brick Sheetrock Plaster Metal Concrete	electrical wall mount	34	B	Fire alarm mount near playground exit	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA	
			35	B	Fire bell mount near playground exit	0.0		NEG					
			36	B	Fire bell mount near classroom 1	0.0		INC					
red	Wood Brick Sheetrock Plaster Metal Concrete	door	37	B	Classroom 3 - door casing	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA	
			38	D	classroom 6 - door casing	0.1		NEG					
			39	B	classroom 1	0.0		INC					
			40	B	Classroom 5	0.0							
wht	Wood Brick Sheetrock Plaster Metal Concrete	electrical panel	41	B	upper panel cover near custodian	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA	
			42	B	lower panel frame " office	0.0		NEG					
								INC					
wht	Wood Brick Sheetrock Plaster Metal Concrete	fire alarm mount	43	B	outside custodian office	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA	
								NEG					
								INC					





Criterion

## XRF Testing Report

Page 5 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary P House ESSignature: [Signature]Room Equivalent: 6th Bmt Rd West Chester PAProject No.: 231799Room #: Main Office - Classroom 6 HallwayXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
red	Wood Brick Sheetrock Plaster Metal Concrete	Classroom numbers on walls	44	D	# outside classroom 4	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
			45	D	# outside classroom 2	0.0		NEG		
								INC		
whit	Wood Brick Sheetrock Plaster Metal Concrete	socket covers	46	D	outside nurse office	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	exterior door	47	C	to playground - door	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
			48	C	to playground - casing	0.0		NEG		
			49	C	" - jamb	0.0				
			50	C	" - support window <sup>dividers</sup> mullion	0.0		INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	window	51	B	main office - stool	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
			52	B	" - apron	0.0		NEG		
			53	B	" - casing	0.0				
			54	B	" - mullion	0.0		INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	office/RR closet doors	55	B	custodian office - casing	0.1	0.1	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
			56	D	Adult BR to right of nurse - jamb	0.1		NEG		
			57	D	nurse office - casing	0.0				
			58	B	Door to main office kitchen - jamb	0.0		INC		





## Page 6 of 47

Date: 7/5/23

Signature: Sheela

Project No.: 031799

XRF Serial No.: 015766

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	★ HW wall	59	C	above door to playground (part of exterior wall)	3.0	3.0	POS	FRICTION INTACT	HR A ENCP
								NEG	NON-FRICTION FAIR	AR CA OSHA
								INC	POOR	A ENCL N/A
wht	Wood Brick Sheetrock Plaster Metal Concrete	classroom wall	60	D	Classroom 5	0.0	0.1	POS	FRICTION INTACT	HR A ENCP
			61	C	Classroom 3	0.1		NEG	NON-FRICTION FAIR	AR CA OSHA
			62	A	Classroom 1	0.1			POOR	A ENCL N/A
			63	B	Classroom 2	0.0		INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	classroom wall	64	A	Classroom 2	0.0	0.0	POS	FRICTION INTACT	HR A ENCP
			65	A	Classroom 1	0.0		NEG	NON-FRICTION FAIR	AR CA OSHA
			66	A	Classroom 3	0.0			POOR	A ENCL N/A
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	Classroom window	67	C	Classroom 3 - casing	0.0	0.0	POS	FRICTION INTACT	HR A ENCP
			68	D	Classroom 5 - frame	0.0		NEG	NON-FRICTION FAIR	AR CA OSHA
			71	B	Classroom 6 - lift	0.0			POOR	A ENCL N/A
								INC		
tan	Wood Brick Sheetrock Plaster Metal Concrete	Univent	69	C	Classroom 3	0.0	0.0	POS	FRICTION INTACT	HR A ENCP
			70	B	Classroom 6	0.0		NEG	NON-FRICTION FAIR	AR CA OSHA
								INC	POOR	A ENCL N/A



Criterion

## XRF Testing Report

Page 7 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C Howse EsSignature: [Signature]Room Equivalent: 601 Post Rd West Chester PAProject No.: 231799Room #: Main office - Classroom 6 HallwayXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
blk	Wood Brick Sheetrock Plaster Metal Concrete	Classroom window stool	72	D	Classroom 5	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
			73	B	Classroom 6	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	pipe	74	A	Classroom 5 - right bathroom	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	radiator supply	75	B	Classroom 6	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	vent	76	A	Classroom 6 - on wall above cabinets		0.0 bl/wh	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	fire exit door	77	A	Classroom 6 - door	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
								NEG		
								INC		





Criterion

\* no access electrical room

## XRF Testing Report

Page 8 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Marly C House ES  
641 Brook Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Main office + surrounding faculty officesXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition		Recommendation	
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	78	B	Case worker office	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			79	A	"	0.0		NEG				
								INC				
red	Wood Brick Sheetrock Plaster Metal Concrete	door	80	A	nurse worker office - casing	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			81	A	nurse office - mess + file room - casing	0.0		NEG				
			82	A	room to left of principal office	0.0		INC				
			83	A	main office - jamb - jamb	0.0						
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	84	B	storage closet	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			85	C	Nurse office	0.0		NEG				
			86	D	main office	0.0		INC				
			87	A	main office	0.0						
red	Wood Brick Sheetrock Plaster Metal Concrete	windows	88	C	principal's office - frame	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			89	A	main office - mullion	0.0		NEG				
			90	B	main office - casing	0.0		INC				
wht	Wood Brick Sheetrock Plaster Metal Concrete	radiator	91	C	under window - principal office	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
								NEG				
								INC				



# XRF Testing Report

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Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Harry C. House ES

Signature: [Signature]

Room Equivalent: 641 Boat Rd West Chester PA

Project No.: 231799

Room #: Main office + faculty offices + bathrooms

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
brk	Wood Brick Sheetrock Plaster Metal Concrete	window stool	92	A	main office	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
whr	Wood Brick Sheetrock Plaster Metal Concrete	wall	93	B	girls BR across from main office	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
whr	Wood Brick Sheetrock Plaster Metal Concrete	fire alarm support box	94	B	"	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
whr	Wood Brick Sheetrock Plaster Metal Concrete	tray ceiling	95		girls BR across from main office	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
whr	Wood Brick Sheetrock Plaster Metal Concrete	ceiling vent covers	96		" - metal vent	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			97		" - metal access panel	0.0		NEG		
								INC		





# XRF Testing Report

Page 10 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Harry C House ES

Signature: [Signature]

Room Equivalent: 241 Boat Rd West Chester PA

Project No.: 231799

Room #: Hallway from entryway to room 14

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wh	Wood Brick Sheetrock Plaster Metal Concrete	walls	98	B	outside gym/auditorium	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
			99	D	outside classroom 8	0.0		NEG		
			100	B	outside classroom 11	0.0		INC		
			101	C	outside back left exterior exit	0.0		POS		
red	Wood Brick Sheetrock Plaster Metal Concrete	doors	102	B	classroom 9 - casing	0.1	0.1	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
			103	D	paper storage room across from room 7	0.1		NEG		
			104	B	classroom 7 - jamb	0.0		INC		
			105	D	classroom 10 - jamb	0.0		POS		
red	Wood Brick Sheetrock Plaster Metal Concrete	electrical support box	106	D	Fire alarm support near room 3	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
								NEG		
								INC		
								POS		
wh	Wood Brick Sheetrock Plaster Metal Concrete	electrical support box	107	D	light switch near room 13	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
								NEG		
								INC		
								POS		
wh	Wood Brick Sheetrock Plaster Metal Concrete	Fire door headers	108	B	exterior exit access from 14 - inside door	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL A ENCP CA OSHA NIA
			109	B	" - outside door	0.0		NEG		
			110		doors next to room 13	0.0		INC		





\* no access server room in CR 14

# XRF Testing Report

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Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary C House Es

Signature: [Signature]

Room Equivalent: 641 Bost Rd West Chester PA

Project No.: 231799

Room #: Classrooms 7-14 + Hallway ext doors

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition		Recommendation	
red	Wood Brick Sheetrock Plaster Metal Concrete	exterior door	111	#B	Exit Doors across from room 14 - interior casing	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			112	B	" - interior door frame	0.0		NEG				
			113	B	" - exterior door	0.0		INC				
			114	B	" - exterior jamb	0.0						
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	115	B	classroom 14	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			121	D	classroom 12	0.0		NEG				
			128	C	classroom 10	0.0		INC				
			133	A	classroom 8	0.0						
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	116	A	classroom 13	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			132	A	classroom 10	0.0		NEG				
								INC				
red	Wood Brick Sheetrock Plaster Metal Concrete	closet door	117	A	classroom 13 - closet - casing	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			133	A	classroom 10 - middle closet - jamb	0.0		NEG				
								INC				
wht	Wood Brick Sheetrock Plaster Metal Concrete	radiator	118	D	classroom 13 - under chalkboard	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			122	C	classroom 12 - next to inlet	0.0		NEG				
								INC				



# XRF Testing Report

Page 12 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary C. House, E.S.  
641 Boat Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Classrooms 7-14

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
blk	Wood Brick Sheetrock Plaster Metal Concrete	Cove base	119	C	classroom 13 - <del>order</del> univent	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			<del>122</del>	C	classroom 10 - only under	0.0		NEG		
			130		univent			INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	Window stool	120	C	classroom 13	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			129	C	classroom 10	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	window	123	C	classroom 12 - mullion/frame	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			131	C	classroom 10 - lift	0.0		NEG		
			135	C	classroom 7 - casing	0.0		INC		
tan	Wood Brick Sheetrock Plaster Metal Concrete	univent	<del>124</del>				0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			125	C	classroom 12	0.0		NEG		
			134	C	classroom 8	0.0		INC		
brown	Wood Brick Sheetrock Plaster Metal Concrete	univent cover	124	C	classroom 12	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		





Criterion

## XRF Testing Report

Page 13 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. Houser Esq  
641 Bank Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Classrooms 7-14 + HWXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
wh	Wood Brick Sheetrock Plaster Metal Concrete	pipe riser	126	B	classroom 12 - corner	0.1	0.1	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wh	Wood Brick Sheetrock Plaster Metal Concrete	electrical conduit	127	B	classroom 12 - corner	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wh	Wood Brick Sheetrock Plaster Metal Concrete	access panel cover	136	A	classroom 7 - above closet	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
multi	Wood Brick Sheetrock Plaster Metal Concrete	wall-murals	137	D	Hallway - green dragon	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			138	D	" - blue book	0.0		NEG		
			139	D	" - red car	0.0		INC		
wh	Wood Brick Sheetrock Plaster Metal Concrete	electrical panel cover	140	D	Hallway across from room 7	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		



# XRF Testing Report

Page 14 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary C House ES  
1641 Pratt Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Boys BR near classroom 7, rooms 9 + 11

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	tray ceiling	141		Boys BR near room 7 - ceiling	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			142		" - vent	0.0		NEG		
			143		" - access panel cover	0.0		INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	144	A	classroom 9	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			158	A	classroom 11	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	145	A	classroom 9	0.1	0.2	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			151	D	classroom 9	0.0		NEG		
			154	C	classroom 11	0.6		INC		
			159	B	classroom 11	0.0				
wht	Wood Brick Sheetrock Plaster Metal Concrete	radiator	146	C	classroom 9 - next to univent	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			153	C	classroom 11 - "	0.0		NEG		
								INC		
tan	Wood Brick Sheetrock Plaster Metal Concrete	univent	147	C	classroom 9	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		





Criterion

## XRF Testing Report

Page 15 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. House, ES  
1441 Brant Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Classrooms 9 + 11XRF Serial No.: 015766

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
red	Wood Brick Sheetrock Plaster Metal Concrete	window	148	C	classroom 9 - frame/mullion	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			156	C	classroom 11 - casing	0.0		NEG		
			157	C	classroom 11 - <del>base</del> lift	0.0		INC		
wh	Wood Brick Sheetrock Plaster Metal Concrete	access cover	149	A	classroom 9 - above closet	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	closet door	150	A	classroom 9 - casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			152	A	classroom 11 - jamb	0.0		NEG		
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	window stool	155	C	classroom 11	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	cove base	160	C	classroom 11 - under window	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		



Criterion

## XRF Testing Report

Page 16 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House ES  
641 Boot Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Hallway Classroom 15-libraryXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition		Recommendation	
wht	Wood Brick Sheetrock Plaster Metal Concrete	walk	161	B	outside classroom 15	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			162	D	outside classroom 16	0.0		NEG				
			163	ED	next to courtyard doors	0.0		INC				
			164	EC	next to rear exit doors	0.0						
red	Wood Brick Sheetrock Plaster Metal Concrete	door	165	B	classroom 15 - casing	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			166	D	jamb 2 <del>exterior</del> custodian closet across from library	0.0		NEG				
			167	D	classroom 16 - jamb	0.0		INC				
			168	D	girls BR across from lib - casing	0.0						
red	Wood Brick Sheetrock Plaster Metal Concrete	windows	169	D	next to courtyard access - frame	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			170	D	" - stool	0.0		NEG				
			176	B	to see into library - casing	0.0		INC				
			177	B	" - frame	0.0						
blk	Wood Brick Sheetrock Plaster Metal Concrete	window <del>door</del> sill	171	D	next to courtyard access	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
								NEG				
								INC				
red	Wood Brick Sheetrock Plaster Metal Concrete	exterior door	172	D	courtyard access - casing	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA NIA
			173	B	rear exit - jamb	0.0		NEG				
			174	D	courtyard access - frame	0.0		INC				
			175	B	rear exit - door	0.0						





Criterion

## XRF Testing Report

Page 17 of 47

Client:

Hayes  
Blackney Architects

Date:

7/5/23

Sampling Location:

Mary C. Hawise ES  
641 Brnt Rd West Chester PA

Signature:

Room Equivalent:

Project No.:

231799

Room #:

Hallway classroom 15-library

XRF Serial No.:

01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
red	Wood Brick Sheetrock Plaster Metal Concrete	★ beam over door	178	C	beam over old exterior door connecting library hallway to room 38 hallway	1.5	1.5	POS	FRICION INTACT	HR A ENCP
								NEG	NON-FRICION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA
whit	Wood Brick Sheetrock Plaster Metal Concrete	conduit	179	C	next to entrance to room 38 hallway	0.0	0.0	POS	FRICION INTACT	HR A ENCP
								NEG	NON-FRICION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA
red	Wood Brick Sheetrock Plaster Metal Concrete	fire alarm support	180	D	next to courtyard access	0.0	0.0	POS	FRICION INTACT	HR A ENCP
								NEG	NON-FRICION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA
multi	Wood Brick Sheetrock Plaster Metal Concrete	wall murals	205		access from classroom 15-green	0.0	0.0	POS	FRICION INTACT	HR A ENCP
			206		↓ - red	0.0	0.0	NEG	NON-FRICION FAIR	AR CA
			207		↓ - blue	0.0	0.0	INC	POOR	A ENCL OSHA NIA
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT	HR A ENCP
								NEG	NON-FRICION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA



Criterion

## XRF Testing Report

Page 18 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. Hauke ES  
641 Boot Rd, West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: ~~Classroom 15~~ to Rooms in CR 15-Library HallwayXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	187	A	classroom 15	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			201	D	classroom 15	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	188	C	classroom 15	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			195	B	copy room across from electrical	0.0		NEG		
			196	A	classroom 16	0.0		INC		
			197	D	classroom 16	0.0				
blk	Wood Brick Sheetrock Plaster Metal Concrete	window sill	189	C	classroom 15	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			198	C	classroom 16	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	window	190	C	classroom 15 - stool	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			191	C	classroom 15 - frame	0.0		NEG		
			199	C	classroom 16 - lift	0.0		INC		
			200	C	classroom 16 - casing	0.0				
brown	Wood Brick Sheetrock Plaster Metal Concrete	unvent cover	192	C	classroom 15	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		





Criterion

## XRF Testing Report

Page 19 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C Hawke ES  
1411 Boat Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Rooms in CR 15 - Library HallwayXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
tan	Wood Brick Sheetrock Plaster (Metal) Concrete	Univent	193	C	classroom 15	0.0	0.0	POS	FRICION INTACT NON-FRICION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
whk	Wood Brick Sheetrock Plaster (Metal) Concrete	Pipe Over	194	C	classroom 15	0.0	0.0	POS	FRICION INTACT NON-FRICION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
whk	Wood Brick Sheetrock Plaster Metal Concrete	wall panel	202	D	girls BR across from library	0.0	0.0	POS	FRICION INTACT NON-FRICION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
whk	Wood Brick Sheetrock Plaster (Metal) Concrete	riser access panel	203	D	Boys BR across from library	0.0	0.0	POS	FRICION INTACT NON-FRICION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
whk	Wood Brick Sheetrock Plaster (Metal) Concrete	#conduit	204		custodian office- ceiling	0.0	0.0	POS	FRICION INTACT NON-FRICION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		



# XRF Testing Report

Page 20 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary House ES  
641 Boot Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Library + offices

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	I-beam	208		Custodial office across from library	6.0	0.0	POS	FRICTION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
								NEG	NON-FRICTION FAIR	
									POOR	
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	HVAC Vent	209		Custodial office across from library	0.0	0.0	POS	FRICTION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
								NEG	NON-FRICTION FAIR	
									POOR	
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	Window sill	210	D	library office	0.0	0.0	POS	FRICTION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
								NEG	NON-FRICTION FAIR	
									POOR	
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	211	D	library office	0.0	0.0	POS	FRICTION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
			216	B	library	0.0		NEG	NON-FRICTION FAIR	
			217	C	↓	0.0			POOR	
			218	A	↓	0.0		INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	Window	212	D	library office - stool	0.0	0.0	POS	FRICTION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
			213	D	" - casing	0.0		NEG	NON-FRICTION FAIR	
			219	C	library-frame	0.0			POOR	
			220	C	" - lift	0.0		INC		





Criterion

## XRF Testing Report

Page 21 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House ES  
1041 Boat Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Library + officeXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
red	Wood Brick Sheetrock Plaster Metal Concrete	door	214	B	library office - jamb	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			215	A	library - single door casing entrance	0.0		NEG		
								INC		
white	Wood Brick Sheetrock Plaster Metal Concrete	HVAC vent	221	A	library	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			222	B	↓	0.0		NEG		
								INC		
white	Wood Brick Sheetrock Plaster Metal Concrete	Boiler	223	B	library	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			224	A	↓	0.0		NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		



Criterion

## XRF Testing Report

Page 22 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. Hawse & S.  
641 Boat Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Hallway rooms 38-22XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
red	Wood Brick Sheetrock Plaster Metal Concrete	old door to exterior	225	A	door to left of room 38 - rising	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			776	A	" - jamb	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	electrical support box	227	D	Fire alarm next to old exterior door @ top of ramp	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	electrical outlet panel cover	228	D	on wall next to old exterior door	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	229	D	across from classroom 38	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			230	B	next to classroom 34	0.0		NEG		
			231	D	next to classroom 29	0.0		INC		
			232	B	next to classroom 26	0.0				
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	233	C	next to room 22	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		





Criterion

## XRF Testing Report

Page 23 of 47Client: Blackroy Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House Es  
641 Boot Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Hallway rooms 38-22XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
wh	Wood Brick Sheetrock Plaster Metal Concrete	electrical panel cover	234	D	next to classroom 29	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA N/A
								NEG		
								INC		
wh	Wood Brick Sheetrock Plaster Metal Concrete	electrical support box	235	D	across from classroom 36	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA N/A
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	doors	236	B	classroom 38 - casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA N/A
			248	B	classroom 34 - casing	0.0		NEG		
			258	D	classroom 29 - jamb	0.0		INC		
			267	B	classroom 28 - jamb	0.0				
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA N/A
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA N/A
								NEG		
								INC		



Criterion

## XRF Testing Report

Page 24 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House Es  
641 Boot Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Classrooms 38-22XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition		Recommendation	
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	237	B	classroom 38	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA N/A
			242	A	classroom 36	0.0		NEG				
			252	C	classroom 31	0.0		INC				
			265	D	classroom 27	0.0						
tan	Wood Brick Sheetrock Plaster Metal Concrete	univent	238	C	classroom 38	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA N/A
			251	C	classroom 31	0.0		NEG				
								INC				
wht	Wood Brick Sheetrock Plaster Metal Concrete	outlet box	239	C	classroom 38	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA N/A
			253	B	classroom 31	0.0		NEG				
								INC				
red	Wood Brick Sheetrock Plaster Metal Concrete	window	240	C	classroom 38 - <del>24</del> frame	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA N/A
			250	C	classroom 34 - casing	0.0		NEG				
			260	C	classroom 29 - lift	0.0		INC				
			263	C	classroom 27 - mullion	0.0						
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	241	A	classroom 38	0.0	0.0	POS	FRICTION NON-FRICTION	INTACT FAIR POOR	HR AR A ENCL	A ENCP CA OSHA N/A
			246	A	classroom 33	0.0		NEG				
			256	A	classroom 32	0.0		INC				
			264	A	classroom 27	0.0						





# XRF Testing Report

Page 25 of 47

Client: Blackney Hays Architects

Date: 7/5/23

Sampling Location: Mary C House & S  
641 Boat Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Classrooms 38-22

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	conduit	243	A	Classroom 36	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			266	A	Classroom 27	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	radiator	244	C	classroom 36 - next to Univent	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			261	C	Classroom 30 - "	0.0		NEG		
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	window stool	245	C	classroom 33	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			255	C	Classroom 32	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	closet door	247	A	classroom 33 - casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			259	A	Classroom 29 - jamb	0.0		NEG		
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	cove base	249	C	Classroom 34 - only under Univent	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			<del>268</del>					NEG		
			270	C	Classroom 26 - "	0.0		INC		



# XRF Testing Report

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Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary C House & S  
641 Bost Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Rooms 38-22

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	Soffit	254	A	Classroom 31 - above closet	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			262	A	Classroom 30 - " area	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	Access Panel Cover	257	A	Classroom 32 above closets	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			271	A	Classroom 26 above closets	0.0		NEG		
								INC		
tan	Wood Brick Sheetrock Plaster Metal Concrete	Radiator Cover	268	C	Room 25 - back wall	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	Pipes	269	C	Room 25 - back corner	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	Walls	272	A	Room 22	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			273	B		0.0		NEG		
			274	C		0.0		INC		
			275	D		0.0				





# XRF Testing Report

Page 27 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Harry C. House ES  
641 Bont Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Room 22 + Bathrooms next to it

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	pencil sharpener wall support	276	A	Room 22	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	pencil sharpener	277	B	Room 22 - corner	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	278	C	Boys BR across from Room 26	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			281	A	" "	0.0		NEG		
			283	B	Girls BR across from Room 22	0.0		INC		
			284	D	↓	0.0				
red	Wood Brick Sheetrock Plaster Metal Concrete	door	279	A	Boys BR across from Room 26	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			282	A	Girls BR across from Room 22	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall panel	280	A	Boys BR across from Room 26	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			285	C	Girls BR across from Room 22	0.0		NEG		
								INC		



Criterion

## XRF Testing Report

Page 28 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary F House ES  
641 Boat Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Bathrooms across from Room 22 + <sup>26</sup>XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
Wht	Wood Brick Sheetrock Plaster Metal Concrete	Tray ceiling	286		Boys BR across from Room 26 → ceiling	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			287		" - access panel on ceiling	0.0		NEG		
			288		Girls BR across from Room 22 → ceiling	0.0		INC		
			289		" - vents on ceiling	0.0				
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
							NEG			
							INC			
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
							NEG			
							INC			
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
							NEG			
							INC			
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
							NEG			
							INC			
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
							NEG			
							INC			





Criterion

## XRF Testing Report

Page 29 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. House, FL  
641 Boot Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 031799Room #: Rooms 23 + 24 + their Hallway/VestibuleXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	290	A	Hallway outside rooms 23/24	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			291	B	↓	0.0		NEG		
			292	C	↓	0.0				
			293	D	↓	0.0		INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	exterior doors	294	B	HW outside 23/24 - door to portable-casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			295	B	" - door to portable-door	0.0		NEG		
			296	D	" - door to parking lot - jamb	0.0		INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	interior doors	297	A	doors to room 22 / jamb	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			298	A	door to maintenance - casing	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	radiator	299	C	HW to right of room 24	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT	HR A ENCP
								NEG	NON-FRICTION FAIR	AR CA
								INC	POOR	A ENCL OSHA N/A



# XRF Testing Report

Page 30 of 47

Client: Blackney Hayes Architects

Date: 2/5/23

Sampling Location: Mary C. Howse ES  
641 Boat Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Rooms 23 + 24

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	E wall	300	A	Room 23	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
			301	D	Room 23	0.0		NEG		
			310	C	Room 24	0.0				
			311	B	Room 24	0.0		INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	Classroom casing door	302	A	Room 23 - casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
			307	A	Room 24 - jamb	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	303	A	Room 23	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
			308	A	Room 24	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	closet door	304	A	Room 23 - jamb	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
			309	A	Room 24 - casing	0.0		NEG		
								INC		
brown	Wood Brick Sheetrock Plaster Metal Concrete	Univent Cover	305	C	Room 23	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL N/A
								NEG		
								INC		





Criterion

## XRF Testing Report

Page 31 of 47Client: Blackery Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House  
641 Boot Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Rooms 23 + 24XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
red	Wood Brick Sheetrock Plaster Metal Concrete	window	306	C	Room 23 - frame	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA NIA
			312	C	Room 24 - stool	0.0		NEG		
			316	C	↓ - casing	0.0		INC		
			317	C	↓ - mullion					
blk	Wood Brick Sheetrock Plaster Metal Concrete	window sill	313	C	Room 24	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA NIA
								NEG		
								INC		
tan	Wood Brick Sheetrock Plaster Metal Concrete	univent	314	C	Room 24	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA NIA
								NEG		
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	core base	315	C	Room 24 - under univent	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR AR A ENCL CA OSHA NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT	HR A ENCL CA
								NEG	NON-FRICTION FAIR	AR OSHA
								INC	POOR	NIA



# XRF Testing Report

Page 32 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary's House ES  
641 Boat Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Hallway from 17 - maintenance

XRF Serial No.: 015766

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	318	B	<del>exterior access</del> across from maintenance	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			319	B	outside courtyard access	0.0		NEG		
			320	D	outside room 18	0.0		INC		
			321	D	outside room 21	0.0				
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	322	D	to right of boiler room	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			323	D	to left of boiler room	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	room doors	324	D	maintenance office - jamb	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			325	B	room 19 - casing	0.0		NEG		
			331	B	lounge - jamb	0.0		INC		
			332	D	room 21 - casing	0.0				
red	Wood Brick Sheetrock Plaster Metal Concrete	ext. fire doors	326	B	courtyard access next to room 20 - door	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			327	B	" - casing	0.0		NEG		
			333		door next to room 19 - jamb	0.0		INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	radiators	328	D	next to boiler room	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		





# XRF Testing Report

Page 33 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary C Howie ES  
641 Boat Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Hallway from 17-maintenance

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	electrical panel cover	329	B	Across from room 21 - lower panel	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
			330	B	"upper panel frame	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	electrical support box	334	B	Fire alarm support near lounge	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
								NEG		
								INC		



Criterion

## XRF Testing Report

Page 34 of 42Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. House ESSignature: [Signature]Room Equivalent: 641 Boat Rd West Chester PAProject No.: 231799Room #: Boiler RoomXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
yellow	Wood Brick Sheetrock Plaster Metal Concrete	Floor	335		Floor walking areas	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
gray	Wood Brick Sheetrock Plaster Metal Concrete	railing	336	D	back right fire exit	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
gray	Wood Brick Sheetrock Plaster Metal Concrete	stairs	337	D	back right fire exit - tread	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			338	D	" - riser	0.0		NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	339	A	Boiler Room	0.0	0.1	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			340	B	↓	0.0		NEG		
			341	C		0.1		INC		
			342	D		0.0				
wht	Wood Brick Sheetrock Plaster Metal Concrete	HVAC	343	C	near fire exit - duct	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			351		vent in ceiling of closet	0.0		NEG		
								INC		





# XRF Testing Report

Page 35 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary C Howse ES  
641 Brock Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Boiler Room

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	electrical conduit	344	D	next to fire exit stairs	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	pipes	345	C	to left of HVAC	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
blue	Wood Brick Sheetrock Plaster Metal Concrete	electrical lines	346	A	next to entrance	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	ext fire exit doors	347	D	back right fire exit - door	0.0	0.1	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			348	C	back left ext exit - casing	0.0		NEG		
			349	C	" - jamb	0.1		INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	ceiling	350		Boiler Room	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		



# XRF Testing Report

Page 36 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary C Howse ES  
641 Brook Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Rooms in 17 - maintenance Hallway

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wh	Wood Brick Sheetrock Plaster Metal Concrete	wall	352	B	Room 17	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
			355	D	Room 18	0.0		NEG		
			362	A	Room 20	0.0		INC		
			368	C	Adult BR on right thru lounge	0.0				
wh	Wood Brick Sheetrock Plaster Metal Concrete	Ladder	353	B	Room 17 - rungs	1.0	2.4	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
			354	B	Room 17 - supports	4.8		NEG		
								INC		
wh	Wood Brick Sheetrock Plaster Metal Concrete	radiator	356	D	Room 18	0.1	0.1	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	window	357	C	Room 19 - casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
			363	D	Room 20 - frame	0.0		NEG		
			364	B	Lounge - sill	0.0		INC		
			368	A	Room 21 window frame	0.0				
brown	Wood Brick Sheetrock Plaster Metal Concrete	Univent Cover	358	C	Room 19	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA OSHA A ENCL NIA
								NEG		
								INC		





Criterion

## XRF Testing Report

Page 37 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. House ES  
641 Bont Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Rooms in 17-maintenance twXRF Serial No.: 015766

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
brk	Wood Brick Sheetrock Plaster Metal Concrete	window sill	359	C	Room 19	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	electrical support box	360	A	Room 19-outlets	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
tan	Wood Brick Sheetrock Plaster Metal Concrete	univent	361	D	Room 20	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
brk	Wood Brick Sheetrock Plaster Metal Concrete	radiator box	365	B	lounge	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
purple	Wood Brick Sheetrock Plaster Metal Concrete	floor	367		Adult BR to left thru lounge	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		



Criterion

## XRF Testing Report

Page 38 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House ES  
641 Boat Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 23799Room #: Room 21 + maintenance officeXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	369	D	Room 21	0.0	0.0	POS	FRICITION INTACT	HR A ENCP
								NEG	NON-FRICITION FAIR	AR CA
									POOR	OSHA
								INC		NIA
wht	Wood Brick Sheetrock Plaster Metal Concrete	conduit	370	A	Room 21 office	0.0	0.0	POS	FRICITION INTACT	HR A ENCP
			371	D	Maintenance-Electrical	0.0		NEG	NON-FRICITION FAIR	AR CA
									POOR	OSHA
								INC		NIA
red	Wood Brick Sheetrock Plaster Metal Concrete	fire door	372	C	Maintenance-back office door	0.0	0.0	POS	FRICITION INTACT	HR A ENCP
			373	D	Maintenance-electrical	0.0		NEG	NON-FRICITION FAIR	AR CA
					ext exit-casing				POOR	OSHA
								INC		NIA
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICITION INTACT	HR A ENCP
								NEG	NON-FRICITION FAIR	AR CA
									POOR	OSHA
								INC		NIA
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICITION INTACT	HR A ENCP
								NEG	NON-FRICITION FAIR	AR CA
									POOR	OSHA
								INC		NIA





Criterion

## XRF Testing Report

Page 39 of 47Client: Brackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House ESSignature: [Signature]Room Equivalent: 641 Boat Rd West Chester PAProject No.: 231799Room #: Gym/Caf/StageXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	walls	374	A	Caf	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP CA AR OSHA A ENCL NIA
			375	C	Caf	0.0		NEG		
			376	B	Gym	0.0		INC		
			577	D	Gym	0.0				
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	378	C	Caf		0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP CA AR OSHA A ENCL NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	electrical box	379	B	Caf	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP CA AR OSHA A ENCL NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	conduit	380		Stage-back left room	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP CA AR OSHA A ENCL NIA
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	door	381	A	Stage-back left room-casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP CA AR OSHA A ENCL NIA
			384	C	Stage-back right room -	0.0		NEG		
			385	C	Kitchen - exterior exit door	0.0				



# XRF Testing Report

Page 40 of 47

Client: Blackney Hayes Architects

Date: 7/5/23

Sampling Location: Mary E House ES  
641 Bost Rd West Chester PA

Signature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799

Room #: Gym/Caf/Stage

XRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
y/k	Wood Brick Sheetrock Plaster Metal Concrete	pipe riser	382	B	Stage	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
w/k	Wood Brick Sheetrock Plaster Metal Concrete	radiator	383	B	Stage	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
w/k	Wood Brick Sheetrock Plaster Metal Concrete	water pipe	386		Kitchen - ceiling near Caf	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
orange	Wood Brick Sheetrock Plaster Metal Concrete	wall	387	C	Kitchen	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
green	Wood Brick Sheetrock Plaster Metal Concrete	wall	388	D	Kitchen	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		





Criterion

## XRF Testing Report

Page 41 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House ES  
641 Brnt Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Gym/Caf/StageXRF Serial No.: 015766

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
ylnw	Wood Brick Sheetrock Plaster Metal Concrete	wall	389	A	Kitchen	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
ylnw	Wood Brick Sheetrock Plaster Metal Concrete	wall	390	A	Kitchen	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wpy	Wood Brick Sheetrock Plaster Metal Concrete	wall	391	C	Storage in Caf to right of Kitchen	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	vent	392	C	<del>Caf near Exit</del> Gym-back left corner	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
wnt	Wood Brick Sheetrock Plaster Metal Concrete	radiator	393	C	Gym-bays BR	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		





Criterion

\* no access ceiling I-beams

## XRF Testing Report

Page 42 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House ES  
641 Boat Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Caf/Gym/StageXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
tan	Wood Brick Sheetrock Plaster Metal Concrete	Univen+	394	C	Front Right Gym Office	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
yellow	Wood Brick Sheetrock Plaster Metal Concrete	pipe	395	C	kitchen-near ceiling	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
whit	Wood Brick Sheetrock Plaster Metal Concrete	* Header beam	396	B	Caf- above stage entrance	4.3	4.3	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
whit	Wood Brick Sheetrock Plaster Metal Concrete	HVAC	397	ceiling	Caf-Circular supply duct	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			398	A	Gym-square supply duct	0.0		NEG		
								INC		
whit	Wood Brick Sheetrock Plaster Metal Concrete	corrugated support beams	399	B	Gym-back left basket-main beam	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			400	B	- support beam	0.0		NEG		
			401	B	- corrugated	0.0		INC		
					sweet					



Criterion

## XRF Testing Report

Page 43 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House ES  
641 Quaker Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: Entryway to BldgXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	402	C	At Start of hallways	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
wht	Wood Brick Sheetrock Plaster Metal Concrete	wall	403	A	interior door support wall	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	door	404	A	interior door - jamb	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			405	A	exterior door - door	0.0		NEG		
			406	A	exterior door - casing	0.0		INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	window	407	A	exterior-casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			408	A	exterior-frame	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	TV mount	409	C	TV @ interior wall	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		





Criterion

## XRF Testing Report

Page 44 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House E.S.Signature: [Signature]Room Equivalent: 641 East Rd West Chester PAProject No.: 231799Room #: I-Beams being removedXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
blk	Wood Brick Sheetrock Plaster Metal Concrete	I-beam	410		Room 4 - above ceiling	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	I-beam	411		Room 11 - above ceiling	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		



Criterion

## XRF Testing Report

Page 45 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Harry C House ESSignature: [Signature]Room Equivalent: 641 Boat Rd West Chester PAProject No.: 231799Room #: ExteriorXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm²	Results mg/cm²	Classification	Surface/Condition	Recommendation
red	Wood Brick Sheetrock Plaster Metal Concrete	doors	412	*	'1-3*' Door-exterior	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			414	*	'1-8' door-casing	0.0		NEG		
			422		'3-1*' door-frame	0.0		INC		
			424		'2-1*' door-casing	0.0				
red	Wood Brick Sheetrock Plaster Metal Concrete	pipe	413	*	Near 1-4 door	0.2	0.2	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	column pole	415		Near 1-9* door	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
								NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	window	416		next to boiler exit-casing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			417		next to 4-1* exit-frame	0.0		NEG		
			418		left of left portable mullion	0.0				
			425		Window of room 11-frame	0.0				
red	Wood Brick Sheetrock Plaster Metal Concrete	drain line	419		left of left portable	0.3	0.4	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA NIA
			420		near swings	0.2		NEG		
			426		outside room 11	0.6				
			428		outside room 4	0.5				





Criterion

## XRF Testing Report

Page 46 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C House ES  
641 Boot Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: ExteriorXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
gray	Wood Brick Sheetrock Plaster Metal Concrete	vent	421		near swings	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
			427		outside room 11	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	header beam	423		outside 3-1* door	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
					outside 2-1* door	0.0		NEG		
								INC		
red	Wood Brick Sheetrock Plaster Metal Concrete	window	429		outside room 4-frame	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
blue	Wood Brick Sheetrock Plaster Metal Concrete	fence frame	430		outside room 1-6 wing	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		
blk	Wood Brick Sheetrock Plaster Metal Concrete	fence post	431		"	0.0	0.0	POS	FRICTION INTACT NON-FRICTION FAIR POOR	HR A ENCP AR CA A ENCL OSHA N/A
								NEG		
								INC		





Criterion

1.0 x 2, 1.1, 0.0 x 3

436-441

## XRF Testing Report

Page 47 of 47Client: Blackney Hayes ArchitectsDate: 7/5/23Sampling Location: Mary C. House ES  
641 Boot Rd West Chester PASignature: [Signature]

Room Equivalent: \_\_\_\_\_

Project No.: 231799Room #: ExteriorXRF Serial No.: 01566

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm <sup>2</sup>	Results mg/cm <sup>2</sup>	Classification	Surface/Condition	Recommendation
y/w	Wood Brick Sheetrock Plaster (Metal) Concrete	pipe	432		next to boiler room	0.0	0.0	POS	FRICITION INTACT	HR A ENCP
								NEG	NON-FRICITION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA
tan	Wood Brick Sheetrock Plaster (Metal) Concrete	soffit/ window header	433		outside classroom 6-back side	0.0	0.1	POS	FRICITION INTACT	HR A ENCP
			434		↓ — playground side	0.1		NEG	NON-FRICITION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA
tan	Wood Brick Sheetrock Plaster (Metal) Concrete	triangular roof beams	435		outside classroom 6 under roof near playground	1.1	1.1	POS	FRICITION INTACT	HR A ENCP
								NEG	NON-FRICITION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICITION INTACT	HR A ENCP
								NEG	NON-FRICITION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICITION INTACT	HR A ENCP
								NEG	NON-FRICITION FAIR	AR CA
								INC	POOR	A ENCL OSHA NIA

C6

PENNSYLVANIA LEAD CERTIFICATION

007293

Birth Date  
12/18/1993



ALEX FORLENZA

4338 PINE ST

APT 3F

PHILADELPHIA PA 19104

Expires

03/03/2024

Issue Date

06/17/2023

Sex

F

Height

5' 0"

Eyes

Hazel

Class  
RISK ASSESSOR

*Alex Forlenza*



September 15, 2020

West Chester Area School District  
Facilities Department  
1811 McDermott Drive  
West Chester, PA 19380

**Attention:** Mr. Wayne Birster

**Reference:** AHERA 3-Year Reinspection  
Mary C. Howse Elementary School  
Criterion's Project Number **201378**

Dear Mr. Birster,

On August 3 & 4, 2020, a certified inspector from Criterion Laboratories, Inc. (Criterion) completed the AHERA three-year re-inspection of the **Mary C. Howse Elementary School** in the West Chester Area School District. All identified and assumed asbestos-containing materials (ACM) were visually re-inspected according to 40 CFR Part 763 to determine their condition. If a change in condition had taken place since the last AHERA re-inspection, the material was reassessed and assigned into the appropriate category as indicated by AHERA regulations.

The attached response actions and forms are to be inserted into the respective sections of the original management plan.

If you have any questions regarding this report, please do not hesitate to contact me at (215) 244-1300, extension 1026.

Sincerely,

Michael Panepresso

Management Planner's Signature

PA #000673  
Accreditation Number

Ananth K. Vinjamuri

Building Inspector's Signature

PA #12110  
Accreditation Number

West Chester Area School District

Mary C. Howse Elementary School

AHERA 3- Year Inspection Summary & Response Actions

Material	Location	Confirmed/ Assumed	Total Quantity	Damage Quantity	Response Action
12" x 12" White with Brown Specks Floor Tile & Mastic	Throughout	Assumed	27,013 SF	0 SF	O & M Program
12" x 12" Tan Floor Tile & Mastic	Throughout	Assumed	10,507 SF	2 SF	O & M Program
12" x 12" Blue Floor Tile & Mastic	Faculty Lounge Area	Assumed	380 SF	0 SF	O & M Program
12" x 12" Red Floor Tile & Mastic	Gym, Cafeteria	Assumed	250 SF	1 SF	O & M Program
Tan Linoleum Floor Covering	Restrooms (Throughout)	Assumed	836 SF	2 SF	O & M Program
Blue Linoleum Floor Covering	Faculty Restrooms	Assumed	108 SF	0 SF	O & M Program
Beige Sink Mastic	Throughout	Assumed	136 SF	0 SF	O & M Program
Uni-Ventilator Insulation	Throughout	Assumed	396 SF	0 SF	O & M Program
Thermal Insulation	Throughout (Above inaccessible ceilings, and within walls and pipe chases)	Assumed	Not Quantified	N/A	O&M Program
9" x 9" Floor Tile & Mastic	Under walls, casework, etc.	Assumed	Not Quantified	N/A	O&M Program
Chalkboard/Tack Board Adhesive	Throughout	Assumed	Not Quantified	N/A	O&M Program
Window Sills	Throughout	Assumed	Not Quantified	O&M Program	O & M Program



**Non -ACM Materials as per Eagle Industrial Hygiene Company's 2012 3-Year Inspection Report**

-Ceiling Plaster & Drywall

Note: Other materials listed were not observed.

-Inspection did not include hard ceilings and/or Inaccessible areas.

-As per the West Chester Area School District's General Specifications Section 3.8 ASBESTOS CONTAINING MATERIALS PROHIBITED, Contractor is prohibited from installing Asbestos containing materials or Asbestos Containing Building materials (please see the Operations Department for additional information).

Project No. 201378

Building\_ WCASD - Mary C. Howse Elementary School \_\_\_\_\_ Inspection Date\_ 8/3 & 8/4/2020

Sample Numbers N/A Total Quantity 38,150 (SF) LF

Friable Y ☒ N (Circle one)

Classify ACBM and suspected ACBM assumed to be ACM into one of the following eight categories:

List General Functional Spaces e.g., Classrooms, Gym, Lunchroom

Accessibility: Limited Moderate **High**  
Potential for Disturbance: **Limited** Moderate High

Preventative Measures:	Continued O&M
------------------------	---------------

3-YEAR AHERA REINSPECTION  
ASSESSMENT FORM  
West Chester Area School District

Project No. 201378

Inspector Signature [Signature] Accreditation ID No. 012110  
Building WCASD - Mary C. Howse Elementary School Inspection Date 8/3 & 8/4/2020

Homogenous Area Linoleum Floor Covering Homogenous I.D. No. N/A

Sample Numbers N/A Total Quantity 944 SF LF

Mandatory Assessment Criterion

Friable (Y) N (Circle one)

ACBM by: Analysis Assumed Result

Classify ACBM and suspected ACBM assumed to be ACM into one of the following eight categories:

Category	Type of Material	Condition
<u>1</u> a.	Thermal System Insulation ACM	Damaged
<u>2</u> b.	Thermal System Insulation ACM	Significantly Damaged
<u>3</u> 2.	Friable ACM Surfacing Material	Damaged
<u>4</u> 3.	Friable ACM Surfacing Material	Significantly Damaged
<u>5</u> 4. a.	Friable ACM Miscellaneous	Damaged
<u>6</u> b.	Friable ACM Miscellaneous	Significantly Damaged
<u>7</u> 5.	ACBM	Potential for Damage
<u>8</u> 6.	ACBM	Potential for Significant Damage
<u>X</u> 7.	Friable ACBM or Friable Suspected ACM	Undamaged

List General Functional Spaces e.g., Classrooms, Gym, Lunchroom

Tan Linoleum in Classroom Restrooms and Blue Linoleum in Faculty Restrooms

General Condition of Entire Homogenous Area: Good Fair Poor  
Accessibility: Limited Moderate High  
Potential for Disturbance: Limited Moderate High

Damage:

Type of e.g. water, torn etc.:

Percent over Entire Homogenous Area:

Known or Suspected Case:

Preventative Measures: Continued O&M

Project No. 201378

Homogenous Area Beige Sink Mastic Homogenous I.D. No N/A

Sample Numbers N/A Total Quantity 136 **SF**/LF

Friable Y **(N)** (Circle one)

ACBM by: Analysis Assumed Result \_\_\_\_\_

<u>Category</u>	<u>Type of Material</u>	<u>Condition</u>
_____ 1.	a. Thermal System Insulation ACM	Damaged
_____	b. Thermal System Insulation ACM	Significantly Damaged
_____ 2.	Friable ACM Surfacing Material	Damaged
_____ 3.	Friable ACM Surfacing Material	Significantly Damaged
_____ 4.	a. Friable ACM Miscellaneous	Damaged
_____	b. Friable ACM Miscellaneous	Significantly Damaged
X _____ 5.	ACBM	Potential for Damage
_____ 6.	ACBM	Potential for Significant Damage
_____ 7.	Friable ACBM or Friable Suspected ACM	Undamaged

Throughout

General Condition of Entire Homogenous Area: Good Fair Poor

Accessibility: Limited Moderate High

Potential for Disturbance: Limited Moderate High

Type of e.g. water, torn etc.:

Percent over Entire Homogenous Area: \_\_\_\_\_

Known or Suspected Case: \_\_\_\_\_

Preventative Measures:	Continued O&M
------------------------	---------------



Project No. 201378

Building WCASD - Mary C. Howse Elementary School Inspection Date 8/3 & 8/4/2020

Sample Numbers N/A Total Quantity: 396 **SF/LF**

Friable ☒ Y ☐ N (Circle one)

Classify ACBM and suspected ACBM assumed to be ACM into one of the following eight categories:

List General Functional Spaces e.g., Classrooms, Gym, Lunchroom

Potential for Disturbance: **Limited** Moderate High

Preventative Measures:	Continued O&M
------------------------	---------------

3-YEAR AHERA REINSPECTION  
ASSESSMENT FORM  
West Chester Area School District

Project No. 201378

Inspector Signature [Signature] Accreditation ID No. 012110  
Building WCASD - Mary C. Howse Elementary School Inspection Date 8/3 & 8/4/2020

Homogenous Area 9" x 9" Floor Tile Homogenous I.D. No N/A

Sample Numbers \_\_\_\_\_ Previously Sampled \_\_\_\_\_ Total Quantity: Unknown SF/LF

Mandatory Assessment Criterion

Friable Y (N) (Circle one)

ACBM by: Analysis Assumed Result Positive

Classify ACBM and suspected ACBM assumed to be ACM into one of the following eight categories:

Category	Type of Material	Condition
<u>      </u> 1. a.	Thermal System Insulation ACM	Damaged
<u>      </u> b.	Thermal System Insulation ACM	Significantly Damaged
<u>      </u> 2.	Friable ACM Surfacing Material	Damaged
<u>      </u> 3.	Friable ACM Surfacing Material	Significantly Damaged
<u>      </u> 4. a.	Friable ACM Miscellaneous	Damaged
<u>      </u> b.	Friable ACM Miscellaneous	Significantly Damaged
<u>  X  </u> 5.	ACBM	Potential for Damage
<u>      </u> 6.	ACBM	Potential for Significant Damage
<u>      </u> 7.	Friable ACBM or Friable Suspected ACM	Undamaged

List General Functional Spaces e.g., Classrooms, Gym, Lunchroom

Possibly Under Walls, Casework, etc. \_\_\_\_\_

General Condition of Entire Homogenous Area: Good Fair Poor (Unknown)  
Accessibility: (Limited) Moderate High  
Potential for Disturbance: (Limited) Moderate High

Damage:

Type of e.g. water, torn etc.: \_\_\_\_\_

Percent over Entire Homogenous Area: \_\_\_\_\_

Known or Suspected Case: \_\_\_\_\_

Preventative Measures: Continued O&M

3-YEAR AHERA REINSPECTION  
ASSESSMENT FORM  
West Chester Area School District

Project No. 201378

Inspector Signature [Signature] Accreditation ID No. 012110

Building WCASD - Mary C. Howse Elementary School Inspection Date 8/3 & 8/4/2020

Homogenous Area Chalkboard/Tackboard Adhesive Homogenous I.D. No. N/A

Sample Numbers N/A Total Quantity: Unknown SF/LF

Mandatory Assessment Criterion

Friable Y (N) (Circle one)

ACBM by: Analysis (Assumed) Result

Classify ACBM and suspected ACBM assumed to be ACM into one of the following eight categories:

Category	Type of Material	Condition
<u>      </u> 1. a.	Thermal System Insulation ACM	Damaged
<u>      </u> b.	Thermal System Insulation ACM	Significantly Damaged
<u>      </u> 2.	Friable ACM Surfacing Material	Damaged
<u>      </u> 3.	Friable ACM Surfacing Material	Significantly Damaged
<u>      </u> 4. a.	Friable ACM Miscellaneous	Damaged
<u>      </u> b.	Friable ACM Miscellaneous	Significantly Damaged
<u>  X  </u> 5.	ACBM	Potential for Damage
<u>      </u> 6.	ACBM	Potential for Significant Damage
<u>      </u> 7.	Friable ACBM or Friable Suspected ACM	Undamaged

List General Functional Spaces e.g., Classrooms, Gym, Lunchroom

Throughout       

General Condition of Entire Homogenous Area: Good Fair Poor (Unknown)

Accessibility: (Limited) Moderate High

Potential for Disturbance: (Limited) Moderate High

Damage:

Type of e.g. water, torn etc.:       

Percent over Entire Homogenous Area:       

Known or Suspected Case:       

Preventative Measures: Continued O&M

3-YEAR AHERA REINSPECTION  
ASSESSMENT FORM  
West Chester Area School District

Project No. 201378

Inspector Signature [Signature] Accreditation ID No. 012110  
Building WCASD - Mary C. Howse Elementary School Inspection Date 8/3 & 8/4/2020

Homogenous Area Pipe Insulation Homogenous I.D. No. N/A

Sample Numbers \_\_\_\_\_ Previously Sampled \_\_\_\_\_ Total Quantity: Unknown SF/LF

Mandatory Assessment Criterion

Friable ☒ Y ☐ N (Circle one)

ACBM by: Analysis Assumed Result Positive

Classify ACBM and suspected ACBM assumed to be ACM into one of the following eight categories:

Category	Type of Material	Condition
<u>      </u> 1. a.	Thermal System Insulation ACM	Damaged
<u>      </u> b.	Thermal System Insulation ACM	Significantly Damaged
<u>      </u> 2.	Friable ACM Surfacing Material	Damaged
<u>      </u> 3.	Friable ACM Surfacing Material	Significantly Damaged
<u>      </u> 4. a.	Friable ACM Miscellaneous	Damaged
<u>      </u> b.	Friable ACM Miscellaneous	Significantly Damaged
<u>      </u> 5.	ACBM	Potential for Damage
<u>      </u> 6.	ACBM	Potential for Significant Damage
<u>  X  </u> 7.	Friable ACBM or Friable Suspected ACM	Undamaged

List General Functional Spaces e.g., Classrooms, Gym, Lunchroom

Throughout (Possibly Above inaccessible ceilings, and within walls and pipe chases).

General Condition of Entire Homogenous Area: Good Fair Poor ☒ Unknown

Accessibility: ☒ Limited ☐ Moderate ☐ High

Potential for Disturbance: ☒ Limited ☐ Moderate ☐ High

Damage:

Type of e.g. water, torn etc.: \_\_\_\_\_

Percent over Entire Homogenous Area: \_\_\_\_\_

Known or Suspected Case: \_\_\_\_\_

Preventative Measures: Continued O&M



## Project No. 201378

Homogenous Area	Window Sills	Homogenous I.D. No	N/A
-----------------	--------------	--------------------	-----

Sample Numbers N/A Total Quantity: Unknown SF/LF

Friable Y ☒ N (Circle one)

ACBM by:                  Analysis      Assumed      Result

Category	Type of Material	Condition
_____ 1.	a. Thermal System Insulation ACM	Damaged
_____ 2.	b. Thermal System Insulation ACM	Significantly Damaged
_____ 3.	Friable ACM Surfacing Material	Damaged
_____ 4.	Friable ACM Surfacing Material	Significantly Damaged
_____ 5.	a. Friable ACM Miscellaneous	Damaged
_____ 6.	b. Friable ACM Miscellaneous	Significantly Damaged
_____ X	5. ACBM	Potential for Damage
_____ 6.	ACBM	Potential for Significant Damage
_____ 7.	Friable ACBM or Friable Suspected ACM	Undamaged

### Throughout

General Condition of Entire Homogenous Area: Good Fair Poor

Accessibility: Limited Moderate **High**

Potential for Disturbance: Limited Moderate High

Damage:

Type of e.g. water, torn etc.: \_\_\_\_\_

Percent over Entire Homogenous Area: \_\_\_\_\_

**Known or Suspected Case:**

Preventative Measures:	Continued O&M
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August 28, 2020

West Chester Area School District  
1181 McDermott Drive  
West Chester, PA 19380

**ATTENTION:** Mr. Wayne Birster

**REFERENCE:** Asbestos Bulk Sampling  
Mary C. Howse Elementary School  
641 Boot Road, West Chester, PA 19380  
Criterion's Project Number: 201378

Dear Mr. Birster,

We are pleased to provide you with the results of our analysis for the bulk samples, which were collected by Criterion Laboratories, Inc. (Criterion) on August 11, 2020 to be analyzed for asbestos. The analytical method employed was Polarized Light Microscopy (PLM) with Dispersion Staining following the EPA "Interim Method" for the determination of asbestos in bulk building materials (EPA-600/M4-82-020, or 40 CFR Part 763, Appendix E to Subpart E). Our laboratory is certified by the National Institute of Standards and Technology's NVLAP Program (Lab Code No. 102046-0).

In accordance with the EPA's Toxic Substances and Control Act (TSCA) regulation, a material is classified as asbestos-containing if it contains greater than one (1) percent (>1%) asbestos as analyzed by PLM.

As indicated on the attached certificate, no asbestos was detected in the following materials:

- Pipe fitting insulation associated with (A/W) fiberglass pipe insulation collected from the Faculty Women's Restroom and Faculty Men's Restroom (above ceiling tile)
- 12"x12" pink floor tile with black mastic collected from the Gym and the Custodial Office
- 12"x12" gray floor tile with black mastic collected from the Electrical Room at Custodial Office
- 12"x12" tan floor tile with yellow mastic collected from the Hallway at Library

If you should have any questions or concerns, please do not hesitate to contact me at (215) 244-1300, extension 1033.

Sincerely,

Ian Forster  
Project Manager

Attachment



## Results of Polarized Light Microscopy

Client West Chester Area School District Site Address Mary C Howse Elementary School, 641 Boot Rd, West Chester, PA 19380 Sample Date 8/11/2020

Project # 201378 Sample Received Date 8/20/2020

Collected By Criterion Laboratories, Inc. Analyzed By Mitchell, Lauren Sample Analysis Date(s) 8/24/2020

Sample Number	Material Description	Location	Appearance	Layer	Fibrous - %	Non-Asbestos Non-Fibrous %	Asbestos Type	Asbestos Percent
201378-02-002-02-01	Pipe Fitting Insulation AWW Fiber Glass Pipe Insulation	Faculty Women's Restroom Above CT	Gray Pipe Fitting	1	Cellulose - 3% Fiber Glass - 45%	52%	None Detected	---
201378-02-002-02-02	Pipe Fitting Insulation AWW Fiber Glass Pipe Insulation	Faculty Men's Restroom Above CT	Gray Pipe Fitting	1	Cellulose - 2% Fiber Glass - 45%	53%	None Detected	---
201378-02-002-02-03	12" x 12" Pink Floor Tile with Black Mastic	Gym	Pink Floor Tile	1	Cellulose - 3%	97%	None Detected	---
201378-02-002-02-03	12" x 12" Pink Floor Tile with Black Mastic	Gym	Black Mastic	2	Cellulose - 10%	90%	None Detected	---
201378-02-002-02-04	12" x 12" Gray Floor Tile with Black Mastic	Electrical Room at Custodial Office	Gray Floor Tile	1	Cellulose - 1%	99%	None Detected	---
201378-02-002-02-04	12" x 12" Gray Floor Tile with Black Mastic	Electrical Room at Custodial Office	Black Mastic	2	Cellulose - 2%	98%	None Detected	---
201378-02-002-02-05	12" x 12" Pink Floor Tile with Black Mastic	Custodial Office	Tan Floor Tile	1	Cellulose - 1%	99%	None Detected	---
201378-02-002-02-05	12" x 12" Pink Floor Tile with Black Mastic	Custodial Office	Black Mastic	2	Cellulose - 2%	98%	None Detected	---
201378-02-002-02-06	12" x 12" Tan Floor Tile with Yellow Mastic	Hallway at Library	Tan Floor Tile	1	Cellulose - 1%	99%	None Detected	---
201378-02-002-02-06	12" x 12" Tan Floor Tile with Yellow Mastic	Hallway at Library	Yellow Mastic <sup>1</sup>	2	Cellulose - 3%	97%	None Detected	---



## Results of Polarized Light Microscopy

Client West Chester Area School District Site Address Mary C Howse Elementary School, 641 Sample Date 8/11/2020  
Project # 201378 Boot Rd, West Chester, PA 19380 Sample Received Date 8/20/2020  
Collected By Criterion Laboratories, Inc. Analyzed By Mitchell, Lauren Sample Analysis Date(s) 8/24/2020

Sample Number	Appearance	Layer	Fibrous - %	Non-Fibrous %	Asbestos Type	Percent
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Sample Count 6 1 - Insufficient Sample Provided

*James A. Weltz*

James A. Weltz, CIH, Technical Director

Criterion Laboratories, Inc. bears no responsibility for sample collection activities of non-Criterion personnel. Results apply to sample as received. This report relates only to the samples reported above, and when reproduced, must be in its entirety. Estimated accuracy, precision and uncertainty data available on request. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Reporting Limit is 1%. QC data associated with this sample set is within acceptable limits. Samples were received in good condition, unless otherwise noted.

Note: If your project number ends with an "R", it is a revised report and replaces the original document in full. The above results represent the analysis of bulk sample(s) by Criterion Laboratories, Inc. according to EPA 40 CFR Part 763 Appendix E to Subpart E - Polarized Light Microscopy. The concentration of asbestos is determined by visual estimation.



Criterion Laboratories, Inc. (ID 100424) is accredited by the ALHA Laboratory Accreditation Programs (ALHA-LAP), LLC in the IHLAP: EMLAP and ELLAP accreditation programs for Polarized Light Microscopy (PLM), Phase Contrast Microscopy (PCM), Air-Direct Examination; and Airborne Dust, Paint, Settled Dust by Wipe and Soil for Fields of Testing as documented by the Scope of Accreditation Certificate and associated Scope. Additionally, Criterion Laboratories, Inc. is certified by the Center for Disease Control (CDC) Environmental Legionella Isolation Techniques Evaluation (ELITE) Program for the determination of Legionella in water by culture and holds accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP ID 102046-0) for the determination of asbestos in bulk samples by Polarized Light Microscopy (PLM). This test report must not be used to claim product endorsement by NVLAP, NIST, ALHA or any agency of the US Government. Unless specifically listed as above, these test results are not covered under ALHA-LAP, LLC, 100424 accreditation.

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# Chain of Custody

**Matrix** Bulk/Building Material  
**Analyte** Asbestos  
**Analysis Type** PLM  
**Container** Bag  
**Project** 201378  
**Client** West Chester Area School District  
**Site Address** Mary C Howse Elementary School, 641 Boot Rd, West Chester, PA 19380  
**Turnaround** 3 - 5 Days  
**Field Tech** Jonathan McKinnon  
**Sample Notes**  
**Chain of Custody Notes**

## Additional Analytes

Sample Number	Location	Material Description	Received Condition	Date	Notes
201378-02-002-02-01	Faculty Women's Restroom Above CT	Pipe Fitting Insulation A/W Fiber Glass Pipe Insulation	Good	8/19/2020	
201378-02-002-02-02	Faculty Men's Restroom Above CT	Pipe Fitting Insulation A/W Fiber Glass Pipe Insulation	Good	8/19/2020	
201378-02-002-02-03	Gym	12" x 12" Pink Floor Tile with Black Mastic	Good	8/19/2020	
201378-02-002-02-04	Electrical Room at Custodial Office	12" x 12" Gray Floor Tile with Black Mastic	Good	8/19/2020	
201378-02-002-02-05	Custodial Office	12" x 12" Pink Floor Tile with Black Mastic	Good	8/19/2020	
201378-02-002-02-06	Hallway at Library	12" x 12" Tan Floor Tile with Yellow Mastic	Good	8/19/2020	

**Sample Count** 6

Handling Chain Type	Handled By	Date	Time	Notes
Samples Taken By	Jonathan McKinnon	8/11/2020	19:28	
Transported By	Jonathan McKinnon	8/11/2020	16:00	
Report Results To	Ian Forster	8/19/2020	19:28	
Send Reports To	Mary C Howse-West Chester Area School District	8/19/2020	19:28	
Relinquished By	Jonathan McKinnon	8/20/2020	14:00	
Received By	Lauren Mitchell	8/20/2020	13:58	
Analyzed By	Lauren Mitchell	8/24/2020	09:25	

DOCUMENT 003132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.
- B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.
- C. A geotechnical investigation report for Project, prepared by Earth Engineering Incorporated, dated April 14, 2023, is available for viewing as appended to this Document.
  - 1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
  - 2. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.
- D. Related Requirements:
  - 1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
  - 2. Document 003119 "Existing Condition Information" for stormwater infiltration testing information that is made available to bidders.

END OF DOCUMENT 003132



## **REPORT OF GEOTECHNICAL INVESTIGATION**

### **PROPOSED NEW ADDITIONS**

#### **MARY C. HOWSE ELEMENTARY SCHOOL**

**641 BOOT ROAD,  
WEST CHESTER, CHESTER COUNTY, PENNSYLVANIA**

#### **Prepared For:**

**Mr. Nate Moran  
Blackney Hayes Architects  
600 Chestnut Street, Suite 1200  
Philadelphia, PA 19106**

**EI Project No. 35810.00**

**April 14, 2023**

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## APPENDIX

PLATE 1 - TOPOGRAPHIC MAP  
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BORING LOCATION PLAN  
BORING PROFILE  
BORING LOGS  
LABORATORY TESTING RESULTS



## **I. INTRODUCTION**

### **A. PROJECT OBJECTIVE AND SCOPE OF WORK**

Earth Engineering Incorporated (EEI) has completed a geotechnical investigation for the proposed new additions to be located at Mary C. Howse Elementary School at 641 Boot Rd, West Chester, Pennsylvania. Based on the encountered conditions and the results of the testing performed for this project, EEI has developed geotechnical recommendations to aid in the foundation design for the proposed structure, as well as general earthwork and construction guidelines for the development of the site.

This investigation was performed in general accordance with EEI proposal BB-21471R, dated March 14, 2023. The scope of work conducted for this investigation included a test boring investigation, a geologic analysis of site conditions, laboratory testing of soil samples, and geotechnical engineering analysis of the data obtained. This report presents the results of the field and laboratory investigations and documents our recommendations regarding the geotechnical engineering aspects of this project. A stormwater infiltration report for the project was issued under separate cover.

### **B. SITE AND PROJECT DESCRIPTION**

The subject site is Mary C. Howse Elementary School, located at 641 Boot Rd, West Chester, Chester County, Pennsylvania. The project site is bordered to the west by residential properties, to the north and east by wooded area, and to south by Boot Road. The location of the approximate development area is indicated on Figure 1 below. A topographic map of the site is attached as Plate 1 in the APPENDIX of this report.

Based on the *Partial Grading Plan*, prepared by Stantec Consulting Services, Inc., dated October 10, 2021, new additions are proposed. According to the aforementioned plan, the finished floor elevation (FFE) is 102.41 feet for the additions. EEI assumed the column loads for the proposed building on the order of approximately 150 kips and wall loads of 3 kips/ linear foot (klf). Should the final loads vary significantly from these loads, EEI should be contacted immediately so that the recommendations provided herein can be verified.

Based on the topographic contours presented on the aforementioned plan the site slopes downward from the west to the east. Existing grades across area of development extend from approximately 106.0 feet in the west to 88.0 feet in the east. The location of the approximate development area is indicated on Figure 1 and Figure 2 below. A topographic map of the site is attached as Plate 1 in the *APPENDIX* of this report.





FIGURE 1 – Aerial View of Site, Google 2021

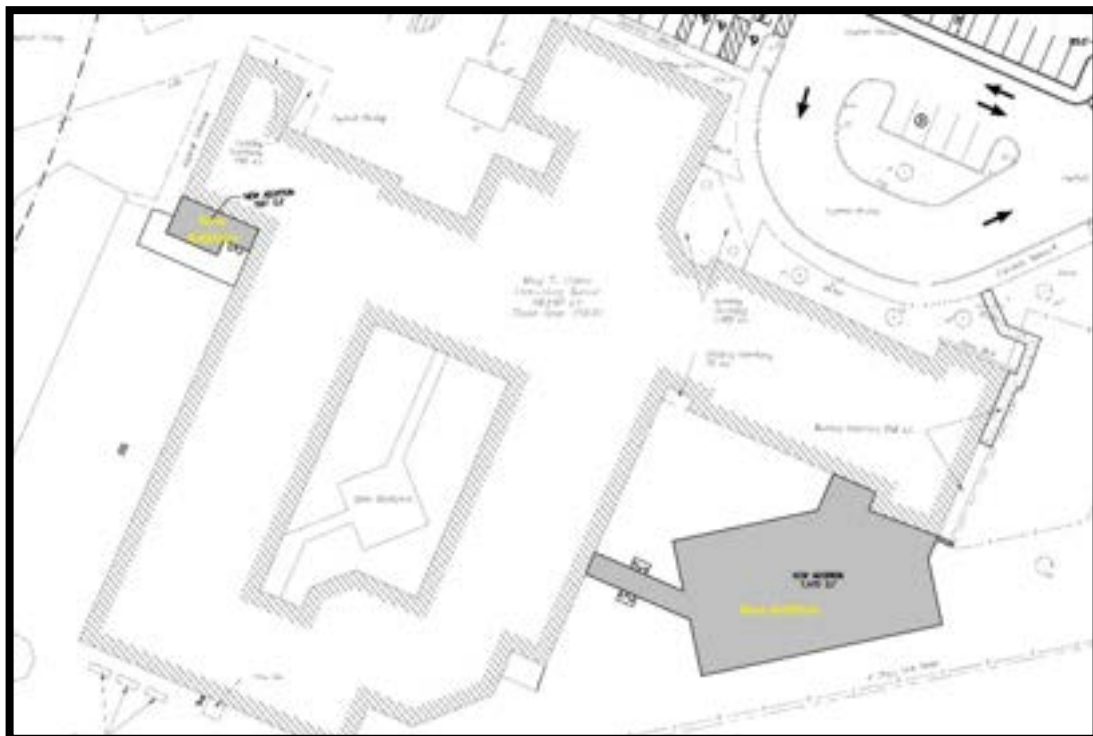


FIGURE 2 – Location of the new additions in the plan

## II. FIELD INVESTIGATION, OBSERVATIONS, AND DATA

### A. TEST BORINGS

Five (5) test borings, designated as B-1 through B-5, were used to explore the subsurface conditions within the proposed development area. The borings were completed on March 22<sup>nd</sup>, 2023, by Main Line Drilling Company, with a B-47 Mobile Drill track rig with cathead safety. Supervision and monitoring of the boring program were performed by a representative of EEI. The boring locations were field located by EEI using existing site features. Site owner had testing locations previously scanned for private/public on-site utilities prior to testing. Surface elevations at the boring locations were estimated from the topographic contours presented on the aforementioned Proposed Plan. The boring locations are depicted on the Testing Location Plan, EEI Drawing No. 35810.00-A-101, which is included in the APPENDIX of this report for reference. The site was investigated as thoroughly as could be based on the available areas accessible to the drilling equipment.

The borings were advanced using 2-inch outer-diameter, split-barrel (spoon) samplers and 2.25 inch inner-diameter hollow-stem augers. The borings were conducted in accordance with ASTM Standard D1586. Standard Penetration Test (SPT) values were recorded for each sample. The SPT values, which are a measure of soil density and consistency, are the number of blows required to drive the 2-inch outer diameter split-barrel sampler 1 foot using a 140-pound weight dropped 30 inches. The number of blows required to advance the sampler over the 12-inch interval from 6 to 18 inches is considered the "N" value, or the SPT value. Detailed descriptions and data regarding the subsurface conditions are shown on the *Boring Logs* which are included in the APPENDIX.

The borings were conducted to approximate depths ranging from 12.5 feet to 20.0 feet below existing grade. Bedrock, defined herein by auger refusal within residual materials, was encountered in B-3 and B-5 within the depths explored. Graphical representations of the stratigraphy encountered are shown on the Boring Profiles. Detailed descriptions and data regarding the subsurface conditions are shown on the Boring Logs which are included in the APPENDIX.

Groundwater measurements were taken during drilling and at the end of each boring. Groundwater was not observed in any test borings.

Boring Logs, which provide sample depths, descriptions of the materials encountered and sampling data, are included in the APPENDIX of this report. The information presented on the logs was used to generate Boring Profiles that graphically represent the subsurface conditions encountered at each boring location.



## B. GEOTECHNICAL LABORATORY TESTING

Two (2) representative samples of the soil recovered from the field investigation were tested in the laboratory to confirm field classification. The soil sample was tested in accordance with ASTM D2487. The tests performed included Particle Size Analysis (ASTM D422), Atterberg Limits (ASTM D4318), and Natural Moisture Content (ASTM D2216). A Unified Soil Classification System (USCS) Group Symbol and an ASTM Group Name have been assigned to the soil sample based upon the results of the laboratory testing.

The results of the laboratory testing are presented in Table I. Gradation curves, which graphically and numerically depicts the results of the analyses, is included in the APPENDIX.

<b>TABLE I</b> <b>LABORATORY TEST RESULTS</b>		
<b>Sample Location</b>	B-2, S-3 B-3, S-3 B-4, S-2	B-5, S-2 B-5, S-3
<b>Sample Depth</b>	4.0' – 6.0' 4.0' – 6.0' 3.0' – 5.0'	3.0' – 5.0' 5.0' – 7.0'
<b>Stratum</b>	Stratum I	Stratum I
<b>Atterberg Limits: Liquid Limit/ Plastic Limit/ Plasticity Index</b>	Non-Plastic	Non-Plastic
<b>Percent Passing No.200 Sieve (%)</b>	31.0	10.8
<b>Natural Moisture Content (%)</b>	12.4	4.1
<b>Unified Soil Classification System (USCS) Group Symbol/ Name</b>	SM, silty sand	SW-SM, well-graded sand with silt and gravel

## C. PUBLISHED GEOLOGICAL INFORMATION

According to the Commonwealth of Pennsylvania, Pennsylvania Geological Survey, Atlas of Preliminary Geologic Quadrangle Maps of Pennsylvania, 1978, Downingtown Quadrangle, the site is underlain by the Wissahickon Formation schist (Geologic Symbol - Xwc). Plate 2, included in the Appendix, shows the location of the site on a geologic map of the area.

As noted in the Commonwealth of Pennsylvania, Topographic and Geologic Survey, Engineering Characteristics of The Rocks of Pennsylvania, Fourth (4th) Series, Revised 1982, the Wissahickon Formation includes the albite-chlorite schist, which is typically a phyllite composed chiefly of quartz, feldspar, and muscovite. The bedding is fissile to thin and steeply



dipping in most places. The cleavage is well developed, highly abundant, and platy. This rock type is moderately resistant to weathering and is highly weathered to a moderate depth. The overlying soil mantle is typically thin. Ease of excavation ranges from easy in the completely to highly weathered material to difficult in the moderately weathered to fresh bedrock.

Based on the soil samples retrieved during the subsurface investigation, the materials encountered appeared typical of the materials associated with the weathering of the Wissahickon schist bedrock.

### **III. STRATIFICATION AND SUBSURFACE CONDITIONS**

#### **A. SOIL STRATA**

The soil samples recovered during the field investigation were examined and visually classified by EEI, both in the field and in the laboratory. Existing Fill encountered in one test boring location. One (1) naturally occurring strata was characterized to exist at the investigated locations. A surface layer of topsoil was observed at B-1, B-2, B-3 and B-5, and asphalt was observed at B-4. Topsoil depths range from 0.5 to 0.6 feet, and asphalt depth at 1.1 foot below existing grades.

Cross-sections of each boring, displaying the various strata, as well as other information obtained from the field investigation, are included within the Appendix on the Boring Profiles. The subsurface information is further detailed on the Boring Logs, which are also included in the Appendix.

#### **EXISTING FILL**

The soil designated as existing FILL materials was observed to be a gray, white sandy gravel with asphalt and concrete. The existing FILL materials were encountered beneath the topsoil. The FILL materials extended to depth is 3.0 feet below existing grade in boring B-5. Based on visual classification the USCS Group Symbol for representative samples of this material is GP. The corresponding ASTM Group Name is Sandy gravel.

The SPT values recorded during the sampling of the existing FILL was greater than 50 blows per foot of penetration. Based on these values, the relative density of the FILL material is very dense. Moisture level observations of this FILL material is moist state.

#### **STRATUM I – WEATHERED SCHIST**

The soil designated as Stratum I materials was observed to be a mixture of green, red brown, brown, gray sandy gravel with some quartz and mica, silty sand, and well-graded sand with silt and gravel (Weathered Schist). Stratum I was observed in all borings. Stratum I materials





were encountered beneath topsoil in B-1, B-2, B-3, beneath asphalt in B-4, and beneath existing FILL in B-5. This material extended to depths ranging from 12.5 to 20.0 feet below existing grade. Based on visual and laboratory classification the USCS Group Symbol for representative samples of this materials are GP, SM, and SW-SM. The corresponding ASTM Group Name is Sandy gravel, Silty sand, and Well-graded sand with silt and gravel.

The N-values recorded during the sampling of this material were ranged from 6 to more than 50 blows per (1) foot of penetration. Based upon the N-values, as well as monitoring of the drilling rates, the relative density of this material is loose to very dense but generally medium dense to very dense. Moisture level observations of this stratum ranged from dry to moist. Confirmed by laboratory testing, the natural moisture contents of Stratum II samples ranged from 4.1 – 12.4%.

## B. BEDROCK

Bedrock, defined herein by auger refusal within residual materials was encountered in B-3 and B-5, at depths ranging from 12.5 feet to 13.0 feet, respectively. Auger refusal is typically interpreted as the drilling equipment encountering the moderately weathered to fresh bedrock surface.

TABLE II DEPTHS TO DENSE TO VERY DENSE WEATHERED ROCK AND BEDROCK					
Boring Location	1.) Ground Surface Elevation (feet)	2.) Approximate Depth to Dense to Very Dense Weathered Rock (feet)	Approximate Dense to Very Dense Weathered Rock Elevation (feet)	2.) Approximate Depth to Bedrock (Auger Refusal) (feet)	Approximate Bedrock Elevation (feet)
B-1	104.0	3.0	101.0	-	-
B-2	102.0	8.5	93.5	-	-
B-3	104.0	5.5	98.5	13.0	91.0
B-4	102.0	1.5	100.5	-	-
B-5	102.0	7.0	95.0	12.5	89.5

1.) Ground surface elevations were topographically estimated using the provided plans.

2.) Depths were measured from existing site grades at the time of the investigation.

Further details regarding the bedrock and very dense weathered rock can be found in the *Excavation Methods* section of this report.



### C. GROUNDWATER

Groundwater measurements were taken in each borehole upon completion of the borings up to 4.0 hours afterward. Groundwater was not encountered in any borings. It should be noted that due to logistics these observations were made just after the drilling operation and that groundwater table elevations may fluctuate with daily, seasonal, tidal, and climatic variations.

### IV. GEOTECHNICAL CONCLUSIONS AND RECOMMENDATIONS

EEl has completed a geotechnical analysis in order to provide foundation design recommendations. The analyses are based on the conditions encountered in the field, the laboratory analyses, and an estimated lowest level finished floor elevation (FFE) of 102.41 feet and resultant bottom of footing elevation (BFE) of 99.41 feet for the proposed new additions. EEl has assumed maximum structural column loads for the proposed buildings in the order of 150 kips, and maximum wall loads on the order of 3 kips per linear foot. In the event that the foundation loads exceed these values, EEl should be informed so that we can review and revise these recommendations, if necessary. EEl has evaluated the subsurface conditions and provides the following soil parameters utilized for foundation analyses in the following table.

<b>TABLE III</b>		
<b>GEOTECHNICAL SOIL PROPERTIES</b>		
<b>Stratum</b>	<b>Existing FILL</b>	<b>Stratum I</b>
<b>Moist Unit Weight - <math>\gamma_m</math> (pcf)</b>	120	130
<b>Effective Stress Angle of Internal Friction - <math>\phi'</math> (deg)</b>	32	38
<b>Cohesion - c (psf)</b>	0	0

#### A. FOUNDATION RECOMMENDATIONS

Based on the results of the geotechnical subsurface investigations, the anticipated structural loads of the proposed development, laboratory analyses, and subsequent calculations, EEl recommends that the structure is supported by standard strip and spread footings at an allowable bearing pressure of 3,000 psf. At this bearing pressure, estimated total and differential settlements are expected to be less than 1.0 inch.

Foundations for the proposed new additions, should bear at least 3 feet below lowest adjacent exterior grades in unheated areas to protect from frost penetration. Interior foundations in heated areas should bear at least 2 feet below top of slab elevations (or as needed by



architectural/structural details). Based on these elevations, the resultant bottom of footing elevation (BFE) is 99.41. At this assumed BFE, foundations will bear on existing Fill or Stratum I soil based on boring data. Loose materials may be encountered below the BFE. EEI recommends adequate soil bearing conditions should be confirmed below BFE encountered. New foundations BFE should initially match adjacent existing structure BFE, but may step up or down if necessary at a predetermined distance away from the existing structure. Prior to foundation construction, the bearing soils should be probed, proof rolled, or otherwise observed by an onsite representative of the Geotechnical Engineer. Any soils deemed unsuitable should be densified, removed, recompacted or replaced at the discretion of the onsite representative of the Geotechnical Engineer.

EEI provides the following recommendations to be used in foundation design for the proposed new additions. These recommendations are based on the assumption that recognized, proper construction practices will be followed throughout construction, and the Geotechnical Engineer of Record will oversee the inspection of site preparation, proof rolling, foundation construction, and other critical earthwork operations.

1. A shallow foundation system including strip and spread footings is recommended for support of the proposed buildings.
2. The base of all strip and spread foundations should be situated on suitably dense Existing FILL or Stratum I soils or properly-placed structural fill. Foundations should not bear on weak fill soils, frozen or saturated soils.
3. The foundations should be designed for a maximum allowable bearing capacity of 3,000 pounds per square foot (psf). Regardless of the load criteria, strip footings should be a minimum 18 inches wide and column footings should be a minimum of 36 inches wide for shear considerations.
4. Foundations maybe designed for a bearing pressure of 3,000 psf at maximum column and wall loads of 150 kips, total and differential settlements are estimated to not exceed 0.5 inches.
5. The bottom of exterior foundations and foundations in unheated areas should be placed at least 36 inches below lowest adjacent exterior grades for protection from frost heave and 24 inches in heated areas.
6. The foundation subgrade (footing bottoms) should be compacted with hand-operated compaction equipment (i.e., a rammer or "jumping jack") or with a static mode, walk-behind, trench roller or a smooth roller (i.e., Rammax, Wacker, or Bomag equipment) in accordance with the Fill and Compaction section of this report.
7. All footing bottoms should be dry and completely cleaned of loose material or debris immediately before the placement of concrete.
8. The actual bearing conditions of the soil at the footing bottom elevation should be confirmed in the field during excavation, by inspection under the supervision of the Geotechnical Engineer of Record.



9. Every effort should be made to prevent water from entering open foundation excavations. Any water, which may accumulate in the bottoms of the excavation, should be removed immediately. It is recommended that following excavation and placement of concrete be performed on the same day and during fair weather conditions. Installation of the foundations should be carried out in accordance with applicable ACI guidelines, under the observation of a representative of EEI.

## **B. FLOOR SLABS**

Floor slabs may be supported by approved subgrade soils and/or structural fill placed and compacted over approved subgrade soils in accordance with the *FILL AND COMPACTION* section of this report. Following completion of site preparation procedures, the proposed building pad area should be probed, proof-rolled or otherwise observed to densify and verify the integrity of the subgrade soils. It is critical that the proof rolling operation be performed in the presence of a representative of the Geotechnical Engineer of Record to ensure that the Fill and Stratum I materials are suitable to provide adequate slab support. Topsoil, if encountered, should be removed and replaced with controlled, compacted lifts of structural fill as outlined in the *FILL AND COMPACTION* section of this report. Any unstable zones of FILL and/or Stratum I soils identified during proof-rolling operations can be aerated and dried in-place, if feasible. Alternately, EEI recommends localized over-excavation of any unstable materials to a firm and stable base and replacement with compacted structural fill as outlined in the *FILL AND COMPACTION* section of this report. The earthwork procedures described herein should be monitored and inspected by a representative of the Geotechnical Engineer of Record.

EEI recommends the floor slab for the proposed building be designed as a slab-on-grade system, and the subgrade should be prepared in accordance with the procedures described in this report. EEI recommends the placement of a granular subbase beneath the floor slab to provide uniform support distribution between the subgrade soils and the base of the concrete slab. Floor slabs supported on a minimum 6-inch thick layer of a clean stone, AASHTO #57 or equivalent, can be designed using a modulus of subgrade reaction of 125.0 psi/in provided that the soils are compacted to a minimum of 95% of the soils maximum dry density as determined by ASTM D 1557 (Modified) in fill areas. The floor slab should be suitably reinforced to control shrinkage cracks. Proper joints should be provided at the junction of the slab and foundation system so that a small amount of independent movement can occur without causing damage.

From a geotechnical perspective, a vapor retarder/barrier is not required to address any issues with moisture intrusion from shallow groundwater where the lower level is parking. The need for a vapor retarder/barrier from a non-geotechnical perspective depends on the floor covering and/or humidity control in the proposed building space. Refer to appropriate



documentation from the Portland Cement Association for guidance on the need and location of a vapor retarder/barrier. If a moisture sensitive floor covering is used, or the building space is equipped with humidity control, then a vapor retarder/barrier is recommended. Additionally, the location of the vapor retarder/barrier would depend on when slab construction is completed with respect to placement of a watertight roofing system. There is some debate in the industry on the use and location of vapor retarder/barrier. Regardless, these issues are not of a geotechnical nature. Therefore, EEI recommends that these issues be evaluated by the Architect and/or the project structural engineer accordingly to determine the need for, and location of the vapor retarder/barrier.

### C. LATERAL EARTH PRESSURES

Subgrade structural elements that are restrained from deflection, such as basement walls, should be designed for the at-rest condition,  $K_o$ . Subgrade structural elements that are free to deflect, such as retaining walls, should be designed for the active condition,  $K_a$ . The characteristics for the on-site subgrade materials are provided in the following table for use in establishing the design of subgrade structural elements, as necessary. The coefficients presented in Table IV are based on assumptions of vertical structural elements, horizontal backfill and no wall friction. These values do not include a design safety factor. This information should only be used by design professionals with experience in this type of design, as certain soil parameters can vary depending on anticipated loading conditions. The design should incorporate anticipated surcharge loads from construction.

In accordance with the International Building Code (IBC 2009), Section 1805, below grade walls should at a minimum be damp-proofed. Damp-proofing materials for walls shall be installed on the exterior surface of the wall and shall extend from the top of the footing to above the ground level in accordance with IBC 2009, Section 1805.2.2.

<b>TABLE IV</b>		
<b>PROPERTIES TO BE USED FOR THE COMPUTATION OF LATERAL LOADS</b>		
<b>STRATUM:</b>	<b>Existing FILL</b>	<b>Stratum I</b>
<b>Effective Angle of Internal Friction, <math>\phi'</math> (deg)</b>	32	38
<b>Moist Unit Weight - <math>\gamma_m</math> (pcf)</b>	120	130
<b>Rankine Coefficient of Active Earth Pressure, <math>K_a</math></b>	0.31	0.24
<b>Rankine Coefficient of Passive Earth Pressure, <math>K_p</math></b>	3.25	4.20
<b>Rankine Coefficient of At-Rest Earth Pressure, <math>K_o</math></b>	0.47	0.38
<b>Coefficient of Sliding, <math>\mu</math></b>	0.44	0.55





#### **D. SITE PREPARATION**

EEI recommends that any existing utilities present to within 10-feet of the construction areas be relocated prior to the start of site preparation. Initial site preparation measures should include the complete removal of organics (including topsoil, mulch, root mass, wood, brush and trees), and any deleterious materials, extending a minimum distance of 10 feet beyond the proposed construction areas.

The existing features at the site will be demolished or removal. Existing underground piping and existing foundation elements, below existing grade should be removed, or abandoned in place by filling with lean concrete or flowable fill. Existing foundation elements should be removed to a depth of at least two (2) feet below the affected, planned building foundation, utility or finished pavement grade. The excavation to remove these utilities or existing foundations should be backfilled with structural fill as described in the FILL AND COMPACTION section of this report.

EEI recommends that the subgrade be proofrolled probed, or otherwise observed to densify and verify its stability prior to the placement of new foundations, concrete, drainage base stone, or structural fill. Proofrolling and compaction procedures are an integral part of the site preparation process necessary to densify and verify the integrity of the existing soils. EEI recommends that a smooth-drum vibratory roller having a minimum static-weight of 10 tons be used for proofrolling. Areas that cannot be accessed by this size of equipment should be densified and compacted by use of walk-behind or hand-operated equipment. The proofrolling and compaction activities should be overseen and evaluated during construction by the on-site representative of the Geotechnical Engineer of Record.

The site should be graded during construction to convey surface runoff away from active work areas. The work areas should be sealed by rolling on a daily basis to promote runoff. Careful grading and management of surface water runoff will help minimize disturbance of the subgrade. EEI recommends that all construction areas be proofrolled immediately before the placement of any structural fill and/or the placement of drainage base stone, and again before the installation of concrete or asphalt. Such preparations will allow soft and weak areas to be observed and remediated before construction.

#### **E. EXCAVATION METHODS**

Excavations will be within existing FILL or Stratum I soil based on proposed and existing grades. The existing FILL should be capable of being excavated with conventional earth excavation equipment and techniques. Excavations that extend into the very dense weathered



rock of Stratum I may become increasingly difficult and contingencies should be in place in order to facilitate a rock removal method like hydraulic hammering or splitting (or other rock removal equipment and/or techniques).

Excavations must be sloped, benched, or shored to prevent collapse during excavation and construction. Sloping, benching, or shoring of all construction excavation should be conducted in accordance with 29 CFR 1926, Subpart P. A competent person, as defined by the aforementioned regulation, is required to confirm the stability of all excavations during construction. The actual excavation reinforcement should be determined in the field and should be based on the required depth of excavations and on the soil types encountered.

Excavations adjacent to existing structural elements should not undermine existing foundations, walls, slabs, driveways, or walkways. If excavations are required in the vicinity of these elements, EEI recommends that precautionary measures (i.e. underpinning or shoring) be implemented in the development scheme for this project. The recommendations outlined herein are provided for planning purposes only, and the contractor will remain the entity in “Responsible Charge” of all health and safety on the site. If underpinning or shoring is determined to be required, EEI should be contacted so that proper design of such measures may be formulated.

## **F. GROUNDWATER CONTROL**

As previously referenced, static groundwater level was not observed in any borings below the existing ground surface. However, groundwater conditions may fluctuate with daily, seasonal and climatic events.

## **G. LOWER LEVEL DAMPPROOFING**

Based on the findings of the geotechnical investigation, hydrostatic pressures due to groundwater are not anticipated to develop adjacent to any subsurface walls or beneath slabs in the proposed construction area. Consequently, in accordance with the International Building Code (IBC 2018) Section 1805, below grade walls and floors should at a minimum be damp-proofed.

## **H. FILL AND COMPACTION**

### **1. ON-SITE FILL CRITERIA**

Fill material which supports foundations, floor slabs, pavements, and walkways, as well as fill for retaining walls and basin berms, is considered structural fill. Excavations required to achieve proposed grades may make Existing FILL and Stratum I soils available for re-use as structural fill. Existing FILL is suitable for re-use if deleterious, non-inert materials are removed prior to re-use. Visual observations of Stratum I indicate that these materials are suitable for use



as structural fill. However, cobbles, boulders and rock fragments from weathered rock, and bedrock should be processed to less than 3 inches in size and mixed with suitable soil materials during placement to provide a well-graded structural fill. EEI recommends that all soil be further evaluated during site construction activities by the on-site Geotechnical Representative during the fill placement process.

If excessively moist portions of any of the strata are encountered during excavation, they will require time for aeration and drying to achieve the required densities and percentage compaction values for re-use as structural fill. Aeration and drying of excessively moist soil are best accomplished during warm dry summer months. The on-site soils will require careful moisture control as the majority contain finer-grained material that are sensitive to moisture changes. Caution should be exercised during construction to not stockpile and/or expose these soils to weather conditions for long periods of time. Materials stockpiled for use as structural fill should be graded to shed water and rolled to maintain the soils. During periods of wet site conditions, travel upon the building pads and construction areas should be limited to minimize disturbance of the subgrade which will lead to instabilities.

## **2. IMPORTED FILL CRITERIA**

If any general structural fill is required to be imported to the site, it should meet the following criteria:

- Granular soils such as GW, GP, GM SW, SP or SM as classified by ASTM D2487 are preferred, however soils having soil classifications GC, SC, ML or CL may be acceptable provided the Geotechnical Engineer of Record approves the soil;
- the largest particles within the fill should be no greater than 3 inches in diameter;
- not include deleterious materials such as construction debris, wood, glass, ash, trash, refuse, roots and other organic matter or contain frozen clumps of soil, snow or ice;
- have moisture contents within 3 percent of the soil's optimum moisture content and
- meets the definition of clean fill according to PADEP Management of Fill Policy, Document Number 258-2182-773.

The above criteria are provided as a general guideline for soil materials imported to the site. Soil materials that become available for use as a structural fill should be submitted to the Geotechnical Engineer of Record for evaluation before they are imported to the site.



### 3. COMPACTION CRITERIA

Structural fill should be placed in horizontal lifts not exceeding 8 inches in loose thickness and compacted with a smooth drum or sheep's foot vibratory roller with a minimum static weight of 10 tons. Structural fill should be placed in horizontal lifts of 6 inches loose thickness where compaction by hand-operated equipment is necessary. The optimum lift thickness and number of repetitions necessary to achieve the required percentage compaction values should be determined in the field with test passes of the chosen compaction equipment. Structural fill material should be placed at, or deviate nominally from, the optimum moisture content as determined in accordance with ASTM D698 (Standard Proctor) or ASTM D1557 (Modified Proctor) and compacted to a minimum of dry density as indicated in Table V.

<b>TABLE V</b> <b>COMPACTION CRITERIA</b>		
<b>Fill Area</b>	<b>Percent of Maximum Dry Density ASTM D698 (Standard Proctor)</b>	<b>Percent of Maximum Dry Density ASTM D1557 (Modified Proctor)</b>
<b>Foundation Support, Slab-On-Grade</b>	98	95
<b>Pavements and Sidewalks</b>	98	95
<b>Basin Berms, Wall Backfill</b>	98	95
<b>Non-Structural</b>	92	90

### I. SEISMIC SITE CLASSIFICATION

According to the 2009 International Building Code (IBC Section 1615.1.1 Site Class Definitions) and the information obtained from the geotechnical field investigation, the average properties in the top 100 feet of soil/rock correspond to Site Class C. Therefore, Site Class C conditions should be applied for the seismic design of the proposed building.

### V. CONSTRUCTION QUALITY CONTROL

As documented within this report, the proposed construction will include significant earthwork procedures and foundation construction activities. It is the opinion of EEI that the quality of this work is an integral part of the development of this site and directly impacts the validity of the recommendations presented in this report. Based upon our past experience, the most effective and economical earthwork inspection is obtained through the presence of a qualified



representative of the Geotechnical Engineer of Record during site preparation, proof rolling efforts, placement of structural fill, and installation of foundation elements. Therefore, we would recommend that these construction activities should be considered for monitoring and testing by EEI.

## **VI. LIMITATIONS**

The conclusions and recommendations presented in this report are based on assumptions regarding structural design and loads as stated herein. As the design progresses, EEI should be made aware if the stated assumptions deviate substantially from the final design, to provide an opportunity to revise the recommendations, if necessary.

The conclusions and recommendations presented in this report are based on assumptions regarding structural design and loads as stated herein. As the design progresses, EEI should be made aware if the stated assumptions deviate substantially from the final design, to provide an opportunity to revise the recommendations, if necessary.

This report has been prepared in order to assist the client for design of the proposed structure. Standard geotechnical practices were utilized in the subsurface investigation and development of this report. However, it must be noted that subsurface conditions may vary between testing locations. The recommendations presented herein do not address site elements such as any proposed utilities, stormwater structures, and pavement sections.

Unless specifically indicated to the contrary in this report, the scope of work for this report was limited only to the investigation and evaluation of the geotechnical aspects of the site conditions and does not include any considerations of potential site pollution, contamination, or other environmental issues. This report offers no opinions related to potential pollution or contamination of the site.

The procedures followed during the subsurface exploration, and the analyses and conclusions contained herein, have followed generally accepted practices of geotechnical engineering. EEI provides no other warranties, either expressed or implied, as to the professional advice provided under the terms of EEI's agreement and included in this report. The conclusions and recommendations presented in this report are based on the assumption that recognized proper construction practices will be followed throughout construction, and that a Professional Engineer qualified in Geotechnical Engineering, such as EEI, will be retained as the Geotechnical Engineer of Record to oversee the inspection of site preparation, proof rolling, foundation construction, and other critical earthwork operations. If subsurface conditions substantially deviate during construction from those described in this report, EEI should be contacted promptly.





EEl emphasizes that this geotechnical analysis was made for the construction of the proposed new additions at the Mary C. Howse Elementary School located at 641 Boot Road, West Chester, Pennsylvania. EEl does not assume any responsibility for the use of this report in generating a foundation design for a site other than the one specifically addressed in this report or for any other purpose.



Respectfully submitted,  
**EARTH ENGINEERING INCORPORATED**

A handwritten signature in black ink, appearing to read "BSY".

Bulut S. YILDIZ  
Project Manager – Geotechnical Investigations

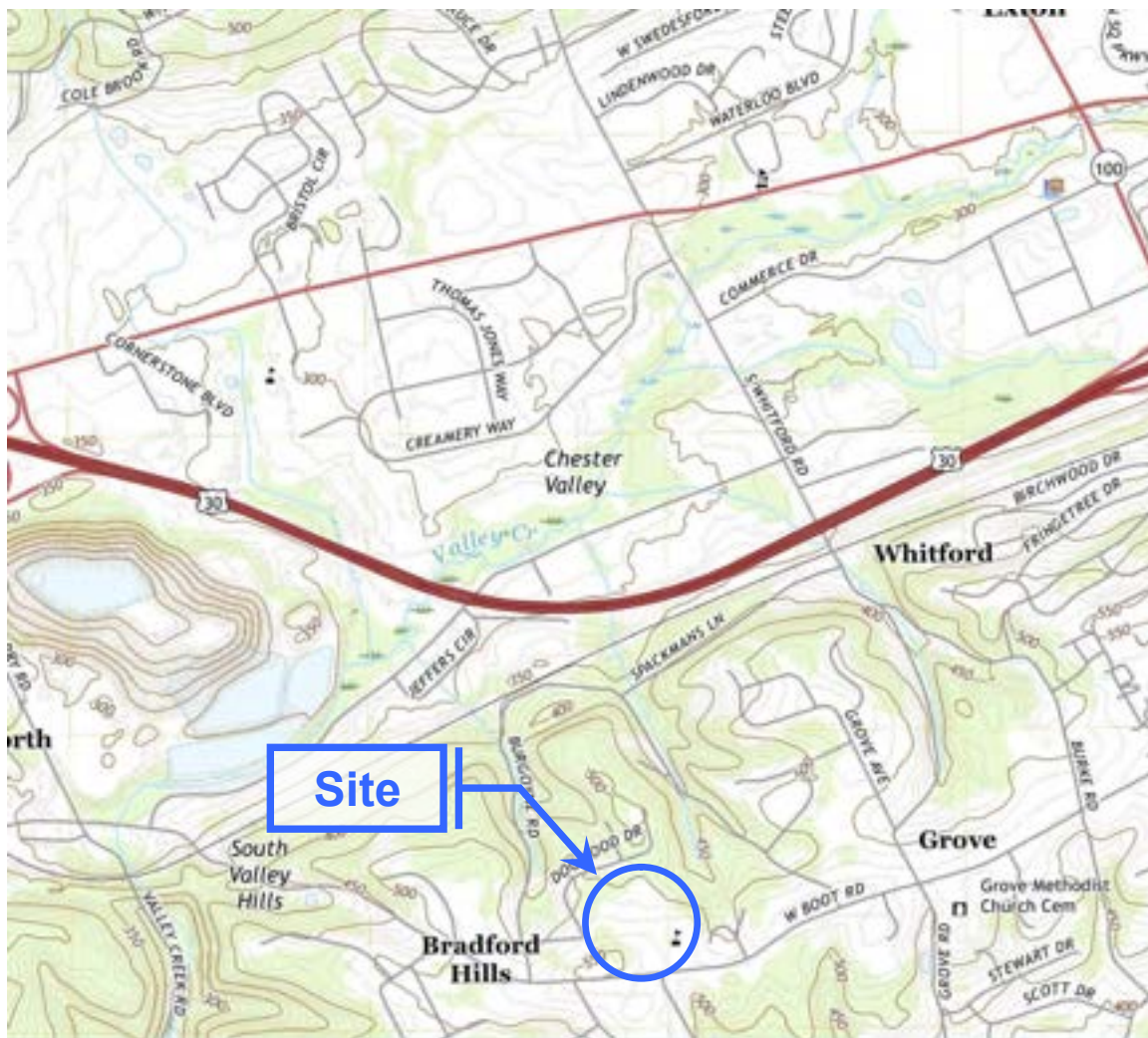
A handwritten signature in black ink, appearing to read "Timothy B. Carlin".

Timothy B. Carlin, P.E.  
Assistant Director – Geotechnical Investigations

#### APPENDIX

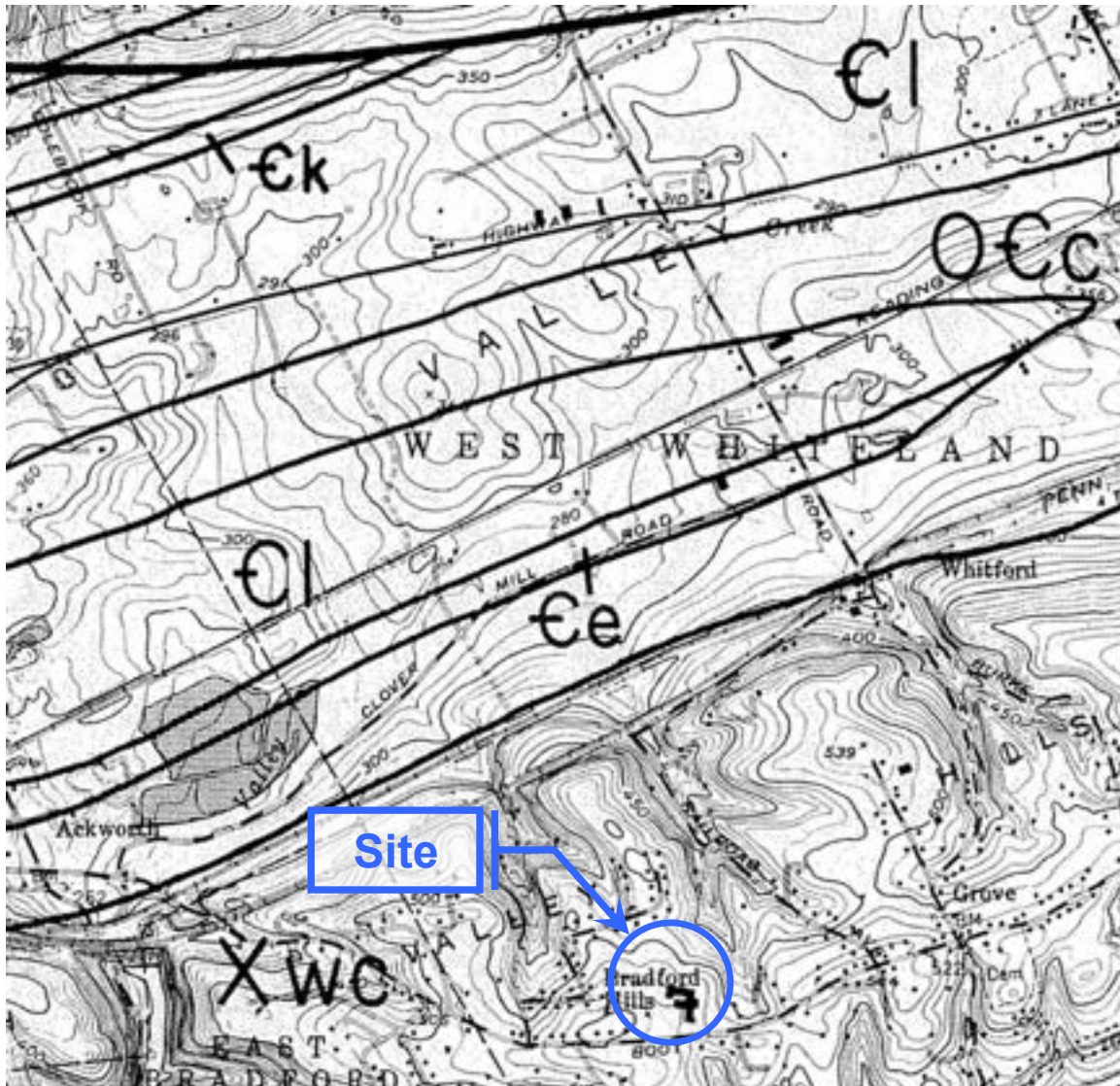
PLATE 1 - TOPOGRAPHIC MAP  
PLATE 2 - GEOLOGIC MAP  
BORING LOCATION PLAN  
BORING PROFILES  
BORING LOGS  
LABORATORY TESTING RESULTS





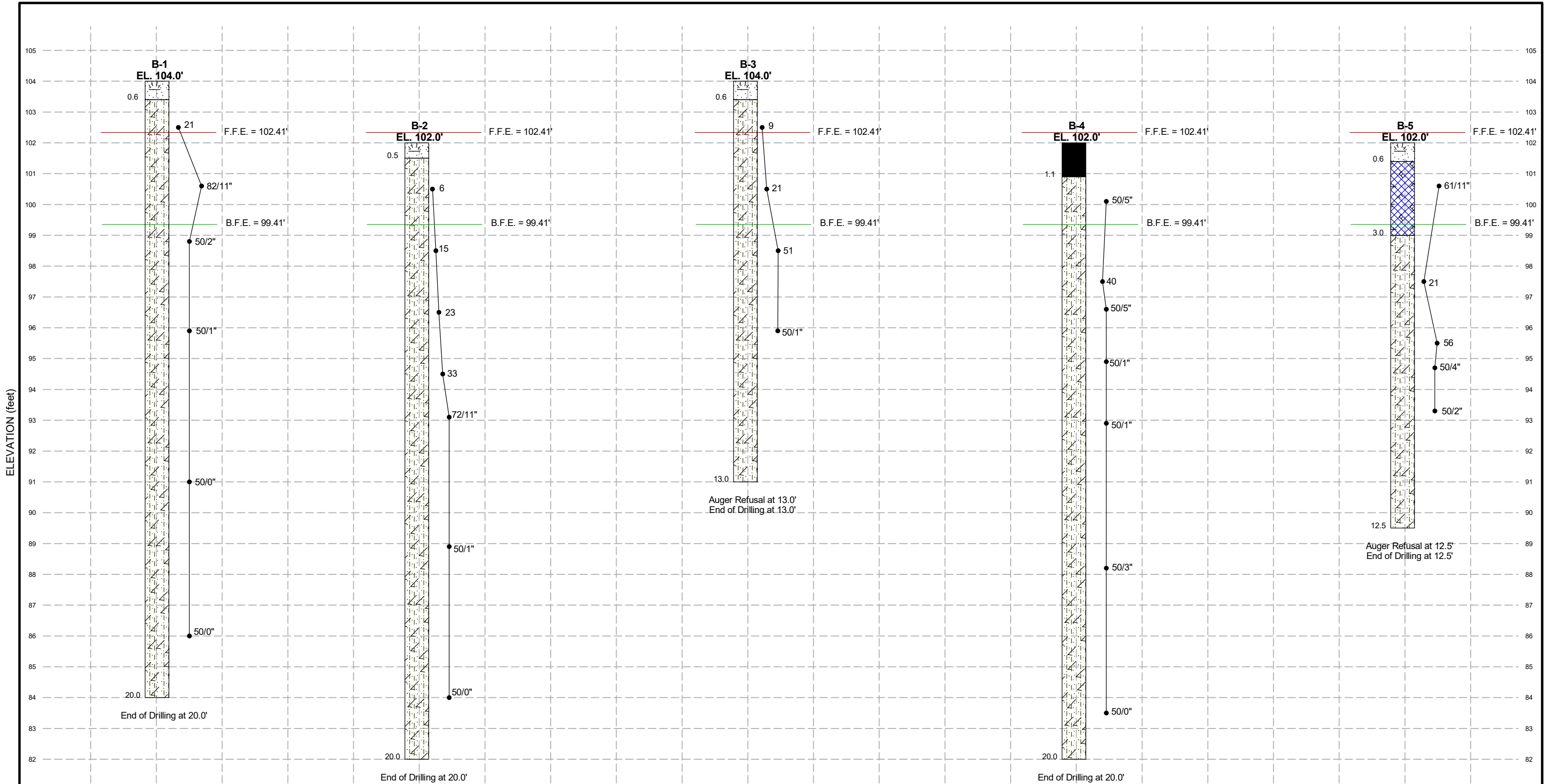
**PLATE 1 – TOPOGRAPHIC MAP OF SITE**

Reprinted from the United States Department of the Interior Geological Survey, Topographic Maps of Pennsylvania, Downingtown, PA Quadrangle, Photorevised 2019.



**PLATE 2 - GEOLOGIC MAP OF SITE**

Reprinted from the Pennsylvania Geological Survey, Atlas of Preliminary Geologic Quadrangle Maps of Pennsylvania, Downingtown, PA Quadrangle, 1978.



**Lithology Graphics**

- Topsoil
- Asphalt
- FILL
- Weathered Schist

F.F.E. = Finished Floor Elevation  
B.F.E. = Bottom of Footing Elevation

**EARTH  
ENGINEERING  
INCORPORATED**  
*Geotechnical Engineers & Geologists*

**BORING PROFILES**  
PREPARED FOR  
**MARY C. HOWSE EL. SCHOOL**  
641 BOOT ROAD, WEST CHESTER, PA





# BORING LOG

BORING NO. B-1  
SHEET 1 OF 1  
DATE: START 3/22/23  
END 3/22/23  
SURFACE  
ELEV. (FT) 104.0

PROJECT LOCATION 641 Boot Road, West Chester, PA

INSPECTOR NAME **B. Yildiz**

EQUIPMENT USED B-47 mobile track rig with cathead safety DRILLER NAME/COMPANY W. Corcoran/Main Line Drilling

DRILLING METHODS 2" Split Spoon Sampling, continuous 0.0 to 10.0 ft, 5' intervals to 20.0 ft

AUGER: SIZE: 2.25" ID HSA ; AUGER DEPTH:        ; WATER: DEPTH: dry TIME: 0.25 h. DATE: 3/22/2023

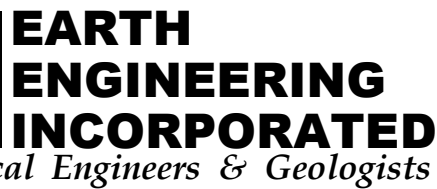
CHECKED BY: J. DeVita ; DATE: 3/22/2023 DEPTH: dry TIME: 4 h. DATE: 3/22/2023

NOT ENCOUNTERED ☐

DEPTH (FT)	SAMPLE NO./ TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (Ft.)	RECOVERY(%)		USCS	AASHTO	H <sub>2</sub> O CONTENT	GRAPHIC LOG	DESCRIPTION		REMARKS
				ROD (%)						DEPTH	ELEVATION	
0.0	S-1	4	1.7'	-	GP		m			0.6	Topsoil	Moderate drilling 0.0' to 20.0'
		10								Sandy Gravel; gray, brown (Weathered Schist)		
		11										
2.0	S-2	26	1.8'	-	GP		d			103.4		
		32										
		50/5"										
3.4												
5.0	S-3	50/2	0.2'	-	GP		d					
5.2												
8.0	S-4	50/1	0.1'	-	GP		d					
8.1												
13.0	S-5	50/0	0.0'	-			NA					
18.0	S-6	50/0	0.0'	-			NA					
											End of drilling at 20.0'	

\*\* D = DRY, M = MOIST, W = WET





# BORING LOG

BORING NO. B-2  
SHEET 1 OF 1  
DATE: START 3/22/23  
END 3/22/23  
SURFACE  
ELEV. (FT) 102.0

PROJECT LOCATION 641 Boot Road, West Chester, PA

INSPECTOR NAME B. Yildiz

DRILLING METHODS 2" Split Spoon Sampling, continuous 0.0 to 10.0 ft, 5' intervals to 20.0 ft

CHECKED BY: J. DeVita ; DATE: 3/22/2023 DEPTH: dry TIME: 4 h. DATE: 3/22/2023

NOT ENCOUNTERED ☐

[illegible]

\*\* D = DRY, M = MOIST, W = WET

# BORING LOG

BORING NO.	<u>B-3</u>
SHEET	<u>1</u> OF <u>1</u>
DATE: START	<u>3/22/23</u>
END	<u>3/22/23</u>
SURFACE ELEV. (FT)	<u>104.0</u>

PROJECT NAME Mary C. Howse Elementary School

PROJECT LOCATION 641 Boot Road, West Chester, PA

PROJECT NUMBER 35810.00

INSPECTOR NAME B. Yildiz

EQUIPMENT USED B-47 mobile track rig with cathead safety

DRILLER NAME/COMPANY W. Corcoran/Main Line Drilling

DRILLING METHODS 2" Split Spoon Sampling, continuous 0.0 to 10.0 ft, 5' intervals to 13.0 ft

AUGER: SIZE: 2.25" ID HSA ; AUGER DEPTH: \_\_\_\_\_ ; WATER: \_\_\_\_\_ DEPTH: dry TIME: 0.25 h. DATE: 3/22/2023

CHECKED BY: J. DeVita ; DATE: 3/22/2023 DEPTH: dry TIME: 4 h. DATE: 3/22/2023

NOT ENCOUNTERED ☐

DEPTH (FT)	SAMPLE NO./ TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (Ft.)	RECOVERY(%) RQD (%)	USCS AASHTO	H <sub>2</sub> O CONTENT	GRAPHIC LOG	DEPTH	ELEVATION	DESCRIPTION	REMARKS
0.0		3			SM			0.6	103.4	Topsoil	
0.5	S-1	4	1.8'	-		m				Sandy Gravel, Silty Sand; gray, brown (Weathered Schist)	Moderate drilling 0.0' to 6.0'
1.0		5									
1.5		5									
2.0	S-2	5	1.0'	-	GP	d					
2.5		8									
3.0		13									
3.5		14									
4.0	S-3	15	1.5'	-	SM	d					
4.5		21									
5.0		30									
5.5		50/4"									
6.0											
6.5											
7.0											
7.5											
8.0											
8.1	S-4	50/1	0.1'	-	GP	d					
8.5											
9.0											
9.5											
10.0											
10.5											
11.0											
11.5											
12.0											
12.5											
13.0								13.0	91.0		Auger refusal at 13.0' End of drilling at 13.0'

\*\* D = DRY, M = MOIST, W = WET

# BORING LOG

BORING NO.	<b>B-4</b>
SHEET	<b>1</b> OF <b>1</b>
DATE: START	<b>3/22/23</b>
END	<b>3/22/23</b>
SURFACE ELEV. (FT)	<b>102.0</b>

PROJECT NAME **Mary C. Howse Elementary School**

PROJECT LOCATION **641 Boot Road, West Chester, PA**

PROJECT NUMBER **35810.00**

INSPECTOR NAME **B. Yildiz**

EQUIPMENT USED **B-47 mobile track rig with cathead safety**

DRILLER NAME/COMPANY **W. Corcoran/Main Line Drilling**

DRILLING METHODS **2" Split Spoon Sampling, continuous 0.0 to 10.0 ft, 5' intervals to 20.0 ft**

AUGER: SIZE: **2.25" ID HSA** ; AUGER DEPTH: ; WATER: DEPTH: **dry** TIME: **0.25 h.** DATE: **3/22/2023**

CHECKED BY: **J. DeVita** ; DATE: **3/22/2023** DEPTH: **dry** TIME: **4 h.** DATE: **3/22/2023**

NOT ENCOUNTERED ☐

DEPTH (FT)	SAMPLE NO./ TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (Ft.)	RECOVERY(%) RQD (%)	USCS AASHTO	H <sub>2</sub> O CONTENT	GRAPHIC LOG	DEPTH ELEVATION	DESCRIPTION	REMARKS
1.5								1.1	Asphalt (4") Subbase Stone (10")	Moderate drilling 0.0' to 20.0'
1.9	S-1	50/5"	0.4'	-	GP	d		100.9	Sandy Gravel, Silty Sand; gray, brown (Weathered Schist)	
3.0										
5.0	S-2	18 19 21 38	1.5'	-	SM	d				
5.4	S-3	50/5"	0.4'	-	GP	d				
7.0										
7.1	S-4	50/1"	0.1'	-	GP	d				
9.0										
9.1	S-5	50/1"	0.1'	-	GP	d				
13.5										
13.8	S-6	50/3"	0.3'	-	GP	d				
18.5	S-7	50/0	0.0'	-		NA				
								20.0		End of drilling at 20.0'


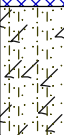
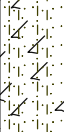












\*\* D = DRY, M = MOIST, W = WET



# BORING LOG

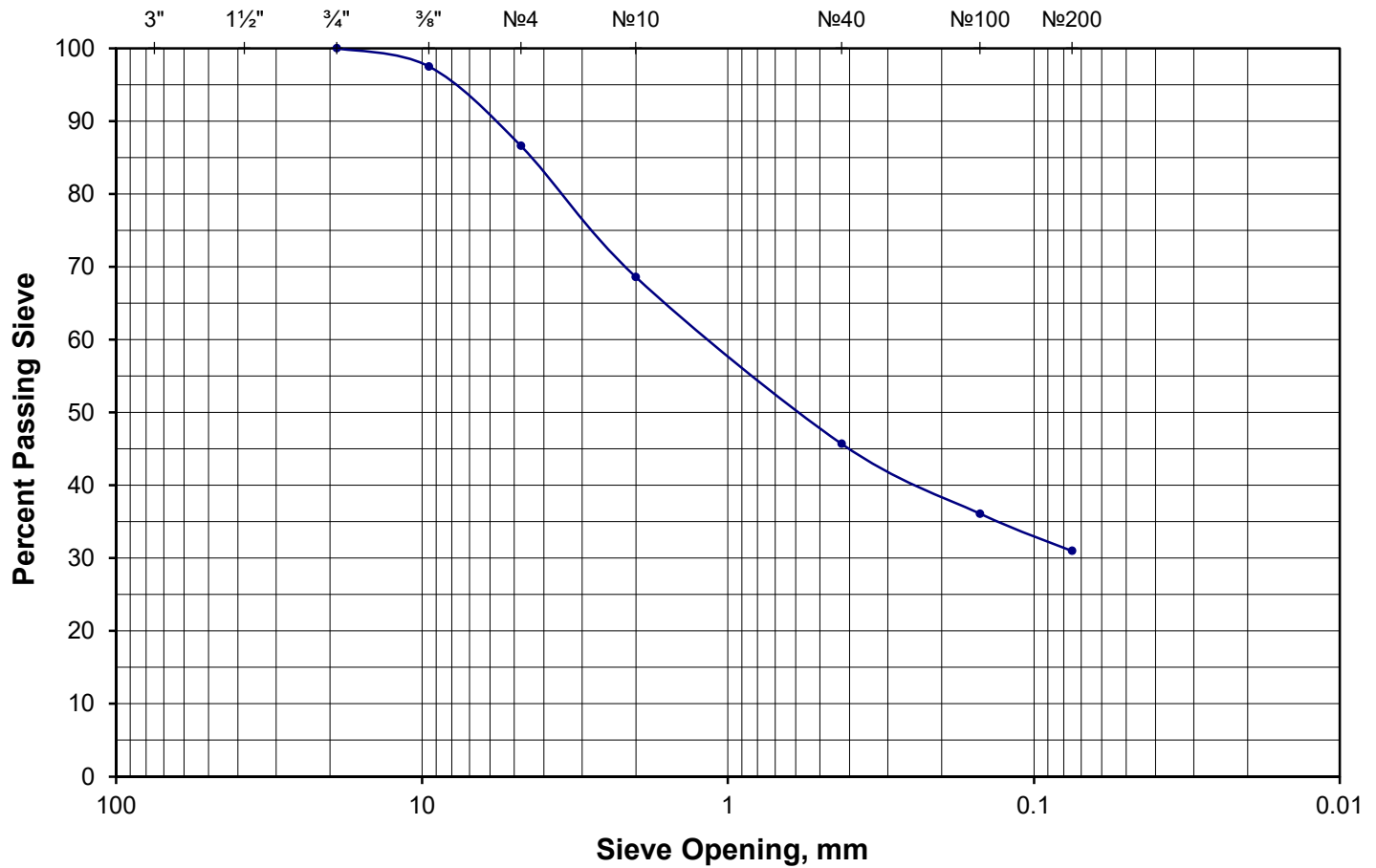
BORING NO. B-5  
SHEET 1 OF 1  
DATE: START 3/22/23  
END 3/22/23  
SURFACE  
ELEV. (FT) 102.0


NOT ENCOUNTERED ☐

DEPTH (FT)	SAMPLE NO./ TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FL)	RECOVERY(%)	ROD (%)	USCS	AASHTO	H <sub>2</sub> O CONTENT	GRAPHIC LOG	DESCRIPTION	REMARKS	
										DEPTH	ELEVATION	
0.0	S-1	4	1.2'	-	GP			m		0.6	101.4	Moderate drilling 0.0' to 3.0'
1.4		11								50/5"	3.0	
3.0	S-2	10	1.8'	-	SW-SM			d		3.0	99.0	Hard drilling 3.0' to 12.5'
5.0		10								11	14	
7.0	S-3	28	1.0'	-	SW-SM			d				
7.3		30								26	18	
8.5	S-4	50/4"	0.3'	-	GP			d				
8.7	S-5	50/2"	0.2'	-	GP			d				
												
												
												
												
												
												
												
												
												
												

\*\* D = DRY, M = MOIST, W = WET

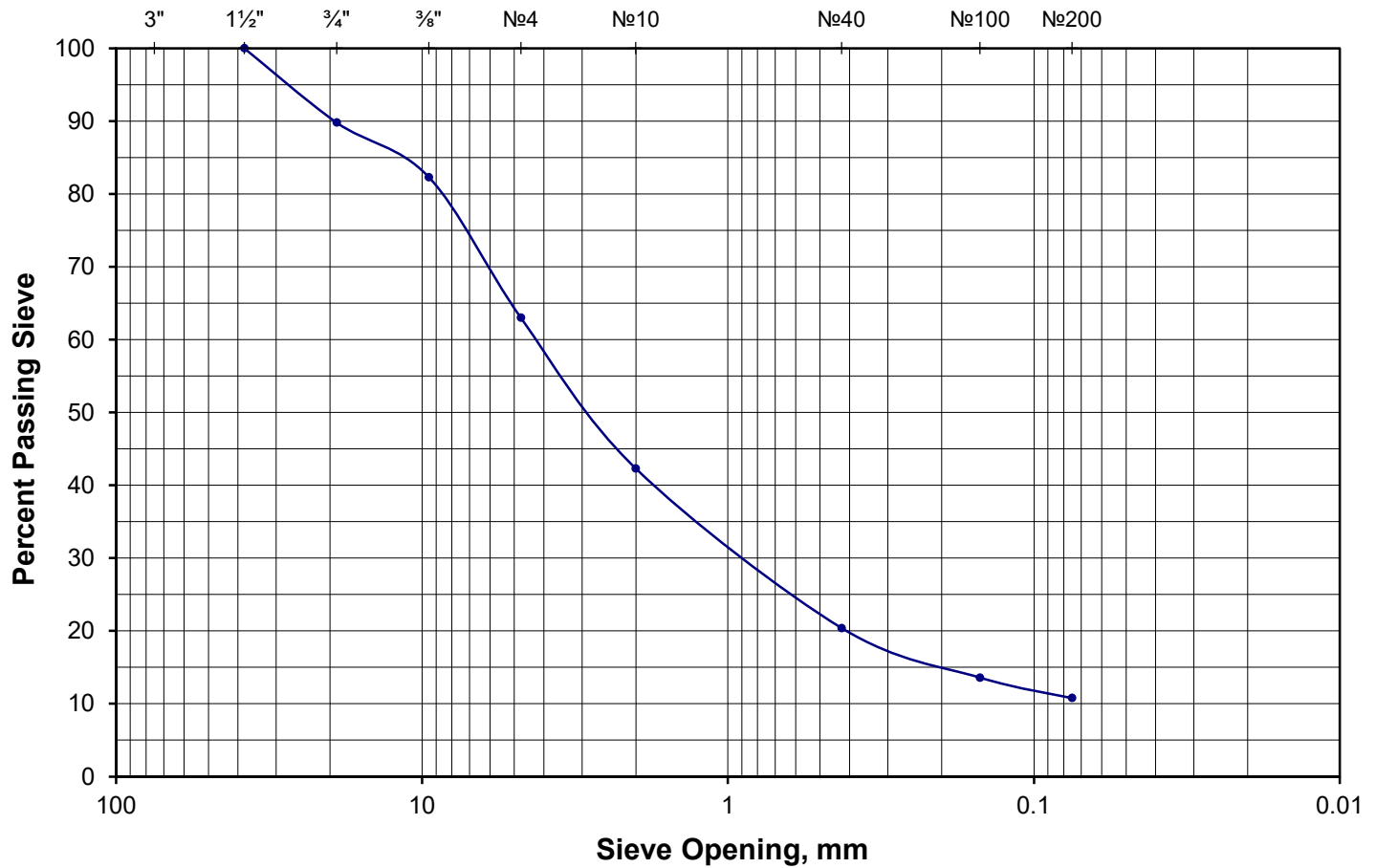
# Particle Size Analysis of Soils




As-rec'd water content: 12.4      moist      Odor: NR			Particle Size					
% Gravel: 13.4      Coarse: 0.0      Fine: 13.4			US Standard Sieve Size		Diameter, % Finer			
% Sand: 55.6      Coarse: 18.0      Medium: 22.9      Fine: 14.7			GRAVEL	Coarse	3"	75		
Gravel description: gray, subangular to subrounded with flat pieces					1½"	38.1		
					¾"	19.0	100.0	
Sand description: gray, including mica, subangular to subrounded				Fine	⅜"	9.5	97.5	
			No 4		4.75	86.6		
Consistency: firm		Hardness: NR		SAND	Coarse	No 10	2.00	68.6
Cementation: NR		Dry Strength: NR			Medium	No 40	0.425	45.7
Structure: homogeneous		Dilatency: NR			Fine	No 100	0.150	36.1
Reaction to HCl: NR		Toughness: NR				No 200	0.075	31.0
USCS Classification: SM, silty sand			Hydrometer Analysis		Clay Size	0.005	NR	
AASHTO Classification: A-2-4					Colloids	0.001	NR	
			G <sub>s</sub> : NR	C <sub>u</sub> : N/A	C <sub>c</sub> : N/A			
Project: 35810.00 - Mary C. Howse Elementary School - INV			LL: NP	PL: NP	PI: NP			
Client: Blackney Hayes Architects			<div>EARTH ENGINEERING INCORPORATED</div> <div>Southern NJ 856-768-1001</div> <div>Central PA 717-697-5701</div> <div>Lehigh Valley 610-967-4540</div> <div>115 W Germantown Pk East Norriton, PA 19401 tel 610-277-0880 fax 610-277-0878</div>					
Sample: B-4, S-2 (18-19-21-38), B-2, S-3 (11-11-12-15), & B-3, S-3 (15-21-30-50/4")								
Depth: 3.0'- 5.0', 4.0'- 6.0', & 4.0'- 6.0'								
Description: Gray-brown silty sand (weathered schist)								
Remarks:								
Classification of Soils, ASTM D 2487-17 / D 2488-09a				March 28, 2023				



# Particle Size Analysis of Soils



As-rec'd water content: 4.1                    moist                    Odor: NR			Particle Size				
% Gravel: 37.0	Coarse: 10.2	Fine: 26.8	US Standard Sieve Size		Diameter,    % Finer		
% Sand: 52.2	Coarse: 20.7	Medium: 21.9    Fine: 9.6	GRAVEL	Coarse	3"	75	
Gravel description: gray, subangular to subrounded with flat pieces		1½"			38.1	100.0	
		¾"			19.0	89.8	
Sand description: gray, including mica, subangular to subrounded		Fine		⅜"	9.5	82.3	
				No 4	4.75	63.0	
Consistency: firm	Hardness: NR		SAND	Coarse	No 10	2.00	42.3
Cementation: NR	Dry Strength: NR			Medium	No 40	0.425	20.4
Structure: homogeneous	Dilatancy: NR			Fine	No 100	0.150	13.6
Reaction to HCl: NR	Toughness: NR				No 200	0.075	10.8
USCS Classification: SW-SM, well-graded sand with silt and gravel				Hydrometer Analysis		Clay Size	0.005
AASHTO Classification: A-1-a			Colloids			0.001	NR
			G <sub>s</sub> : NR	C <sub>u</sub> : 58.6	C <sub>c</sub> : 2.8		
Project: 35810.00 - Mary C. Howse Elementary School - INV			LL: NP	PL: NP	PI: NP		
Client: Blackney Hayes Architects			<div>EARTH ENGINEERING INCORPORATED</div> <div>Southern NJ 856-768-1001</div> <div>Central PA 717-697-5701</div> <div>Lehigh Valley 610-967-4540</div> <div>115 W Germantown Pk East Norriton, PA 19401 tel 610-277-0880 fax 610-277-0878</div>				
Sample: B-5, S-2 (10-10-11-24), & S-3 (28-30-26-18)							
Depth: 3.0'- 5.0' & 5.0'- 7.0'							
Description: Gray to dark gray well-graded sand with silt and gravel (weathered schist)							
Remarks:							
Classification of Soils, ASTM D 2487-17 / D 2488-09a				March 28, 2023			

DOCUMENT 004100.01 - BID FORM - GENERAL CONSTRUCTION

**PROPOSAL NO. GC-1 - GENERAL CONSTRUCTION**

Submitted By:

\_\_\_\_\_  
Bidder's Name

\_\_\_\_\_  
Bidder's Address

\_\_\_\_\_  
County

\_\_\_\_\_  
State

\_\_\_\_\_  
Bidder's Phone No.

\_\_\_\_\_  
Bidder's Fax No.

This proposal is submitted in response to your Invitation to Bid in which Proposals were requested to be submitted for the Project identified as:

**Mary C. Howse Elementary School  
West Chester Area School District  
Chester County, Pennsylvania**

**BASE BID**

Having carefully examined the Contract Documents together with all addenda thereto, all as prepared by **The West Chester Area School District** and being familiar with the various conditions affecting the Work, the undersigned herein agrees to furnish all materials, perform all labor, and do all else necessary to complete the Work in accordance with the Contract Documents for the Base Bid.

**Base Bid – Mary C. Howse Elementary School**

(\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars

(Base Bid Item #1 in words)

**TOTAL LUMP SUM FOR THE BASE BID (\$ \_\_\_\_\_).**

\_\_\_\_\_  
Dollars

(Base Bid in Words)

Accompanying this proposal is the bid security in the form of

\_\_\_\_\_  
in the amount of (\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars.

(Security Amount in Words)

**UNIT PRICING**

We, the Undersigned, agree, if awarded the Contract, to provide additional Work, beyond the allowance quantity, if requested by the Owner, according to the following Schedule of Unit prices:

Unit Price GC-1: Repair floor slab surface and prepare for scheduled floor finishes.

COST PER UNIT: (\$\_\_\_\_\_) / Square Foot

**ALTERNATES**

NONE

The undersigned proposes to complete the Work covered by this Proposal in such time and such manner and in cooperation with all others engaged on the Project, so that all Work will be fully completed by the date stated in Article 9 of the Supplementary Instructions to Bidders

**PERFORMANCE OF WORK BY CONTRACTOR**

The undersigned bidder agrees that if awarded this Contract; the Contractor's own work force shall perform at least ten percent (10%) of the construction work of this Contract.

**SUBMIT THE FOLLOWING WITH THE BID:** The following items shall be submitted with this Bid. Failure to include these items may result in the Bid being declared unresponsive.

- Bid Security
- Non-Collusion Affidavit
- Agreement of Surety guaranteeing issuance of Performance & Payment Bonds
- Contractor's Qualification Statement
- Major Subcontractor's Identification (See Below)

**MAJOR SUBCONTRACTORS**

The undersigned submits this Proposal with the disclosure that the Bid furnished is based upon using the following Major Subcontractors. Bidder shall identify any subcontractor performing more than 25% of the contract amount for his Bid. Failure to identify a subcontractor performing more than 25% of the contract amount will be sufficient reason to declare a bid unresponsive and the bid may be treated as such.

Subcontractor A:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor B:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor C:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

**ADDENDA**

The undersigned hereby acknowledges receipt of, and has included in this Proposal the Work covered by the following Addenda:

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

In submitting this Proposal, it is understood that the unrestricted right is reserved by the Owner to reject any and all proposals, or parts thereof, or to waive any informalities or technicalities in said proposals, and it is agreed that this proposal may not be withdrawn for a period of 60 days, or as provided by Pennsylvania law, from the opening thereof, except as permitted by law.

Should the Owner notify the undersigned of its intention to award a Contract to the undersigned based upon this Proposal the undersigned will furnish properly executed bonds and insurance certificates and will execute the proposed contract within the time and in the forms and amounts required by the Contract Documents, as defined in the Specifications, and that upon his failure, neglect or refusal to do so, he shall forfeit to the Owner, this security accompanying this Proposal, not as a penalty, but as liquidated damages.

In submitting this proposal, it is understood the Contract Documents for this project, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of state and federal laws, including but not limited to, the latest amendments of the following:

Williams-Steiger Occupational Safety & Health Act of 1970, Public Law 91-596;

Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

Part 1518 - Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations;

Regulatory Requirements - Those statutes, laws, and regulations identified in Section 014100 - Regulatory Requirements

The undersigned submits this Proposal with the understanding that he has carefully reviewed all items noted in the Instructions to Bidders and inspected the site prior to Submission of this Bid. Contractor's Qualification Statement & Major Subcontractor Qualification statements shall be submitted prior to submission of Bid or included with the Bid.

The undersigned hereby certifies that this proposal is genuine, and not sham or collusive, or made in the interest of or in behalf of any person, firm or corporation not herein named; that the undersigned has not directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not, in any manner, sought by collusion to secure for himself an advantage over any other bidder.

In witness whereof, the undersigned has caused this Proposal to be executed

this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_\_\_.

INDIVIDUAL

WITNESS: \_\_\_\_\_ (SEAL)

\_\_\_\_\_

\*\*\*\*\*

PARTNERSHIP

WITNESS: \_\_\_\_\_ (Name of Partnership)

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner



\*\*\*\*\*

CORPORATION

\_\_\_\_\_  
(Name of Corporation)

BY \_\_\_\_\_ (SEAL)  
(Vice) President

Attest \_\_\_\_\_ (SEAL)  
(Ass't) Secretary

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Address

The Corporation has been organized and is existing under the laws of the State of \_\_\_\_\_.

END OF DOCUMENT 004100.01

DOCUMENT 004100.02 - BID FORM - MECHANICAL

**PROPOSAL NO. MC-1 – MECHANICAL CONSTRUCTION**

Submitted By:

\_\_\_\_\_  
Bidder's Name

\_\_\_\_\_  
Bidder's Address

\_\_\_\_\_  
County

\_\_\_\_\_  
State

\_\_\_\_\_  
Bidder's Phone No.

\_\_\_\_\_  
Bidder's Fax No.

This proposal is submitted in response to your Invitation to Bid in which Proposals were requested to be submitted for the Project identified as:

**Mary C. Howse Elementary School  
West Chester Area School District  
Chester County, Pennsylvania**

**BASE BID**

Having carefully examined the Contract Documents together with all addenda thereto, all as prepared by **The West Chester Area School District** and being familiar with the various conditions affecting the Work, the undersigned herein agrees to furnish all materials, perform all labor, and do all else necessary to complete the Work in accordance with the Contract Documents for the Base Bid, with the exception of the Alternates listed below.

**Base Bid – Mary C. Howse Elementary School**

(\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars

(Base Bid Item #1 in words)

Accompanying this proposal is the bid security in the form of

\_\_\_\_\_  
in the amount of (\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars.

(Security Amount in Words)

**UNIT PRICING**

NONE

### **ALTERNATES**

Alternate MC-B: State the price to be added to or deducted from the base bid to include the materials and labor to provide underground chiller piping systems manufactured by Aquatherm or Perma-Pipe in lieu of Schedule 40 PVC piping.

Add/Deduct: \_\_\_\_\_ Dollars (\$ \_\_\_\_\_)  
(Please Circle "Add" or "Deduct")

The undersigned proposes to complete the Work covered by this Proposal in such time and such manner and in cooperation with all others engaged on the Project, so that all Work will be fully completed by the date stated in Article 9 of the Supplementary Instructions to Bidders

### **PERFORMANCE OF WORK BY CONTRACTOR**

The undersigned bidder agrees that if awarded this Contract; the Contractor's own work force shall perform at least ten percent (10%) of the construction work of this Contract.

**SUBMIT THE FOLLOWING WITH THE BID:** The following items shall be submitted with this Bid. Failure to include these items may result in the Bid being declared unresponsive.

- Bid Security
- Non-Collusion Affidavit
- Agreement of Surety guaranteeing issuance of Performance & Payment Bonds
- Contractor's Qualification Statement
- Major Subcontractor's Identification (See Below)

### **MAJOR SUBCONTRACTORS**

The undersigned submits this Proposal with the disclosure that the Bid furnished is based upon using the following Major Subcontractors. Bidder shall identify any subcontractor performing more than 25% of the contract amount for his Bid. Failure to identify a subcontractor performing more than 25% of the contract amount will be sufficient reason to declare a bid unresponsive and the bid may be treated as such.

Subcontractor A:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor B:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor C:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

**ADDENDA**

The undersigned hereby acknowledges receipt of, and has included in this Proposal the Work covered by the following Addenda:

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

\_\_\_\_\_\

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

\_\_\_\_\_\

In submitting this Proposal, it is understood that the unrestricted right is reserved by the Owner to reject any and all proposals, or parts thereof, or to waive any informalities or technicalities in said proposals, and it is agreed that this proposal may not be withdrawn for a period of 60 days, or as provided by Pennsylvania law, from the opening thereof, except as permitted by law.

Should the Owner notify the undersigned of its intention to award a Contract to the undersigned based upon this Proposal the undersigned will furnish properly executed bonds and insurance certificates and will execute the proposed contract within the time and in the forms and amounts required by the Contract Documents, as defined in the Specifications, and that upon his failure, neglect or refusal to do so, he shall forfeit to the Owner, this security accompanying this Proposal, not as a penalty, but as liquidated damages.

In submitting this proposal, it is understood the Contract Documents for this project, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of state and federal laws, including but not limited to, the latest amendments of the following:

Williams-Steiger Occupational Safety & Health Act of 1970, Public Law 91-596;

Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

Part 1518 - Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations;

Regulatory Requirements - Those statutes, laws, and regulations identified in Section 014100 - Regulatory Requirements

The undersigned submits this Proposal with the understanding that he has carefully reviewed all items noted in the Instructions to Bidders and inspected the site prior to Submission of this Bid. Contractor's Qualification Statement & Major Subcontractor Qualification statements shall be submitted prior to submission of Bid or included with the Bid.

The undersigned hereby certifies that this proposal is genuine, and not sham or collusive, or made in the interest of or in behalf of any person, firm or corporation not herein named; that the undersigned has not directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not, in any manner, sought by collusion to secure for himself an advantage over any other bidder.

In witness whereof, the undersigned has caused this Proposal to be executed

this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_\_\_.

INDIVIDUAL

WITNESS: \_\_\_\_\_ (SEAL)  
\_\_\_\_\_

\*\*\*\*\*

PARTNERSHIP

WITNESS: \_\_\_\_\_ (Name of Partnership)  
\_\_\_\_\_  
Partner BY \_\_\_\_\_ (SEAL)  
\_\_\_\_\_  
Partner BY \_\_\_\_\_ (SEAL)  
\_\_\_\_\_  
Partner BY \_\_\_\_\_ (SEAL)  
\_\_\_\_\_  
Partner BY \_\_\_\_\_ (SEAL)



\*\*\*\*\*

CORPORATION

\_\_\_\_\_  
(Name of Corporation)

BY \_\_\_\_\_ (SEAL)  
(Vice) President

Attest \_\_\_\_\_ (SEAL)  
(Ass't) Secretary

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Address

The Corporation has been organized and is existing under the laws of the State of \_\_\_\_\_.

END OF DOCUMENT 004100.02

DOCUMENT 004100.03 - BID FORM - PLUMBING

**PROPOSAL NO. PC-1 - PLUMBING CONSTRUCTION**

Submitted By:

\_\_\_\_\_  
Bidder's Name

\_\_\_\_\_  
Bidder's Address

\_\_\_\_\_  
County

\_\_\_\_\_  
State

\_\_\_\_\_  
Bidder's Phone No.

\_\_\_\_\_  
Bidder's Fax No.

This proposal is submitted in response to your Invitation to Bid in which Proposals were requested to be submitted for the Project identified as:

**Mary C. Howse Elementary School  
West Chester Area School District  
Chester County, Pennsylvania**

**BASE BID**

Having carefully examined the Contract Documents together with all addenda thereto, all as prepared by **The West Chester Area School District** and being familiar with the various conditions affecting the Work, the undersigned herein agrees to furnish all materials, perform all labor, and do all else necessary to complete the Work in accordance with the Contract Documents for the Base Bid.

**Base Bid – Mary C. Howse Elementary School**

(\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars

(Base Bid Item #1 in words)

**TOTAL LUMP SUM FOR THE BASE BID (\$ \_\_\_\_\_).**

\_\_\_\_\_  
Dollars

(Base Bid in Words)

Accompanying this proposal is the bid security in the form of

\_\_\_\_\_  
in the amount of (\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars.

(Security Amount in Words)

### **UNIT PRICING**

NONE

### **ALTERNATES**

Alternate PC-A: State the price to be added to or deducted from the base bid to include the materials and labor to remove and replace the existing grease trap interceptor.

Add/Deduct: \_\_\_\_\_ Dollars (\$ \_\_\_\_\_)  
(Please Circle "Add" or "Deduct")

The undersigned proposes to complete the Work covered by this Proposal in such time and such manner and in cooperation with all others engaged on the Project, so that all Work will be fully completed by the date stated in Article 9 of the Supplementary Instructions to Bidders

### **PERFORMANCE OF WORK BY CONTRACTOR**

The undersigned bidder agrees that if awarded this Contract; the Contractor's own work force shall perform at least ten percent (10%) of the construction work of this Contract.

**SUBMIT THE FOLLOWING WITH THE BID:** The following items shall be submitted with this Bid. Failure to include these items may result in the Bid being declared unresponsive.

- Bid Security
- Non-Collusion Affidavit
- Agreement of Surety guaranteeing issuance of Performance & Payment Bonds
- Contractor's Qualification Statement
- Major Subcontractor's Identification (See Below)

### **MAJOR SUBCONTRACTORS**

The undersigned submits this Proposal with the disclosure that the Bid furnished is based upon using the following Major Subcontractors. Bidder shall identify any subcontractor performing more than 25% of the contract amount for his Bid. Failure to identify a subcontractor performing more than 25% of the contract amount will be sufficient reason to declare a bid unresponsive and the bid may be treated as such.

Subcontractor A:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor B:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor C:

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_  
\_\_\_\_\_

**ADDENDA**

The undersigned hereby acknowledges receipt of, and has included in this Proposal the Work covered by the following Addenda:

Addendum No.\ Dated

\_\_\_\_\_\\_\_\_\_\_  
\_\_\_\_\_\\_\_\_\_\_

Addendum No.\ Dated

\_\_\_\_\_\\_\_\_\_\_  
\_\_\_\_\_\\_\_\_\_\_

In submitting this Proposal, it is understood that the unrestricted right is reserved by the Owner to reject any and all proposals, or parts thereof, or to waive any informalities or technicalities in said proposals, and it is agreed that this proposal may not be withdrawn for a period of 60 days, or as provided by Pennsylvania law, from the opening thereof, except as permitted by law.

Should the Owner notify the undersigned of its intention to award a Contract to the undersigned based upon this Proposal the undersigned will furnish properly executed bonds and insurance certificates and will execute the proposed contract within the time and in the forms and amounts required by the Contract Documents, as defined in the Specifications, and that upon his failure, neglect or refusal to do so, he shall forfeit to the Owner, this security accompanying this Proposal, not as a penalty, but as liquidated damages.

In submitting this proposal, it is understood the Contract Documents for this project, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of state and federal laws, including but not limited to, the latest amendments of the following:

Williams-Steiger Occupational Safety & Health Act of 1970, Public Law 91-596;

Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

Part 1518 - Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations;

Regulatory Requirements - Those statutes, laws, and regulations identified in Section 014100 -  
Regulatory Requirements

The undersigned submits this Proposal with the understanding that he has carefully reviewed all items noted in the Instructions to Bidders and inspected the site prior to Submission of this Bid. Contractor's Qualification Statement & Major Subcontractor Qualification statements shall be submitted prior to submission of Bid or included with the Bid.

The undersigned hereby certifies that this proposal is genuine, and not sham or collusive, or made in the interest of or in behalf of any person, firm or corporation not herein named; that the undersigned has not

directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not, in any manner, sought by collusion to secure for himself an advantage over any other bidder.

In witness whereof, the undersigned has caused this Proposal to be executed

this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_\_\_.

INDIVIDUAL

\_\_\_\_\_(SEAL)  
WITNESS:

\_\_\_\_\_

\*\*\*\*\*

PARTNERSHIP

\_\_\_\_\_  
(Name of Partnership)

WITNESS:

\_\_\_\_\_  
Partner BY \_\_\_\_\_(SEAL)

\_\_\_\_\_  
Partner BY \_\_\_\_\_(SEAL)

\_\_\_\_\_  
Partner BY \_\_\_\_\_(SEAL)

\_\_\_\_\_  
Partner BY \_\_\_\_\_(SEAL)



\*\*\*\*\*

CORPORATION

\_\_\_\_\_  
(Name of Corporation)

BY \_\_\_\_\_ (SEAL)  
(Vice) President

Attest \_\_\_\_\_ (SEAL)  
(Ass't) Secretary

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Address

The Corporation has been organized and is existing under the laws of the State of \_\_\_\_\_ .

END OF DOCUMENT 004100.03

DOCUMENT 004100.04 - BID FORM - ELECTRICAL

**PROPOSAL NO. EC-1 - ELECTRICAL CONSTRUCTION**

Submitted By:

\_\_\_\_\_  
Bidder's Name

\_\_\_\_\_  
Bidder's Address

\_\_\_\_\_  
County

\_\_\_\_\_  
State

\_\_\_\_\_  
Bidder's Phone No.

\_\_\_\_\_  
Bidder's Fax No.

This proposal is submitted in response to your Invitation to Bid in which Proposals were requested to be submitted for the Project identified as:

**Mary C. Howse Elementary School  
West Chester Area School District  
Chester County, Pennsylvania**

**BASE BID**

Having carefully examined the Contract Documents together with all addenda thereto, all as prepared by **The West Chester Area School District** and being familiar with the various conditions affecting the Work, the undersigned herein agrees to furnish all materials, perform all labor, and do all else necessary to complete the Work in accordance with the Contract Documents for the Base Bid.

**Base Bid – Mary C. Howse Elementary School**

(\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars

(Base Bid Item #1 in words)

**TOTAL LUMP SUM FOR THE BASE BID (\$ \_\_\_\_\_).**

\_\_\_\_\_  
Dollars

(Base Bid in Words)

Accompanying this proposal is the bid security in the form of

\_\_\_\_\_  
in the amount of (\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars.

(Security Amount in Words)

### **UNIT PRICING**

NONE

### **ALTERNATES**

Alternate EC-C: State the price to be added to or deducted from the base bid to include the materials and labor to provide Siemens Cerebrus Fire Alarm system installed by a licensed 3rd party.

Add/Deduct: \_\_\_\_\_ Dollars (\$ \_\_\_\_\_)  
(Please Circle "Add" or "Deduct")

Alternate EC-D: State the price to be added to or deducted from the base bid to include the materials and labor provide Simplex/JCI 4100 ES Fire Alarm system installed by Simplex.

Add/Deduct: \_\_\_\_\_ Dollars (\$ \_\_\_\_\_)  
(Please Circle "Add" or "Deduct")

The undersigned proposes to complete the Work covered by this Proposal in such time and such manner and in cooperation with all others engaged on the Project, so that all Work will be fully completed by the date stated in Article 9 of the Supplementary Instructions to Bidders

### **PERFORMANCE OF WORK BY CONTRACTOR**

The undersigned bidder agrees that if awarded this Contract; the Contractor's own work force shall perform at least ten percent (10%) of the construction work of this Contract.

**SUBMIT THE FOLLOWING WITH THE BID:** The following items shall be submitted with this Bid. Failure to include these items may result in the Bid being declared unresponsive.

- Bid Security
- Non-Collusion Affidavit
- Agreement of Surety guaranteeing issuance of Performance & Payment Bonds
- Contractor's Qualification Statement
- Major Subcontractor's Identification (See Below)

### **MAJOR SUBCONTRACTORS**

The undersigned submits this Proposal with the disclosure that the Bid furnished is based upon using the following Major Subcontractors. Bidder shall identify any subcontractor performing more than 25% of the contract amount for his Bid. Failure to identify a subcontractor performing more than 25% of the contract amount will be sufficient reason to declare a bid unresponsive and the bid may be treated as such.

Subcontractor A:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor B:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor C:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

**ADDENDA**

The undersigned hereby acknowledges receipt of, and has included in this Proposal the Work covered by the following Addenda:

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

In submitting this Proposal, it is understood that the unrestricted right is reserved by the Owner to reject any and all proposals, or parts thereof, or to waive any informalities or technicalities in said proposals, and it is agreed that this proposal may not be withdrawn for a period of 60 days, or as provided by Pennsylvania law, from the opening thereof, except as permitted by law.

Should the Owner notify the undersigned of its intention to award a Contract to the undersigned based upon this Proposal the undersigned will furnish properly executed bonds and insurance certificates and will execute the proposed contract within the time and in the forms and amounts required by the Contract Documents, as defined in the Specifications, and that upon his failure, neglect or refusal to do so, he shall forfeit to the Owner, this security accompanying this Proposal, not as a penalty, but as liquidated damages.

In submitting this proposal, it is understood the Contract Documents for this project, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of state and federal laws, including but not limited to, the latest amendments of the following:

Williams-Steiger Occupational Safety & Health Act of 1970, Public Law 91-596;

Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

Part 1518 - Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations;

Regulatory Requirements - Those statutes, laws, and regulations identified in Section 014100 -  
Regulatory Requirements

The undersigned submits this Proposal with the understanding that he has carefully reviewed all items noted in the Instructions to Bidders and inspected the site prior to Submission of this Bid. Contractor's

Qualification Statement & Major Subcontractor Qualification statements shall be submitted prior to submission of Bid or included with the Bid.

The undersigned hereby certifies that this proposal is genuine, and not sham or collusive, or made in the interest of or in behalf of any person, firm or corporation not herein named; that the undersigned has not directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not, in any manner, sought by collusion to secure for himself an advantage over any other bidder.

In witness whereof, the undersigned has caused this Proposal to be executed

this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_\_\_.

INDIVIDUAL

WITNESS: \_\_\_\_\_ (SEAL)

\_\_\_\_\_

\*\*\*\*\*

PARTNERSHIP

WITNESS: \_\_\_\_\_ (Name of Partnership)

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner



\_\_\_\_\_  
Partner

BY \_\_\_\_\_ (SEAL)

\*\*\*\*\*

CORPORATION

\_\_\_\_\_  
(Name of Corporation)

BY \_\_\_\_\_ (SEAL)  
(Vice) President

Attest  
\_\_\_\_\_  
(Ass't) Secretary

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Address

The Corporation has been organized and is existing under the laws of the State of

\_\_\_\_\_.

END OF DOCUMENT 004100.04

DOCUMENT 004100.05 - BID FORM - SPRINKLER

**PROPOSAL NO. SPC-1 – SPRINKLER CONSTRUCTION**

Submitted By:

\_\_\_\_\_  
Bidder's Name

\_\_\_\_\_  
Bidder's Address

\_\_\_\_\_  
County

\_\_\_\_\_  
State

\_\_\_\_\_  
Bidder's Phone No.

\_\_\_\_\_  
Bidder's Fax No.

This proposal is submitted in response to your Invitation to Bid in which Proposals were requested to be submitted for the Project identified as:

**Mary C. Howse Elementary School  
West Chester Area School District  
Chester County, Pennsylvania**

**BASE BID**

Having carefully examined the Contract Documents together with all addenda thereto, all as prepared by **The West Chester Area School District** and being familiar with the various conditions affecting the Work, the undersigned herein agrees to furnish all materials, perform all labor, and do all else necessary to complete the Work in accordance with the Contract Documents for the Base Bid.

**Base Bid – Mary C. Howse Elementary School**

(\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars

(Base Bid Item #1 in words)

**TOTAL LUMP SUM FOR THE BASE BID (\$ \_\_\_\_\_).**

\_\_\_\_\_  
Dollars

(Base Bid in Words)

Accompanying this proposal is the bid security in the form of

\_\_\_\_\_  
in the amount of (\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars.

(Security Amount in Words)

**UNIT PRICING**

NONE

**ALTERNATES**

NONE

The undersigned proposes to complete the Work covered by this Proposal in such time and such manner and in cooperation with all others engaged on the Project, so that all Work will be fully completed by the date stated in Article 9 of the Supplementary Instructions to Bidders

**PERFORMANCE OF WORK BY CONTRACTOR**

The undersigned bidder agrees that if awarded this Contract; the Contractor's own work force shall perform at least ten percent (10%) of the construction work of this Contract.

**SUBMIT THE FOLLOWING WITH THE BID:** The following items shall be submitted with this Bid. Failure to include these items may result in the Bid being declared unresponsive.

- Bid Security
- Non-Collusion Affidavit
- Agreement of Surety guaranteeing issuance of Performance & Payment Bonds
- Contractor's Qualification Statement
- Major Subcontractor's Identification (See Below)

**MAJOR SUBCONTRACTORS**

The undersigned submits this Proposal with the disclosure that the Bid furnished is based upon using the following Major Subcontractors. Bidder shall identify any subcontractor performing more than 25% of the contract amount for his Bid. Failure to identify a subcontractor performing more than 25% of the contract amount will be sufficient reason to declare a bid unresponsive and the bid may be treated as such.

Subcontractor A:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor B:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor C:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

**ADDENDA**

The undersigned hereby acknowledges receipt of, and has included in this Proposal the Work covered by the following Addenda:

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

In submitting this Proposal, it is understood that the unrestricted right is reserved by the Owner to reject any and all proposals, or parts thereof, or to waive any informalities or technicalities in said proposals, and it is agreed that this proposal may not be withdrawn for a period of 60 days, or as provided by Pennsylvania law, from the opening thereof, except as permitted by law.

Should the Owner notify the undersigned of its intention to award a Contract to the undersigned based upon this Proposal the undersigned will furnish properly executed bonds and insurance certificates and will execute the proposed contract within the time and in the forms and amounts required by the Contract Documents, as defined in the Specifications, and that upon his failure, neglect or refusal to do so, he shall forfeit to the Owner, this security accompanying this Proposal, not as a penalty, but as liquidated damages.

In submitting this proposal, it is understood the Contract Documents for this project, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of state and federal laws, including but not limited to, the latest amendments of the following:

Williams-Steiger Occupational Safety & Health Act of 1970, Public Law 91-596;

Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

Part 1518 - Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations;

Regulatory Requirements - Those statutes, laws, and regulations identified in Section 014100 -  
Regulatory Requirements

The undersigned submits this Proposal with the understanding that he has carefully reviewed all items noted in the Instructions to Bidders and inspected the site prior to Submission of this Bid. Contractor's Qualification Statement & Major Subcontractor Qualification statements shall be submitted prior to submission of Bid or included with the Bid.

The undersigned hereby certifies that this proposal is genuine, and not sham or collusive, or made in the interest of or in behalf of any person, firm or corporation not herein named; that the undersigned has not directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not, in any manner, sought by collusion to secure for himself an advantage over any other bidder.

In witness whereof, the undersigned has caused this Proposal to be executed

this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_.

INDIVIDUAL

WITNESS: \_\_\_\_\_ (SEAL)

\_\_\_\_\_

\*\*\*\*\*

PARTNERSHIP

WITNESS: \_\_\_\_\_ (Name of Partnership)

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\*\*\*\*\*



CORPORATION

\_\_\_\_\_  
(Name of Corporation)

BY \_\_\_\_\_ (SEAL)  
(Vice) President

Attest \_\_\_\_\_ (SEAL)  
(Ass't) Secretary

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Address

The Corporation has been organized and is existing under the laws of the State of

\_\_\_\_\_.

END OF DOCUMENT 004100.05

DOCUMENT 004100.06 - BID FORM - SITEWORK

**PROPOSAL NO. SC-1 – SITE CONSTRUCTION**

Submitted By:

\_\_\_\_\_  
Bidder's Name

\_\_\_\_\_  
Bidder's Address

\_\_\_\_\_  
County

\_\_\_\_\_  
State

\_\_\_\_\_  
Bidder's Phone No.

\_\_\_\_\_  
Bidder's Fax No.

This proposal is submitted in response to your Invitation to Bid in which Proposals were requested to be submitted for the Project identified as:

**Mary C. Howse Elementary School  
West Chester Area School District  
Chester County, Pennsylvania**

**BASE BID**

Having carefully examined the Contract Documents together with all addenda thereto, all as prepared by **The West Chester Area School District** and being familiar with the various conditions affecting the Work, the undersigned herein agrees to furnish all materials, perform all labor, and do all else necessary to complete the Work in accordance with the Contract Documents for the Base Bid.

**Base Bid – Mary C. Howse Elementary School**

(\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars

(Base Bid Item #1 in words)

**TOTAL LUMP SUM FOR THE BASE BID (\$ \_\_\_\_\_).**

\_\_\_\_\_  
Dollars

(Base Bid in Words)

Accompanying this proposal is the bid security in the form of

\_\_\_\_\_  
in the amount of (\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars.

(Security Amount in Words)

**UNIT PRICING**

NONE

**ALTERNATES**

NONE

The undersigned proposes to complete the Work covered by this Proposal in such time and such manner and in cooperation with all others engaged on the Project, so that all Work will be fully completed by the date stated in Article 9 of the Supplementary Instructions to Bidders

**PERFORMANCE OF WORK BY CONTRACTOR**

The undersigned bidder agrees that if awarded this Contract; the Contractor's own work force shall perform at least ten percent (10%) of the construction work of this Contract.

**SUBMIT THE FOLLOWING WITH THE BID:** The following items shall be submitted with this Bid. Failure to include these items may result in the Bid being declared unresponsive.

- Bid Security
- Non-Collusion Affidavit
- Agreement of Surety guaranteeing issuance of Performance & Payment Bonds
- Contractor's Qualification Statement
- Major Subcontractor's Identification (See Below)

**MAJOR SUBCONTRACTORS**

The undersigned submits this Proposal with the disclosure that the Bid furnished is based upon using the following Major Subcontractors. Bidder shall identify any subcontractor performing more than 25% of the contract amount for his Bid. Failure to identify a subcontractor performing more than 25% of the contract amount will be sufficient reason to declare a bid unresponsive and the bid may be treated as such.

Subcontractor A:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor B:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor C:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

**ADDENDA**

The undersigned hereby acknowledges receipt of, and has included in this Proposal the Work covered by the following Addenda:

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

In submitting this Proposal, it is understood that the unrestricted right is reserved by the Owner to reject any and all proposals, or parts thereof, or to waive any informalities or technicalities in said proposals, and it is agreed that this proposal may not be withdrawn for a period of 60 days, or as provided by Pennsylvania law, from the opening thereof, except as permitted by law.

Should the Owner notify the undersigned of its intention to award a Contract to the undersigned based upon this Proposal the undersigned will furnish properly executed bonds and insurance certificates and will execute the proposed contract within the time and in the forms and amounts required by the Contract Documents, as defined in the Specifications, and that upon his failure, neglect or refusal to do so, he shall forfeit to the Owner, this security accompanying this Proposal, not as a penalty, but as liquidated damages.

In submitting this proposal, it is understood the Contract Documents for this project, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of state and federal laws, including but not limited to, the latest amendments of the following:

Williams-Steiger Occupational Safety & Health Act of 1970, Public Law 91-596;

Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

Part 1518 - Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations;

Regulatory Requirements - Those statutes, laws, and regulations identified in Section 014100 - Regulatory Requirements

The undersigned submits this Proposal with the understanding that he has carefully reviewed all items noted in the Instructions to Bidders and inspected the site prior to Submission of this Bid. Contractor's Qualification Statement & Major Subcontractor Qualification statements shall be submitted prior to submission of Bid or included with the Bid.

The undersigned hereby certifies that this proposal is genuine, and not sham or collusive, or made in the interest of or in behalf of any person, firm or corporation not herein named; that the undersigned has not directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not, in any manner, sought by collusion to secure for himself an advantage over any other bidder.

In witness whereof, the undersigned has caused this Proposal to be executed

this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_.

INDIVIDUAL

WITNESS: \_\_\_\_\_ (SEAL)

\_\_\_\_\_

\*\*\*\*\*

PARTNERSHIP

WITNESS: \_\_\_\_\_ (Name of Partnership)

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\*\*\*\*\*



CORPORATION

\_\_\_\_\_  
(Name of Corporation)

BY \_\_\_\_\_ (SEAL)  
(Vice) President

Attest \_\_\_\_\_ (SEAL)  
(Ass't) Secretary

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Address

The Corporation has been organized and is existing under the laws of the State of

\_\_\_\_\_.

END OF DOCUMENT 004100.06

DOCUMENT 004100.07 - BID FORM - ROOFING

**PROPOSAL NO. RC-1 – ROOFING**

Submitted By:

\_\_\_\_\_  
Bidder's Name

\_\_\_\_\_  
Bidder's Address

\_\_\_\_\_  
County

\_\_\_\_\_  
State

\_\_\_\_\_  
Bidder's Phone No.

\_\_\_\_\_  
Bidder's Fax No.

This proposal is submitted in response to your Invitation to Bid in which Proposals were requested to be submitted for the Project identified as:

**Mary C. Howse Elementary School  
West Chester Area School District  
Chester County, Pennsylvania**

**BASE BID**

Having carefully examined the Contract Documents together with all addenda thereto, all as prepared by **The West Chester Area School District** and being familiar with the various conditions affecting the Work, the undersigned herein agrees to furnish all materials, perform all labor, and do all else necessary to complete the Work in accordance with the Contract Documents for the Base Bid.

**Base Bid – Mary C. Howse Elementary School**

(\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars

(Base Bid Item #1 in words)

**TOTAL LUMP SUM FOR THE BASE BID (\$ \_\_\_\_\_).**

\_\_\_\_\_  
Dollars

(Base Bid in Words)

Accompanying this proposal is the bid security in the form of

\_\_\_\_\_  
in the amount of (\$ \_\_\_\_\_)

\_\_\_\_\_  
Dollars.

(Security Amount in Words)

**UNIT PRICING**

NONE

**ALTERNATES**

NONE

The undersigned proposes to complete the Work covered by this Proposal in such time and such manner and in cooperation with all others engaged on the Project, so that all Work will be fully completed by the date stated in Article 9 of the Supplementary Instructions to Bidders

**PERFORMANCE OF WORK BY CONTRACTOR**

The undersigned bidder agrees that if awarded this Contract; the Contractor's own work force shall perform at least ten percent (10%) of the construction work of this Contract.

**SUBMIT THE FOLLOWING WITH THE BID:** The following items shall be submitted with this Bid. Failure to include these items may result in the Bid being declared unresponsive.

- Bid Security
- Non-Collusion Affidavit
- Agreement of Surety guaranteeing issuance of Performance & Payment Bonds
- Contractor's Qualification Statement
- Major Subcontractor's Identification (See Below)

**MAJOR SUBCONTRACTORS**

The undersigned submits this Proposal with the disclosure that the Bid furnished is based upon using the following Major Subcontractors. Bidder shall identify any subcontractor performing more than 25% of the contract amount for his Bid. Failure to identify a subcontractor performing more than 25% of the contract amount will be sufficient reason to declare a bid unresponsive and the bid may be treated as such.

Subcontractor A:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor B:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

Subcontractor C:

Company Name: \_\_\_\_\_  
Company Address: \_\_\_\_\_  
\_\_\_\_\_

**ADDENDA**

The undersigned hereby acknowledges receipt of, and has included in this Proposal the Work covered by the following Addenda:

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

Addendum No.\ Dated

\_\_\_\_\_\

\_\_\_\_\_\

In submitting this Proposal, it is understood that the unrestricted right is reserved by the Owner to reject any and all proposals, or parts thereof, or to waive any informalities or technicalities in said proposals, and it is agreed that this proposal may not be withdrawn for a period of 60 days, or as provided by Pennsylvania law, from the opening thereof, except as permitted by law.

Should the Owner notify the undersigned of its intention to award a Contract to the undersigned based upon this Proposal the undersigned will furnish properly executed bonds and insurance certificates and will execute the proposed contract within the time and in the forms and amounts required by the Contract Documents, as defined in the Specifications, and that upon his failure, neglect or refusal to do so, he shall forfeit to the Owner, this security accompanying this Proposal, not as a penalty, but as liquidated damages.

In submitting this proposal, it is understood the Contract Documents for this project, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of state and federal laws, including but not limited to, the latest amendments of the following:

Williams-Steiger Occupational Safety & Health Act of 1970, Public Law 91-596;

Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

Part 1518 - Safety and Health Regulations for Construction, Chapter XIII of Title 29, Code of Federal Regulations;

Regulatory Requirements - Those statutes, laws, and regulations identified in Section 014100 - Regulatory Requirements

The undersigned submits this Proposal with the understanding that he has carefully reviewed all items noted in the Instructions to Bidders and inspected the site prior to Submission of this Bid. Contractor's Qualification Statement & Major Subcontractor Qualification statements shall be submitted prior to submission of Bid or included with the Bid.

The undersigned hereby certifies that this proposal is genuine, and not sham or collusive, or made in the interest of or in behalf of any person, firm or corporation not herein named; that the undersigned has not directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not, in any manner, sought by collusion to secure for himself an advantage over any other bidder.

In witness whereof, the undersigned has caused this Proposal to be executed

this \_\_\_\_\_ day of \_\_\_\_\_, 202\_\_.

INDIVIDUAL

WITNESS: \_\_\_\_\_ (SEAL)

\_\_\_\_\_

\*\*\*\*\*

PARTNERSHIP

WITNESS: \_\_\_\_\_  
(Name of Partnership)

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\_\_\_\_\_ BY \_\_\_\_\_ (SEAL)  
Partner

\*\*\*\*\*

CORPORATION

\_\_\_\_\_  
(Name of Corporation)

BY \_\_\_\_\_ (SEAL)  
(Vice) President

Attest \_\_\_\_\_ (SEAL)  
(Ass't) Secretary

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Address

The Corporation has been organized and is existing under the laws of the State of

\_\_\_\_\_  
END OF DOCUMENT 004100.06



DOCUMENT 004313 - BID SECURITY FORM

KNOW ALL MEN BY THESE PRESENTS that we

\_\_\_\_\_, a  
(Insert full and correct legal name of bidder.)

\_\_\_\_\_, of  
(As appropriate, insert: "Individual trading as", "Partnership known as", or "Corporation organized and  
existing under the laws of the State of \_\_\_\_\_.")

\_\_\_\_\_  
(Insert complete address)  
(the "Principal"),

and \_\_\_\_\_

a corporation organized and existing under the laws of the State of \_\_\_\_\_  
(the "Surety"),

are held and firmly bound unto the **West Chester Area School District** as obligee (the "Obligee"),  
in the full and just sum of

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_),

lawful money of the United States of America, for the payment of which we bind ourselves, our heirs,  
executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WITNESSETH:

WHEREAS, the Principal is herewith submitting to the Obligee a certain bid or proposal,  
attached hereto, dated as of

\_\_\_\_\_, 20\_\_\_\_ (the "Proposal"),

to perform \_\_\_\_\_ (insert contract type) Construction work for the Obligee,  
in connection with the construction of

**MARY C. HOWSE ELEMENTARY SCHOOL**

pursuant to plans, specifications and other related documents, which are incorporated into the Proposal by  
reference (the "Contract Documents"), as prepared by Blackney Hayes Architects, Philadelphia, PA.

NOW THEREFORE, the terms and conditions of this Bond are and shall be that:

- (a) If the Proposal is rejected or, in the alternative;

- (i) If the Obligee shall give notice to the Principal of intent to award the Contract for said construction in the form and manner provided for in the Contract Documents, receive from the Principal the Payment and Performance Bonds required by the Contract Documents; and
- (ii) If the Obligee shall award said Contract to the Principal and the Principal shall, within the time and in the form and manner provided for in the Contract Documents, properly execute and deliver to the Obligee the required Contract Documents,

THEN, this Bond shall be void;

OTHERWISE this Bond shall be and shall remain in full force and effect.

The Surety for value received hereby stipulates and agrees that the obligations of said Surety and of this Bond shall in no way be impaired or affected by any extensions agreed to by the Principal of the time within which the Obligee may accept the Proposal and the Surety hereby waives all right to receive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have caused this Bond to be signed, sealed and

delivered as of the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.\*

\*Bid Bond should be dated same as the date of the related proposal.

EXECUTION by INDIVIDUAL (Principal):

Type or Print Name:

\_\_\_\_\_

Witness: Trading As: \_\_\_\_\_

Sign: \_\_\_\_\_ (SEAL)

\_\_\_\_\_

EXECUTION of PARTNERSHIP:

Type or Print Partnership Name:

\_\_\_\_\_

Witness:

\_\_\_\_\_ BY: \_\_\_\_\_ (SEAL)  
Partner  
\_\_\_\_\_  
(Typed Name/Title)

\_\_\_\_\_ BY: \_\_\_\_\_ (SEAL)  
Partner  
\_\_\_\_\_  
(Typed Name/Title)

\_\_\_\_\_ BY: \_\_\_\_\_ (SEAL)  
Partner  
\_\_\_\_\_  
(Typed Name/Title)

\_\_\_\_\_ BY: \_\_\_\_\_ (SEAL)  
Partner  
\_\_\_\_\_  
(Typed Name/Title)

-----

EXECUTION by CORPORATION:

Type or Print Corporate Name:

\_\_\_\_\_

CORPORATE SEAL

Attest: By: \_\_\_\_\_ (Vice)President

\_\_\_\_\_  
(Typed Name)

\_\_\_\_\_  
(Assistant) Secretary

-----

EXECUTION by SURETY:

Type or Print Surety Name: \_\_\_\_\_

Witness:

\_\_\_\_\_ BY: \_\_\_\_\_  
Attorney-in-fact

CORPORATE SEAL

Appropriate power-of-attorney, dated date of Bond, evidencing authority of Attorney-in-fact to act for Surety must be attached.

Include separate information sheet indicating agent name, physical address, phone and facsimile number.

THE SURETY EXECUTING THIS BOND MUST BE LEGALLY AUTHORIZED TO DO BUSINESS  
IN THE COMMONWEALTH OF PENNSYLVANIA.

END OF DOCUMENT 004313

DOCUMENT 004513 - BIDDER'S QUALIFICATIONS

1. Provision of the information required by the Bidder's Proof of Competency Section is required.
  - A. The bidder is advised that failure to complete or misstating of items required by this section may be sufficient basis for disqualification of bidder and rejection of his bid. The Owner will investigate the low bidder's information for full disclosure before a contract is awarded.
  - B. Bidders are required to provide references, as follows, as well as execution of a Statement of Release of Liability of respondents to inquiries concerning the bidder from the School District or its representative.
  - C. A bidder's failure in the past to have timely completed the work of a project within the contract time may subject the bidder to disqualification and rejection of his bid. Bidders may not have any school project within the last three (3) years that was completed or remains incomplete more than three (3) months beyond contract required substantial completion date.
  - D. A bidder's failure in the past to have satisfactorily completed the work of a project in accordance with the construction contract documents may subject the bidder to disqualification and rejection of his bid.
  - E. A bidder who was awarded a construction contract which was terminated by the Owner for cause may be subject to disqualification and rejection of his bid.
  - F. A bidder who was awarded a construction contract and whose contract with the Owner was terminated by default of the bidder may be subject to disqualification and rejection of his bid.
  - G. A bidder on whose Performance Bond, provided for the benefit of Owner, a claim was made and paid or otherwise adjusted by Surety may be subject to disqualification and rejection of his bid.
  - H. A bidder who has not prior, satisfactory experience completing at least three (3) school construction projects in which they provided similar work may be subject to disqualification and rejection of his bid.
  - I. Where a bidder has been involved on a construction project on which a significant delay of 3 months or greater has existed between the contract date for substantial completion and the issuance of a Certificate of Substantial Completion for the bidder's work, the bidder may be subject to disqualification and rejection of his bid.
  - J. A bidder who has otherwise failed to fully comply with federal, state, or local statutes, ordinances, or regulations applicable to a Pennsylvania public school district construction project may be subject to disqualification and rejection of his bid.
  - K. A bidder who has filed for bankruptcy, or who has been involuntarily placed into bankruptcy by his creditors shall be subject to disqualification and rejection of his bid. This provision shall encompass predecessor corporation, partnerships, individuals or other entities and reach of the principals involved in the bidding corporation, partnership or other entity.

- L. A bidder who has been convicted by any state or federal court of a crime relating to his prosecution of a public works project in any jurisdiction within the United States, may be subject to disqualification and rejection of his bid. This provision shall apply to the entity submitting the bid as well as each of the principals involved in the bidding corporation, partnership or other entity.
  - M. A bidder who has a significant history of insurance claims paid shall be subject to disqualification and rejection of his bid.
2. Bidders Responsibility: (AIA 305 Format Acceptable)
- A. It is each bidder's responsibility to demonstrate his competency. Accordingly, as part of his bid, each bidder shall furnish to the Owner the following information and materials:
    - i. Three (3) project owner references, including names, addresses, telephone numbers and contact persons.
    - ii. Six (6) project architect references, including their names, addresses, telephone numbers and contact persons.
    - iii. A current audited financial statement (not a review statement) provided, however, that the Owner will respect a bidders' request that the audited financial statement need not be provided until, if ever, it is determined that the bidder is one of the three (3) apparent lowest responsible bidders, and will maintain the confidentiality of such information to the extent permitted by law.
    - iv. A listing of work in progress or under contract stating the following:
      - (1) amount of original contract
      - (2) amount of change orders to date
      - (3) required substantial completion date
      - (4) estimated date of substantial completion
      - (5) percentage of work completed
      - (6) name, address, telephone number and contact person of the engineer and owner
    - v. A listing of all public school work completed or in progress during the last three (3) years stating the following:
      - (1) amount of original contract
      - (2) amount of change orders and percentage to total bid
      - (3) required substantial completion date
      - (4) estimated date of substantial completion
      - (5) date of final payment or percentage of work completed
      - (6) name, address, telephone number and contact person of the engineer and school district's superintendent
    - vi. A statement of whether the bidder, whether as a principal or officer of any predecessor or current entity has defaulted or failed to complete a construction project within the previous six (6) calendar years, and, if so, including information as to:
      - (1) the project
      - (2) the project owner
      - (3) the architect and construction manager
      - (4) the circumstances of default



- (5) a listing of all claims made against bonds issued for the bidders' performance, labor and material payment, or maintenance within the past six (6) years, identifying:
    - (a) the project and project owner
    - (b) the surety
    - (c) the claimant
- vii. A listing of all claims made against the bidder's general liability insurance policies, and paid by bidder's insurance carriers resulting out of construction projects on which the bidder was awarded a contract within the past six (6) years, identifying:
  - (1) the project and project owner
  - (2) the type of insurance
  - (3) the claimant
- viii. A listing of all arbitration proceedings or court proceedings completed or in progress during the last six (6) years involving the bidder's performance of any construction contract or warranty, identifying:
  - (1) the parties to such arbitration or litigation
  - (2) the arbitrator, court or forum of dispute
  - (3) the case number or docket number of such dispute
- ix. A listing of the names, titles, and experience of officers, other principals or key individuals in bidder's organization.

By submission of any Bid, the bidder agrees that in the event its bid is rejected by the Owner for any reason and such rejection is contested by the bidder through the commencement of legal proceeding, whether in law or equity, the Owner shall be entitled to an award of reasonable attorneys' fees and costs if the Owner's rejection of the bid is upheld, affirmed, or otherwise not set aside.

RELEASE

The following statement must be signed and dated by the bidder as part of his bid; failure to do so will result in disqualification of the bidder's bid as incomplete.

THIS IS TO AUTHORIZE THE PERSONS AND REFERENCES IDENTIFIED HEREIN, AS WELL AS ANY OTHER REPRESENTATIVES OF BUSINESSES, AGENCIES, SCHOOL DISTRICTS WITH PROJECTS WITH WHICH I OR MY COMPANY HAS BEEN INVOLVED, TO SPEAK FREELY AND WITHOUT HESITATION TO REPRESENTATIVES OF THE WEST CHESTER AREA SCHOOL DISTRICT, INCLUDING ITS ARCHITECT, BOARD OF SCHOOL DIRECTORS, ATTORNEY, AND DIRECTOR OF OPERATIONS AND OPERATIONS AND CONSTRUCTION MANAGEMENT PERSONNEL RELATIVE TO ANY OF THE ABOVE MATTERS OR ANY OTHER SUCH PROJECTS, HEREBY RELEASING ALL PERSONS, FIRMS AND CORPORATIONS WHETHER NAMED HEREIN OR NOT, FROM LIABILITY OR FROM ANY ACTION, SUIT, CLAIM OR DEMAND ARISING OUT OF THE RELEASE OF SUCH INFORMATION.

---

BY \_\_\_\_\_

TITLE \_\_\_\_\_

DATE \_\_\_\_\_

ADDRESS \_\_\_\_\_

END OF DOCUMENT 004513

DOCUMENT 004519 - NON-COLLUSION AFFIDAVIT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-collusion Affidavit.

1.02 INSTRUCTIONS

- A. The following Non-Collusion Affidavit is material to any contract awarded pursuant to this Bid. According to the Pennsylvania Antibid-Rigging Act, 62 Pa.C.S.A. § 4501 et. seq., governmental agencies may require Non-Collusion Affidavits to be submitted together with bids.
- B. This Non-Collusion Affidavit must be executed by the member, officer or employee of the bidder who makes the final decision on prices and the amount quoted in the Bid.
- C. Bid rigging and other efforts to restrain competition, and the making of false sworn statements in connection with the submission of bids is unlawful and may be subject to criminal prosecution. The person who signs the Affidavit should examine it carefully before signing and assure himself or herself that each statement is true and accurate, making diligent inquiry, as necessary, of all persons employed by or associated with the bidder with responsibilities for the preparation, approval, or submission of the bid.
- D. In the case of a bid submitted by a joint venture, each party to the venture must be identified in the Bid Documents, and an Affidavit must be submitted separately on behalf of each party.\
- E. The term “Complementary Bid” as used in the Affidavit has the meaning commonly associated with that term in the bidding process, and includes the knowing submission of bids higher than the bid of another firm, any intentionally higher or noncompetitive bid, and any other form of bid submitted for the purpose of giving a false appearance of competition.
- F. Failure to file an Affidavit in compliance with these instructions may result in disqualification of the bid.

PART 2 PRODUCTS (Not Used.)

PART 3 EXECUTION

3.01 SUBMISSION

- A. Complete and submit the following pages with your bid.

NON-COLLUSION AFFIDAVIT

STATE OF )

COUNTY OF )

I state that I am, \_\_\_\_\_ of \_\_\_\_\_  
(Title) (Name of firm),  
located at \_\_\_\_\_, in the city/town of \_\_\_\_\_,  
County of \_\_\_\_\_, and State of \_\_\_\_\_,

and that I am authorized to make this Affidavit on behalf of my firm, and its Owners, Directors, and Officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

1. The price(s) and amount of this Bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder, or potential bidder.
2. Neither the price(s) nor the amount of this Bid, and neither the approximate price(s) nor approximate amount of this Bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before the Bid opening.
3. No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.
4. The bid of my firm is made in good faith and not pursuant to any agreement of discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.
5. \_\_\_\_\_, its affiliates,  
(Name of firm)  
subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by State or Federal Law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as follows:

I state that \_\_\_\_\_ understands  
(Name of firm)

and acknowledges that the above representations are material and important, and will be relied on by

\_\_\_\_\_ in awarding  
(Name of firm)

the contract(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this Affidavit is and shall be treated as fraudulent concealment from the West Chester Area School District of the true facts relating to the submission of bids for this contract

NAME OF FIRM \_\_\_\_\_

By: \_\_\_\_\_  
Authorized Representative

Title \_\_\_\_\_

Subscribed and sworn to

before me this \_\_\_\_\_ day  
of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
NOTARY PUBLIC

My commission expires \_\_\_\_\_ 20\_\_.

END OF DOCUMENT 004519

DOCUMENT 005200 - AGREEMENT FORM

PART 1 GENERAL

1.01 FORM OF AGREEMENT

1.02 THE AGREEMENT TO BE EXECUTED IS ATTACHED FOLLOWING THIS DOCUMENT.

1.03 RELATED REQUIREMENTS

A. Section 00 7200 - General Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF DOCUMENT 005200



# DRAFT 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)

«West Chester Area School District»« »  
«782 Springdale Drive  
Exton, PA 19341»  
«Telephone Number: (484) 266-1000»  
«Fax Number: (484) 266-1299»

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

« »« »  
« »  
« »  
« »

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

«Additions and Renovations to Mary C. Howse Elementary School »  
«641 Boot Road, West Chester, PA 19380»  
«»

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

«Blackney Hayes Architects»« »  
«150 S Independence Mall West  
Suite 1200  
Philadelphia, PA 19106»  
«Telephone Number: (215) 829-0922»  
«Fax Number: (215) 829-0596»

The Owner and Contractor agree as follows.

### ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

The parties should complete A101™, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™, 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.

**ELECTRONIC COPYING** of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

## 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 for the Separate Contract as follows:

- ☒ General Construction
- ☐ Mechanical
- ☐ Plumbing
- ☐ Electrical
- ☐ Roofing
- ☐ Sprinkler
- ☐ Sitework

### 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

Refer to Phasing Plans as shown on Drawings.

#### Substantial Completion Date

Refer to Phasing Plans as shown on Drawings.

§ 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.)*

ONE THOUSAND FIVE HUNDRED DOLLARS (\$1,500.00) per calendar day until the work reaches substantial completion.

FIVE HUNDRED DOLLARS (\$500) per calendar day for each day of delay beyond 30 calendar days after certification of substantial completion until the work identified on the punch list for each Phase or Final Completion Punchlist has been completed and or corrected.

FIVE HUNDRED DOLLARS (\$500) per calendar day for each day of delay beyond 30 calendar days after certification of substantial completion until the final Operation and Maintenance Instructions have been submitted.

SIX PERCENT (equal to current Pennsylvania Sales Tax) of the Contract Price if the Contractor denies access of their records to the Owner or its representative for auditing the Project.

**§ 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/Engineer by the Contractor and Certificates for Payment issued by the Architect/Engineer, 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 for work performed through the 15th of the month to allow time for review and approval schedules of the Architect/Engineer and Owner.

**§ 5.1.3** The Contractor is to submit Applications for Payment to the Architect/Engineer in such time as to meet the review and approval schedules of the Owner.

- .1 Applications shall be submitted to the Architect/Engineer in sufficient time to allow review and approval, and certificate of payment submitted to Owner.
- .2 Certificates will be paid within 30 days after approval of Certificate of Payment by Architect/Engineer to Owner".

*(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 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/Engineer 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™, 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/Engineer determines, in the Architect/Engineer'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/Engineer has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201;
- .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/Engineer may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201; 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 will 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.)*

In accordance with the Commonwealth Procurement Code 62 Pa. C.S.A. Section 3921, until 50% of the Contract Work (not dollar value) is completed, the Owner will pay 90% of the amount due the Contractor on account of monthly progress payments.

§ 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.)*

When the Work of the Contract is 50% complete and a request in writing from the Contractor has been submitted to the Architect/Engineer a reduction of Retainage to 5% will be considered. Along with the written request, the Contractor shall submit a Consent of Surety to Reduction in Retainage (AIA G707A).

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Final 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.

§ 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, 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/Engineer.

§ 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/Engineer'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/Engineer will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201, 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/Engineer.)*

« »

« »

« »

« »

### § 6.2 Binding Dispute Resolution

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

*(Check the appropriate box.)*

☐ [ « » ] Arbitration pursuant to Article 15 of AIA Document A201

☒ [ X ] Litigation by non-jury trial in the Court of Common Pleas in the County of Chester, Pennsylvania. All parties hereby consent to such jurisdiction and venue and irrevocably waive any right to jury trial which may exist. This Contract will not be subject to resolution by mediation or arbitration.

☐ [ « » ] 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.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201, 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.

## ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201 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)

«Wayne Birster  
Director of Facilities and Operations  
West Chester Area School District  
782 Springdale Drive  
Exton, PA 19341»

« »

« »

« »

« »

« »

§ 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 the General Conditions, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format may be given as set forth below:  
(If other than in accordance with AIA Document E203, 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.)

- .1 Except as otherwise provided in Section 8.6.2, 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.
- .2 Notice of Claims as provided in AIA Document A201 Article 15 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 8.7 Other provisions:

« The Owner will provide standard Builders Risk Insurance. The Contractor will be responsible for the deductible for claims they make against this insurance. The deductible is currently \$10,000.»

**ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS**

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™, Exhibit A, Insurance and Bonds – Not Used; see the General Conditions
- .3 AIA Document A201™, General Conditions of the Contract for Construction
- .4 AIA Document E203™, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

*(Insert the date of the E203-2013 incorporated into this Agreement.)*

Not used

- .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.)*

[ ☐ ] AIA Document E204™, 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™ 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)

DOCUMENT 006113.13 - PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that we,

\_\_\_\_\_, a

\_\_\_\_\_, as  
Principal, (hereinafter called the "Principal") and

\_\_\_\_\_, a

\_\_\_\_\_, as Surety,  
(hereinafter called the "Surety") are held and firmly bound unto the West Chester Area School District  
(hereinafter called the Obligee"), in the sum of

\_\_\_\_\_ DOLLARS

(\$ \_\_\_\_\_), lawful money of the United States of America, for the payment  
of which the Principal and the Surety bind themselves and their respective successors and assigns, jointly  
and severally, firmly by these presents.

WHEREAS, the Obligee is a "contracting body" under provisions of the "Public Works  
Contractors' Bond Law of 1967", as amended (the "Act"); and

WHEREAS, the Principal intends to enter into an agreement dated  
\_\_\_\_\_, 20\_\_ (the "Contract") with  
Obligee for the

\_\_\_\_\_, which  
Contract is by reference made a part of this Bond; and

WHEREAS, the Act requires that the Principal shall furnish this Bond to the Obligee before  
an award of the Contract shall be made to the Principal by the Obligee;

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if the Principal well,  
truly and faithfully shall comply with and shall perform the Contract in accordance with its terms, at the  
time and in the manner provided in the Contract and if the Principal shall satisfy all claims and demands  
incurred in or related to the performance of the Contract by the Principal or growing out of the  
performance of the Contract by the Principal, and if the Principal shall indemnify completely and shall  
save harmless the Obligee and all of its members, directors, officers, employees and agents from any and  
all costs, expenses and damages which the Obligee or any of its members, directors, officers, employees  
and agents may sustain or suffer by reason of any such default or failure of the Principal, and if the  
Principal shall reimburse completely and shall pay to the Obligee any and all costs, expenses and  
damages which the Obligee or any of its members, directors, officers, employees and agents may incur by  
reason of any such default or failure of the Principal, then this Bond shall be void; otherwise, this Bond  
shall be and shall remain in force and effect, subject, however, to the following conditions:

1. This Bond shall be interpreted and enforced in accordance with the Act and the laws of the Commonwealth of Pennsylvania. The Principal and the Surety agree that exclusive jurisdiction and venue for any litigation concerning this Bond and the transactions contemplated shall exist in the Chester County, Pennsylvania, Court of Common Pleas. The Principal and the Surety consent to such jurisdiction and venue. The Principal and Surety further that all disputes shall be resolved by non-jury trial (and the Principal and the Surety hereby waive any right to a jury trial) and that all service of process, including any instrument to institute suit, shall be effective if served in accordance with Pennsylvania law.
2. The Surety hereby waives notice of and consents (a) to all alterations or amendments to the Contract and (b) to all extensions of time for performance of the Contract or other forbearance; and the Surety agrees that its obligations under this Bond shall not thereby be released or affected in any manner.
3. The Surety shall not be liable to the Obligee under this Performance Bond in the aggregate in excess of the sum above stated.

SIGNED and SEALED this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_.

\_\_\_\_\_  
(Principal)

ATTEST: \_\_\_\_\_

BY \_\_\_\_\_

\_\_\_\_\_  
Typed Name/Title

\_\_\_\_\_  
(Surety)

BY \_\_\_\_\_  
Attorney-in-fact

(Attach power of attorney)

Include information on separate sheet indicating surety agent, physical address, phone and facsimile numbers.

END OF DOCUMENT 006113.13

DOCUMENT 006113.16 - PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that we,

\_\_\_\_\_, a

\_\_\_\_\_, as  
Principal, (hereinafter called the "Principal"), and

\_\_\_\_\_, a

\_\_\_\_\_, as Surety,  
(hereinafter called the "Surety"), are held and firmly bound unto the West Chester Area School District,  
hereafter called the "Obligee"), for the use and benefit of claimants as hereinafter defined, in the sum of  
\_\_\_\_\_ DOLLARS

(\$ \_\_\_\_\_), lawful money of the United States of America, for the payment  
of which the Principal and the Surety bind themselves and their respective successors and assigns, jointly  
and severally, firmly by these presents.

WHEREAS, the Obligee is a "contracting body" under the provisions of Public Works  
Contractors' Bond Law of 1967, as amended (the "Act"); and

WHEREAS, The Principal intends to enter into an agreement dated  
\_\_\_\_\_, 20\_\_ (the "Contract"), with Obligee for

\_\_\_\_\_,  
which Contract is by reference made a part of this Bond; and

WHEREAS, the Act requires that the Principal shall furnish this Bond to the Obligee  
before an award of the Contract shall be made to the Principal by the Obligee;

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if the Principal  
shall promptly make payment to all claimants as defined in the Act for all labor and material used or  
reasonably required for use in the performance of the Contract, then this obligation shall be void;  
otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. This Bond shall be interpreted and enforced in accordance with the Act and the laws of the  
Commonwealth of Pennsylvania. The Principal and the Surety agree that exclusive jurisdiction and  
venue for any litigation concerning this Bond and the transactions contemplated shall exist in the  
Chester County, Pennsylvania, Court of Common Pleas. The Principal and the Surety consent to  
such jurisdiction and venue. The Principal and Surety further agree that all disputes shall be  
resolved by non-jury trial (and the Principal and Surety hereby waive any right to a jury trial) and  
that all service of process, including any instrument to institute suit, shall be effective if served in  
accordance with Pennsylvania law.
2. The Surety hereby waives notice of and consents (a) to all alterations or amendments to the  
Contract and (b) to all extensions of time for performance of the Contract or other forbearance; and  
the Surety agrees that its obligations under this Bond shall not thereby be released or affected in any  
manner.



Mary C. Howse ES Additions and Renovations  
West Chester Area School District

Issued for Bid October 31, 2023  
BHA Project No. 22-114

3. The Surety shall not be liable under this Payment Bond in the aggregate in excess of the sum above stated.

SIGNED and SEALED this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_.

\_\_\_\_\_  
(Principal)

ATTEST: \_\_\_\_\_

BY \_\_\_\_\_

\_\_\_\_\_  
Typed Name/Title

\_\_\_\_\_  
(Surety)

BY \_\_\_\_\_  
Attorney-in-fact

(Attach power of attorney)

Include information on separate sheet indicating surety agent, physical address, phone and facsimile numbers.

END OF DOCUMENT 006113.16

DOCUMENT 007200 - GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

- 1.01 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED  
FOLLOWING THIS DOCUMENT.

END OF DOCUMENT 007200

# DRAFT AIA® Document A201™ – 2017

## General Conditions of the Contract for Construction

### for the following PROJECT:

(Name and location or address)

« Additions and Renovations to Mary C. Howse Elementary School »  
« 641 Boot Road, West Chester, PA 19380 »

### THE OWNER:

(Name, legal status and address)

« West Chester Area School District »  
« 782 Springdale Drive  
Exton, PA 19341 »

### THE ARCHITECT:

(Name, legal status and address)

« Blackney Hayes Architects », Professional Corporation  
« 150 S. Independence Mall West  
Suite 1200  
Philadelphia, PA 19106 »

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

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

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

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- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
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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, General 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/Engineer. 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/Engineer or the Architect/Engineer's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect/Engineer or the Architect/Engineer's consultants, (4) between the Contractor or a Separate Contractor engaged in the Project, or (5) between any persons or entities other than the Owner and the Contractor. The Architect/Engineer shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect/Engineer's duties.

#### **§ 1.1.3 The Work**

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

#### **§ 1.1.4 The Project**

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

#### **§ 1.1.5 The Drawings**

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

#### **§ 1.1.6 The Specifications**

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

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

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

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

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

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

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



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

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

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

§ 1.2.4 The Drawings are generally diagrammatic and indicative of the work to be installed. Exact locations of equipment and points of termination shall be approved by the Architect/Engineer. Should it be found that any system or equipment cannot be installed as shown on these Drawings, the Architect/Engineer shall be consulted before installing or making changes to the layout.

§ 1.2.5 The Drawings and Specifications are intended to function as a common set of documents. Anything shown on the Drawings but not in the Specifications, or mentioned in the Specifications and not shown on the Drawings, shall be equally binding, as if both noted on the Drawings and called for in the Specifications.

§ 1.2.5.1 The Contract Documents are complementary, and what is required by any one of the Contract Documents shall be binding as if required by all.

§ 1.2.5.2 Where the Work is shown in detail on only half or a portion of a drawing, or if there is an indication of continuation, the remainder being shown in outline, the work in detail shall be understood to apply to other like portions of the structure. When a detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to all other similar parts in the Work unless otherwise indicated. On all work of a remodeling nature or installation within existing building, the actual situation controls any information given which may affect the quantity, size, and quality of materials required for satisfactory completed contract, whether or not such information is indicated on the Drawings or within the Specifications.

§ 1.2.6 No measurement of a Drawing by scale shall be used as a working dimension. Working measurements shall be taken from figured dimensions.

§ 1.2.7 The Contractor shall request, from the Architect/Engineer interpretation of any apparent inconsistencies, errors, or omissions in the Specifications and Drawings. Subcontractors shall forward such requests through the Contractor. Such requests, and the Architect/Engineer's interpretation, shall be in written form. Other forms of communications may be used to expedite resolution of concerns, but will not be binding and shall be followed up in writing.

§ 1.2.8 Should either the Owner or Contractor consider that the Architect/Engineer's interpretations are cause for changes to the Contract Sum or the Contract Time, that party shall either bring such considerations to the attention of the Architect/Engineer, request a revised interpretation, or shall make a claim in accordance with Article 15.

§ 1.2.9 In the case of an inconsistency between Drawings and Specifications, or within either Document, not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect/Engineer's interpretation, at no additional cost.

§ 1.2.10 Details referenced to portions of the Work shall apply to other like portions of the Work not otherwise detailed.

§ 1.2.11 In the event of inconsistencies among the Contract Documents, interpretations will be based on the following priorities:

- a. Modifications to the Contract.
- b. Addenda, those with a later date having precedence over those of earlier date.
- c. Drawings and Specifications.

- d. The General Conditions of the Contract for Construction.
- e. Agreement between Contractor and Owner.

§ 1.2.12 Any inconsistencies shall be reported at least ten (10) days prior to submission of bid. In the event that such inconsistencies are not reported and a difference in quantity or quality is concerned, then the Architect/Engineer will make the selection based on his sole judgement. No additional compensation or extension of time will be allowed.

### § 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.

§ 1.4.1 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.

§ 1.4.2 Wherever in the Contract Documents an item of work is referred to in the singular number, such reference shall apply to as many such items as are required to complete the Work.

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

§ 1.5.1 The Architect/Engineer and the Architect/Engineer’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/Engineer’s or Architect/Engineer’s consultants’ reserved rights.

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

### § 1.6 Notice

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

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

### § 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™ 2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data. If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

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

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

## **ARTICLE 2 OWNER**

### **§ 2.1 General**

**§ 2.1.1** The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect/Engineer 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 Information and Services Required of the Owner**

**§ 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. 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.

**§ 2.2.2** 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. The Owner shall not be responsible for furnishing surveys or other information as to the physical characteristics of the Project site or utility locations for the Project site. The Contractor shall confirm the location of each utility. Contractor shall have no claims for surface or subsurface conditions, whether unforeseen, foreseen, or foreseeable. Contractor shall exercise special care in executing subsurface work in proximity of subsurface utilities, improvements, and easements.

**§ 2.3.2** The Owner shall retain an ~~architect~~Architect/Engineer lawfully licensed to practice architecture/engineering, or an entity lawfully practicing architecture/engineering, in the jurisdiction where the Project is located. That person or entity is identified as the Architect/Engineer 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/Engineer 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/Engineer.

**§ 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.~~ furnish, upon written request from the Contractor, 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.

**§ 2.3.5** 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.~~ Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one set of the electronic Bid Documents for purposes of making reproductions pursuant to Section 1.5.2.

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

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

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

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

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ~~ten-day~~ seven (7) calendar-day period after receipt of notice from the Architect/Engineer on behalf of the Owner, or 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 ~~deficiencies, default or neglect.~~ deficiencies, and commence and continue to carry out the Work. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect/Engineer and the Architect/Engineer may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect/Engineer'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/Engineer, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

## § 2.6 Owner's Additional Rights

§ 2.6.1 Owner's rights set forth in Sections 2.3 and 2.4 shall be in addition to, and not in limitation of, any other rights of the Owner granted in the Contract Documents or at law or in equity.

§ 2.6.2 The Contractor agrees that the Owner will be damaged in an undeterminable amount if Owner is not given access to all the Contractor's records and is unable to recover any refunds available to the Owner. The Contractor agrees to pay Owner liquidated damages ~~as identified in the Agreement~~ in the amount equal to 5% of the Contract price of this agreement should the Contractor deny access of their records to the Owner or its representative.

## 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/Engineer in the Architect/Engineer's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

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

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect/Engineer any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect/Engineer 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.

§ 3.2.2.1 Dimensions given at full-size or large-scale details shall take precedence over smaller scaled measurements. Discrepancies shall be referred to the Architect/Engineer in writing for adjustments before any work affected thereby has been performed.

§ 3.2.2.2 Where compliance with two or more industry standards or sets of requirements is indicated on drawings or specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement (which is generally recognized to be the most costly) is intended and will be enforced. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to Architect/Engineer in writing for a decision before proceeding. These may be shown on any plan, partial plan, detail, in the Project Manual or in any Addenda.

§ 3.2.2.3 Since Contractor, as Bidder, was afforded the opportunity to visit the Project Site, Contractor shall be held responsible for cognizance and knowledge of existing features and conditions ascertainable by such site visit, and costs of the Work associated therewith.

§ 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/Engineer any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect/Engineer may require.



**§ 3.2.4** If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect/Engineer 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/Engineer 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 Requests for Information (RFI)**

**§ 3.2.5.1** In the event that the Contractor or Sub-Contractor, at any tier, determines that some portion of the Drawings, Specifications, or other Contract Document requires clarification or interpretation, the Contractor must submit a Request for Information, in writing, to the Architect/Engineer.

**§ 3.2.5.2** In the Request for Information, the Contractor shall set forth his interpretation or understanding of the requirement, or proposed solution to address an unforeseen condition including a digital photograph or sketch describing the condition in question, along with the reasons why such an understanding was reached.

**§ 3.2.5.3** Responses to Requests for Information (RFI) shall be issued within five (5) working days of the receipt of the request from the Contractor, unless the Architect/Engineer determines that a longer time is necessary to provide an adequate response. If a longer time is determined to be needed, the Architect/Engineer will notify the Contractor of the anticipated response time. If the Contractor submits a Request for Information on an activity with five (5) working days or less of float on the current project schedule, the Contractor shall not be entitled to any extension of time due to the time it takes to respond to the request provided that the Architect/Engineer responds within the five (5) working days set forth above.

**§ 3.2.5.4** It is not the intent of responses from the Architect/Engineer to change any requirement of the Contract Documents other than as described by Section 7.4, Minor Changes in the Work.

**§ 3.2.5.5** If the Architect/Engineer must prepare "responses to Contractor's Requests for Information" (RFI's) where such information is 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 Project correspondence or documentation, the Owner will back-charge the Contractor for all costs associated with the additional Contract Administration Services provide by the Architect/Engineer.

**§ 3.3 Supervision and Construction Procedures**

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

**§ 3.3.1.1** The Project Coordinator shall cooperate with the Separate Contractors in the coordination of the Work. The Project Coordinator is responsible for making initial coordination recommendations.

**§ 3.3.1.2** The Project Coordinator shall request the Separate Contractors to supply, at no cost to the Owner; additional forces, equipment, tools and materials, or to increase working hours or increase the number of working days per week in order to keep up with the Contractors' Construction Schedule.



§ 3.3.1.3 Disputes between the Project Coordinator and the Separate Contractors pertaining to the creation of the Contractors' Construction Schedule, the furnishing of additional resources to meet the schedule, job coordination, and other areas where scheduling disputes may arise, shall be mutually resolved as a contingency for submitting subsequent payment applications.

§ 3.3.1.4 The progress of the Work in accordance with the Project Coordinator's decision shall not be delayed pending resolution proceedings.

§ 3.3.1.5 The Contractor shall make no claim for, and have no right to, additional payment or extension of time for completion of the work, or any other concession because of any misrepresentation or misunderstanding on his part of the Contractors' Construction Schedule, his failure to attend the pre-bid conference, or because of any failure on his part to fully acquaint himself with all conditions relating to the Contractors' Construction Schedule and the manner in which it will be used on the project, or because of any other failure to participate properly in the development of the schedule or to perform his contract work in accordance with the schedule.

§ 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.

§ 3.4.1.1 The Contractor is required to pay, and is to require any Subcontractor to pay, each employee engaged on the Project not less than the hourly rates prescribed in the Prevailing Minimum Wage Determination issued by the Secretary of Labor and Industry of the Commonwealth of Pennsylvania as included in the Contract Documents.

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

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

§ 3.4.4 Measurements: Before ordering any material or doing any work, the Contractor shall verify all measurements and shall be responsible for the correctness of same. No extra charge or compensation will be allowed on account of difference between actual dimensions and the measurements indicated on the drawings. Any difference which may be found shall be submitted to the Architect/Engineer for consideration before proceeding with the work.

§ 3.4.5 All personnel and agents used by the Contractor for the performance of the Work shall be properly trained and qualified for the type of work being performed and shall have the minimum ability and experience for its classification. The Owner reserves the right to reasonably refuse to accept services from any personnel. The Contractor shall provide evidence of qualifications of any personnel performing work under its contract upon request.

§ 3.4.6 Insofar as practical or required to obtain a full warranty, except as otherwise specified or shown, the material or product of one Manufacturer shall be used throughout the work for each specified purpose.

§ 3.4.7 All workmanship, equipment, materials, and articles incorporated in the work are to be of the best grade of their respective kinds for the purpose. Where equipment, materials or articles are referred to in the Specification as "equal to" any particular standard, the Architect/Engineer shall decide the question of equality. Contractor shall immediately furnish to the Architect/Engineer for its approval the name of the Manufacturer of machinery, mechanical

and other equipment which he contemplates installing, together with their respective performance capacities and other pertinent information to avoid delays. When required, Contractor shall furnish, for the Architect/Engineer's approval, full information concerning materials, or articles which he contemplates incorporating in the work. Samples of materials shall be submitted for approval when and as directed. Machinery, equipment, materials and articles installed or used without such written approval shall be at the risk of subsequent rejection.

**§ 3.4.8** Whenever a material, article or piece of equipment is identified on the Plans or in the Specifications by reference to Manufacturers' or Vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard, and any material article, or equipment of other manufacturers and vendors which will perform adequately equal to or better than, the duties imposed by the general design, will be considered equally acceptable provided the material, article, or equipment so proposed is, in the opinion of the Architect/Engineer of equal or better substance and function. The material, article or equipment so proposed shall not be purchased or installed by the Contractor without the Architect/Engineer's written approval.

**§ 3.4.9** Wherever a sole source manufacturer is listed or identified on the Plans or in the Specifications, no substitutions will be accepted.

**§ 3.4.10** No brand, make, kind or quality of materials shall be used until it has been submitted along with a submittal matrix to and approved by the Architect/Engineer, whose decision shall be final and binding on all parties.

**§ 3.4.11** The acceptance of any material or method shall be understood as an acceptance only insofar as conforming to Specification requirements, and not as an absolute acceptance without respect to the requirements of the Specifications.

### **§ 3.5 Warranty**

**§ 3.5.1** The Contractor warrants to the Owner and Architect/Engineer 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/Engineer, 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, including but not limited to, Sales Tax, Use Tax, Occupational Taxes, Excise Taxes, Social Security Benefits, Unemployed Compensation Taxes, or similar levies on materials, labor, tools and equipment furnished under this agreement as required by the Statutes of the Commonwealth of Pennsylvania.

### **§ 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** The following permits shall be purchased by the Owner, if applicable: Building Permit and Sanitary Sewer Connection (Tap-In) Permit.

- .1 The Owner will pay for all Township-assessed permit fees except for business license fees and business taxes, which shall be paid for by the Contractor.
- .2 The Owner will pay for the tap-in fees for permanent connection of sanitary sewer, water, gas and electric.
- .3 The Contractor shall apply for all required permits and complete paper work in a timely manner.

§ 3.7.1.2 All remaining fees, licenses, and permits required to complete the Work of the Contract shall be obtained and paid for by the Contractor.

§ 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. Without limiting the generality of the foregoing, Contractor shall comply with all governmental requirements applicable to the Work including, without limitation, those included in Specification Section 01 41 00 – Regulatory Requirements.

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

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

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

§ 3.7.4 If any of the Work is required to be inspected or approved by any Public Authority, the Contractor shall cause such inspection or approval to be performed. No inspection performed, or failed to be performed, shall be a waiver of any of the Contractor's obligations hereunder, or be construed as an approval or acceptance of the Work, or any part thereof.

§ 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 promptly provide notice to the Owner and the Architect/Engineer before conditions are disturbed and in no event later than five (5) days after first observance of the conditions. The Architect/Engineer will promptly investigate such conditions and, if the Architect/Engineer 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 an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect/Engineer 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/Engineer shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect/Engineer's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.6 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/Engineer. 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 Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.7.7 Earthwork shall be UNCLASSIFIED. Materially different conditions will not warrant an adjustment in the Contract Sum.

### § 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. There are no cash allowances of any kind included in the Project.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

### § 3.9 Superintendent

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

§ 3.9.1.1 The number of necessary assistants to the superintendent shall be such that work in progress shall be adequately supervised by each Contractor's superintendent or one of its assistants. If, in the Architect/Engineer's opinion, the quality or progress of work is adversely affected by lack of adequate supervision, the Contractor shall increase the number of supervisory personnel at no increase to the Contract sum.

§ 3.9.1.2 Contractor shall maintain supervision of all Subcontractors and Sub-subcontractors working at any time on site. Subcontractors and Sub-subcontractors will not be allowed access to the site to perform work without Prime Contractor's continued on site presence.

§ 3.9.2 The Contractor, as soon as practicable after award or within ten (10) days after signing the Contract, shall notify the Owner and Architect/Engineer of the name and qualifications of a proposed superintendent. This will include previous work experience, qualifications, and references. The proposed superintendent shall be satisfactory to the Owner and Architect/Engineer in all respects. Within 14 days of receipt of the information, the Architect/Engineer may notify the Contractor, stating whether the Owner or the Architect/Engineer (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect/Engineer to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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

§ 3.9.4 The Owner and Architect/Engineer shall have the right to require the Contractor to dismiss from the Project any superintendent whose performance is not satisfactory to the Owner or Architect/Engineer, and to replace such superintendent with another superintendent satisfactory to the Owner and Architect/Engineer.

### § 3.10 Contractors' Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, Project Coordinator shall submit for the Owner's and Architect/Engineer's information a Contractor's construction schedule for the Work. The schedule Architect/Engineer's information a Contractors' Construction Schedule for the work, based on work activity durations

provided by each Separate Contractor for their portion of each Phase of the Work. The Project Coordinator shall be required to obtain the services of a qualified scheduling firm to prepare the schedule and to update the schedule periodically through project completion. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the dates of phased Substantial Completion and Final Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

**§ 3.10.1.1** Within 30 days of Contract award, each Prime Contractor shall provide baseline construction schedule activities with proposed durations to the Project Coordinator for incorporation into the Contractors' Construction Schedule. These activities must include all items of work, including long lead shop drawing submissions, review time, and fabrication time. Activity durations shall be as specified in Specification Section 013216.

**§ 3.10.1.2** The Project Coordinator shall incorporate the Separate Contractor's schedule activities and produce the Contractors' Construction Schedule for submission to the Owner and Architect/Engineer within 45 days of Contract Award.

**§ 3.10.1.3** The Contractors' Construction Schedule shall contain the following statement and the signature of each Separate Contractor: "Our company understands that the meeting the dates of phased Substantial Completion and Final Completion listed in this schedule is critical to maintaining the Project Schedule and meeting the Substantial Completion Date. In signing this schedule, our company agrees to this schedule and further agrees to dedicate whatever resources that are required to complete the work of our Contract in order to meet these dates." Persons signing the Contractors' Construction Schedule shall be the same party as executed the Owner/Contractor Agreement, or an individual authorized to commit the Contractor's resources to the schedule.

**§ 3.10.1.4** The Owner and Architect/Engineer will review and comment on the Contractors' Construction Schedule. The Project Coordinator shall revise the schedule to incorporate the Owner and Architect/Engineer's comments and resubmit the Contractors' Construction Schedule for approval.

**§ 3.10.1.5** The first Application for Payment will not be processed by the Architect/Engineer until the Separate Contractors have obtained approval of the Contractors' Construction Schedule from the Owner and Architect/Engineer.

**§ 3.10.2** The Contractor, ~~promptly after being awarded the~~ within fifteen (15) days after receiving the executed Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect/Engineer's approval. The Architect/Engineer's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractors' construction schedule, and (2) allow the Architect ~~reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of Architect/Engineer reasonable time to review submittals.~~ The Architect/Engineer shall provide notice if the submittal schedule is approved or provide notice what edits are required.

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

**§ 3.10.4** Each Prime Contractor is responsible for the preparation of project construction schedule updates for submission to the Project Coordinator on a regular basis. The Project Coordinator shall receive and input updated schedule information from the Separate Contractors at regular intervals as required by length of the Project, but not less than monthly. If the Contractor does not provide project construction schedule update information to the Project Coordinator, he will not have his Application for Payment processed by the Architect/Engineer.

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

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



Owner, and delivered to the Architect/Engineer 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/Engineer is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect/Engineer 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/Engineer without action.

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

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

**§ 3.12.6.1** Submittals that require coordination with other products and other trades, such as, doors, frames, entrances, hardware, security programs, alarms, etc. shall be submitted together as a coordinated package or they will not be reviewed by the Architect/Engineer. Coordination of all items is the responsibility of the Contractor. Contractor shall replace non-compatible components to the Architect/Engineer's satisfaction at no additional cost.

**§ 3.12.6.2** Each Prime Contractor is required to coordinate their submittals, shop drawings, product data, etc. with the other Prime Contractors prior to submission to the Architect/Engineer for review. Each Prime Contractor is required to perform their coordination in a timely manner as to not delay the project and schedule. This coordination between each Prime Contractor, whether the Prime Contractor is the originator of the submittal or the recipient of the submittal, shall not be an additional cost.

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

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



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

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

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect/Engineer will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect/Engineer. The Owner and the Architect/Engineer 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/Engineer have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect/Engineer 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 Reproductions of Contract Documents are not an acceptable form of creating shop drawings. If an approval from the Architect/Engineer is given, the Architect/Engineer will provide base floor plans and reflected ceiling plans, without notations, text, or dimensions to the Contractor for the use of creating shop drawings.

**§ 3.12.12 Architect/Engineer's Approval Stamp:**

- .1 Drawings which are correct and do not require further review will be returned to the Contractor bearing the Architect/Engineer's stamp, "Approved".
- .2 Drawings which are incorrect but do not require further review will be returned to the Contractor bearing the Architect/Engineer's stamp, "Approved as Noted".
- .3 Drawings which are incorrect and require further review will be returned to the Contractor bearing the Architect/Engineer's stamp, "Revise and Resubmit".
- .4 Drawings which are incomplete will be returned to the Contractor bearing the Architect/Engineer's stamp, "Rejected".
- .5 Drawings which are not required to be reviewed will be returned to the Contractor bearing the Architect/Engineer's stamp "Not Required/Not Reviewed". Such submittals shall not be reviewed by Architect/Engineer.

§ 3.12.13 Reference to procedures concerning Submittals shall be understood to incorporate all submittals including Contractor's Submittal Schedule of all products. Manufacturer's published literature, shop drawings, samples, concrete mix, design and other data. Each submittal is required to be accompanied by a fully completed submittal cover sheet.

§ 3.12.14 Submittal Schedules shall be prepared and incorporated into the Contractors' Construction Schedule as indicated in Section 3.10.1 and Specification Section 013300 – Submittal Procedures. Contractor shall include the following considerations when preparing the submittal schedule so that approved products are at the project site ready for installation in accordance with the time established in the Contractors' Construction Schedule to avoid delays.

- .1 Time frame when the item is needed at the Project.
- .2 Time necessary to produce the product.

- .3 Lead time required to prepare the submittal.
- .4 Time required for the Contractor to review, approve, sign and date the submittal.
- .5 Time for the Architect and its Engineer to review the submittal.
- .6 Time for the Architect and its Engineer or the Owner's consultants to review the submittal.
- .7 Number of Contractors and Subcontractors affected by the information contained in the submittal.
- .8 Time necessary to correct and resubmit if original submittal is not approved.
- .9 Submittal of all color samples within adequate time for review, selection and coordination with other products requiring earlier installation and/or longer lead times for ordering.
- .10 Grouping of related submittals for coordination.

§ 3.12.15 Submittals shall indicate materials, dimensions, seismic bracing in accordance with the Building Code under which the Project is permitted, for Architectural, Mechanical, and Electrical Component Seismic Design Requirements, and job conditions, including clearances required in relationship with the work of their trades. Contractor shall be responsible for verification of existing conditions and coordinating with the work of other trades. Drawings shall be of sufficient size and drawn to sufficient scale to clearly show all details.

§ 3.12.16 Where indicated or required in the Contract Documents, submittals shall indicate compliance with seismic design requirements in accordance with the Building Code under which the Project is permitted, for Architectural, Mechanical and Electrical Component Seismic Design Requirements. Provide seismic calculations signed and sealed by a Professional Engineer licensed in the state where the Project is located as required.

§ 3.12.17 Submittals shall contain a Contractor's stamp of approval, signed and dated by the submitting Contractor, prior to submission to the Architect. Such stamp of approval by the Contractor shall be confirmation that he has determined and verified materials, field measurements and field construction criteria related thereto, and has checked and coordinated the information contained within such submittals. The Contractor shall also note in writing to the Architect/Engineer, all deviations to the Contract Documents. Submittals will not be reviewed by the Architect/Engineer unless they contain such a stamp containing the words "Reviewed and Approved" accompanied by the Contractor's signature and date.

§ 3.12.18 Architect/Engineer's review is for general conformance with the Design Concept and Contract Documents. Markings or comments shall not be construed as relieving the Contractor from compliance with all requirements of the Project Manual, Drawings, and Addenda. No departures therefrom are to be considered as authorizing extra work or relieving the Contractor of work required within the contract. The Contractor remains responsible for materials, dimensions, details and accuracy for confirming and correlating all quantities and dimensions, and warranty/guarantee requirements and other conditions of the contract, etc. for selecting fabrication process and techniques of assembly, for performing this work in a safe and satisfactory manner, and of coordinating this work with that of all other trades.

§ 3.12.19 When brand, make, quality, etc., is not specified definitely, Contractor shall submit written documentation to the Architect/Engineer for the particular kind of brand which he desires to use, altering or substituting others if not satisfactory.

§ 3.12.20 If a substitution submittal differs from the design intent of the Contract Documents, and all associated modifications to the design intent are not identified and included with the submission, all consequential additional costs associated with the substitution including, but not limited to, modifications to existing and new construction, building structure, plumbing, HVAC, electrical systems and all other modifications to not yet constructed work shall be borne by the contractor responsible for the submittal.

§ 3.12.21 Consequential Substitution Impact Fees: If the Contractor makes, or causes to be made, due to impact from approval of substitutions of other than specified equipment and components, any substantial change in the form, type, system, and details of construction from those indicated in the Contract Documents, the Contractor shall be responsible for payment of all impact costs arising from such changes. Impact costs include, but are not limited to, any additional costs to the owner inclusive of Architectural, Engineering and Attorney fees, Code Review and Permit fees as well as all documented impact costs borne by other Contractors resulting from such substitutions. Impact costs shall also include associated re-design, demolition and re-construction work, additional new construction work as may be required and compliance with and maintenance of existing warranties, etc.

§ 3.12.22 If the Contractor makes, or causes to be made, due to approval of substitute equipment or otherwise, any substantial change in the form, type, system and details of construction from those shown on the Drawings including,

submission of approved shop drawings where changes to the original design were not brought to the Architect/Engineer's attention in writing at the time of submission, it shall pay for all costs arising from such changes. The Contractor shall pay all Architectural and Engineering fees required to check the adequacy of such changes. Any changes or departures from the construction and details shown shall be made only after written approval from the Architect/Engineer.

**§ 3.12.23** The Contractor will have only two (2) opportunities to receive approval of any submittal without consequence. If an approval is not received by the second submission due to the Contractor's failure to adhere to the contract documents, the Contractor shall be responsible for costs incurred by the Owner to review each submission thereafter until an approval is received.

### **§ 3.13 Use of Site**

~~The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.~~ **§ 3.13.1** The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

**§ 3.13.2** Reference points: Immediately upon occupancy of the project site for the purpose of beginning the work, the Contractor shall locate all general reference points, bench marks, etc., and take such action as may be necessary to prevent damage or destruction to such points.

**§ 3.13.3** Verification of Dimensions: Verify all site dimensions, building layout dimensions, setbacks, etc., shown on the Drawings before laying out the work. Notify the Architect/Engineer in writing of any error or inconsistency found and do not proceed until error or inconsistency is resolved. The Contractor will be responsible for any work which is done in error because of failure to verify dimensions.

**§ 3.13.4** Layout: The Contractor shall lay out all work and be responsible for all lines, levels, grades, elevations and measurements of building, grading, paving, walks, utilities and other work required under this contract.

**§ 3.13.5** Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor.

**§ 3.13.6** Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and all adjacent areas. The Work shall be performed to the fullest extent reasonably possible in such a manner that public areas adjacent to the site of the Work shall be free from all debris, building material and equipment likely to cause hazardous conditions. Without limitation of any other provision of the Contract Documents, Contractor shall use its best efforts to minimize any interference with the occupancy or beneficial use of (1) any areas and buildings adjacent to the site of the Work; or (2) the Building in the event of partial occupancy, as more specifically described in Section 9.9.

**§ 3.13.7** Contractors may work weekdays, evenings, nights, weekends, and holidays. Evenings, nights, weekend and holiday work is subject to regulations and requirements of local ordinances and also requires prior approval from the Owner.

### **§ 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** Each Prime 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, each Prime Contractor shall remove waste materials, rubbish, the Prime 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/Engineer 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/Engineer 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/Engineer. 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/Engineer.

### **§ 3.18 Indemnification**

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect/Engineer, Architect/Engineer'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 which 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.

**§ 3.18.3** Each Prime Contractor shall indemnify and hold harmless and defend the Owner and the other Prime Contractors against any assertion of claims for mechanics' liens by Subcontractors, Sub-contractors, or material suppliers and against any assertion of security interests by suppliers of goods or materials. No provision of this Section shall give rise to any duties on the part of the Architect/Engineer or the Owner not otherwise provided for by contract or by law. In the event that any party is requested but refuses to honor the indemnity obligations hereunder, then the party refusing to honor such requests shall, in addition to all other obligations, pay the cost of bringing any such action, including attorney's fees to the party requesting indemnity.

**§ 3.18.4** The Contractor, for itself, its successors and assigns, hereby expressly agrees to waive any provision of Pennsylvania Workmens Compensation Act, including section 303 (b), whereby Contractor could preclude its joinder as an additional defendant or avoid liability for damages, contribution or indemnity in any acting law, or otherwise where Contractor's employee or employees, heirs, assigns or anyone otherwise entitled to receive damages by reason of injury or death brings an action at law against the Owner, its successors, assigns, employees, agents, Architects or Engineers.

**§ 3.18.5** The Contractor agrees to indemnify, defend and hold harmless the Owner from any and all administration and judicial actions (including reasonable attorneys' fees related to any such action) and judgments incurred by the Owner

in connection with any labor-related activity rising from the Contractor's performance of the work. As used in these Contract Documents, "labor-related activity" includes, but is not limited to strikes, walk-outs, informational or organizations picketing, use of placards, distribution of hand-outs, leaflets, or other similar acts at or in the vicinity of the Project or in the vicinity of any other facility where the Owner conducts business. The Owner shall advise the Contractor if any labor-related activity occurs and the Contractor shall arrange for the legal representation necessary to protect the Owner's interest, provide such representation is approved by the Owner in advance.

## **ARTICLE 4 ARCHITECT/ENGINEER**

### **§ 4.1 General**

**§ 4.1.1** The Architect/Engineer is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement. The term "Architect/Engineer" also means the Architect/Engineer's authorized representative.

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

**§ 4.1.3** In case of termination of the employment of the Architect/Engineer, the Owner shall appoint another Architect/Engineer whose status under the Contract Documents shall be that of the former Architect/Engineer.

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

**§ 4.2.1** The Architect/Engineer 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/Engineer issues the final Certificate for Payment. The Architect/Engineer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

**§ 4.2.2** The Architect/Engineer will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect/Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect/Engineer 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, except as provided in Section 3.3.1.

**§ 4.2.3** On the basis of the site visits, the Architect/Engineer will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect/Engineer will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect/Engineer 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 Facilitating Contract Administration**

The Owner and Contractor shall include the Architect/Engineer in all communications that relate to or affect the Architect/Engineer's services or professional responsibilities. The Owner shall promptly notify the Architect/Engineer of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect/Engineer's consultants shall be through the Architect/Engineer. 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/Engineer's evaluations of the Contractor's Applications for Payment, the Architect/Engineer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.



**§ 4.2.6** The Architect/Engineer has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect/Engineer considers it necessary or advisable, the Architect/Engineer 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/Engineer 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/Engineer to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

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

**§ 4.2.8.1** In the event the Contractor and Owner, or Contractor and Architect/Engineer are not in total agreement on the scope of Work as outlined in the Contract Documents, the Architect/Engineer may issue a Project Directive. The Architect/Engineer's Project Directive will be an instruction for the Contractor to proceed with the Work as outlined by the Architect/Engineer. The Contractor, if still in disagreement with the Architect/Engineer's interpretation of the Contract Documents, may file a claim with the Owner in accordance with Article 15.

**§ 4.2.9** The Architect/Engineer 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/Engineer agree, the Architect/Engineer will provide one or more Project representatives to assist in carrying out the Architect/Engineer'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/Engineer 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/Engineer'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/Engineer 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/Engineer 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/Engineer'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/Engineer will review and respond to requests for information about the Contract Documents. The Architect/Engineer'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/Engineer will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

## **ARTICLE 5 SUBCONTRACTORS**

### **§ 5.1 Definitions**

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

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

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

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

**§ 5.2.1** Certification of Subcontractors: Each Bidder shall identify and list on the Bid Form each major subcontractor performing more than 25% of the Contract Amount to be used on the Project. Bidder shall also secure and submit Contractor Qualification Statements for these Major Subcontractors. Award of Contract will be contingent on the Architect/Engineer and Owner's approval and acceptance of Bidder's Major Subcontractors. Major Subcontractors shall be approved by the Owner, Architect/Engineer and agreed upon with the Contractor. All Major Subcontractors shall conform to the bidding documents as submitted and shall not be substituted after award unless approved in writing by the Owner.

**§ 5.2.1.1** Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor shall furnish in writing, within 14 calendar days after issuance Notice of Intent to Award, to the Owner through the Architect/Engineer the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect/Engineer may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect/Engineer has reasonable objection to any such proposed person or entity or (2) that the Architect/Engineer requires additional time for review. Failure of the Owner or Architect/Engineer to reply within the 14-day period shall constitute notice of no reasonable objection. Neither the Owner nor the Architect/Engineer is obligated to investigate the ability of any Subcontractor proposed to perform the work designated by the Contractor.

**§ 5.2.2** The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect/Engineer 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/Engineer 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.~~ Architect/Engineer has no reasonable objection. No adjustment in the Contract Sum or extension in Contract Time shall be made due to the substitution of a subcontractor.

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

### § 5.3 Subcontractual Relations

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

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

§ 5.3.2 Notwithstanding any provision of Section 5.3.1, any part of the Work performed for the Contractor by a Subcontractor or its Sub-subcontractor shall be pursuant to a written Subcontract between the Contractor and such Subcontractor (or the Subcontractor and its Sub-subcontractor at any tier), which shall be prepared on a form of subcontract satisfactory to the Owner in all respects. Each such subcontract shall contain provisions that:

- .1 require that such Work be performed in accordance with the requirements of the Contract Documents;
- .2 waive all rights the contracting parties may have against one another, or that the Subcontractor may have against the Owner, for damages caused by fire or other perils covered by the insurance described in the Contract Documents;
- .3 require the Subcontractor to carry and maintain insurance coverage in accordance with the Contract Documents, and to file certificates of such coverage with the Contractor;
- .4 require the Subcontractor to submit certificates and waivers of liens for work completed by it and by its Sub-subcontractors as a condition to the disbursement of the progress payment next due and owing;
- .5 report, so far as practicable, unit prices and any other feasible formula for use in the determination of cost of changes in the Work;
- .6 require each Subcontractor to furnish to the Contractor in a timely fashion all information necessary for the preparation and submission of certified payrolls, or other reports required herein;
- .7 require that each Subcontractor continue to perform under its subcontract in the event the Contract is terminated, and the Owner shall take an assignment of said subcontract and request such Subcontractor to continue such performance;
- .8 require each Subcontractor to remove all debris created by its activities; and
- .9 require subcontractors to provide pricing for Owner requested changes within (5) working days of request from Owner to Contractor.

§ 5.3.3 Where Contractor employs Subcontractors for portions of the Work, the entire responsibility for the subdividing of the Work rests with the Contractor. The Owner and the Architect/Engineer are not responsible for the manner of the subdivision of the Work and neither will enter into, nor settle, disagreements or disputes between Contractor and Subcontractors. The arrangement of Specifications and the manner of graphic illustration of Drawings

are for convenience of reference and do not comprise any exacting method of subdividing work for the purposes of subcontracting, except where the Contract Documents require an undivided responsibility for certain work.

§ 5.3.4 Contractor shall require each Subcontractor to (1) Inspect surfaces and job conditions before beginning work at the Project Site, (2) Accept or cite necessary corrections in surfaces and job conditions before beginning work at the Project Site, and (3) Protect his own materials, equipment, and Work from damage, injury, or loss due to weather, theft, vandalism, etc., or due to the Work of the Contractor, other Subcontractors, or other Contractors. The appropriate means of protection shall be supplied and removed when no longer required.

#### § 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. 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.

§ 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. Each Separate Contractor shall coordinate their Work of the Contract with every other Prime Contractor, who shall cooperate with them. Each Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedule. Each Contractor shall make any revisions to its construction schedule the Contractors' construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by each Prime Contractor, Separate Contractors, and the Owner until subsequently revised.

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

## § 6.2 Mutual Responsibility

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect/Engineer of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect/Engineer 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. promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractors as provided in Section 10.2.5.

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

§ 6.2.5 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. Should the Contractor wrongfully cause damage to the work or property of any Separate Contractor, the Contractor shall upon due notice, promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues the Owner or Architect/Engineer on account of any damage alleged to have been caused by the Contractor, the Owner or Architect/Engineer will notify the Contractor who shall defend such proceedings at the Contractor's expense, and if any judgment or award against the Owner or Architect/Engineer arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner, and Architect/Engineer for all attorneys' fees, court or other legal costs which the Owner, or Architect/Engineer have incurred.

## § 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/Engineer will allocate the cost among those responsible.

## ARTICLE 7 CHANGES IN THE WORK

### § 7.1 General

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

§ 7.1.1.1 Contractor shall have no more than (7) working days to provide pricing to Owner/Architect/Engineer on requested changes from the date of receipt of request from the Architect/Engineer, or Owner.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect/Engineer. A Construction Change Directive requires agreement by the Owner and Architect/Engineer 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/Engineer 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.

§ 7.1.4 No charges by Contractor for extra work or changes in the Work, nor claims on account thereof, shall be valid unless duly authorized in the procedure described herein. Written authority to perform extra work or changes in the Work must be in possession of Contractor before such work commences, and in order for Contractor to receive payment for such work.

§ 7.1.5 In order to facilitate checking of quotations for adjustments in the Contract Sum, all proposals shall be accompanied by a complete itemization of costs including labor, materials, equipment, overhead and profits, and subcontracted labor. If the Work is being performed by Contractor's subcontractor, subcontractor must also itemize the costs of the change in accordance with the Contract Documents.

§ 7.1.6 Deduct change order, or changes that reduce a Contractor's cost of the Work, will be quoted and provided in the same manner as above, as further delineated in Section 7.3.4, and 7.3.4.1, including a credit to the Owner for overhead and profit, and in accordance with the other provisions of the Contract Documents.

## § 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect/Engineer and signed by the Owner, Contractor, and Architect/Engineer 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.

§ 7.2.2 The method for determining adjustments to the Contract Sum shall be in accordance with Section 7.3. It will be the Contractor's responsibility to provide complete breakdown of the labor, materials, equipment, and subcontractor's cost spent on Change Orders or Construction Change Directives. Work done on an hourly basis shall have the labor hours performed each day initialed by the Owner's representative.

## § 7.3 Construction Change Directives

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

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

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

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

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

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



- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and Work which shall be submitted without markup.
- .5 Costs of supervision and field office personnel directly attributable to the change shall be included in the change order overhead and profit, or part of the labor if performed as part of the Work of the change. All other costs for management and support personnel shall be incorporated as part of overhead and profit.

§ 7.3.4.1 The allowances for overhead, profit and bonds included, in the total cost to the Owner, shall be based on the following schedule:

- .1 For all work change order or construction change directive orders, the add for the Contractors' overhead and profit shall be fifteen percent for up to ten thousand dollars; and ten percent over ten thousand dollars.
- .2 Costs to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.
- .3 The Contractors' Overhead and Profit for work performed by subcontractor forces cost shall be limited to the total Subcontractor's invoice plus a markup of 5% for overhead and profit. Subcontractors will be required to submit hourly wage and material costs in accordance with the above definitions.
- .4 Wage Rates used in the calculation of Construction Change Directives and Change Orders shall be those obtained for this Project and in force at the time that the Agreement between the Owner and Contractor was executed. No other rates will be considered applicable to this Project.

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

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect/Engineer 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-If a Construction Change Directive is signed by the Contractor it indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect/Engineer. 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, increase or decrease, 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/Engineer will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect/Engineer determines, in the Architect/Engineer's professional judgment, to be reasonably justified. The Architect/Engineer's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect/Engineer 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/Engineer will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

## § 7.4 Minor Changes in the Work

§ 7.4.1 The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed



to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time. Architect/Engineer has authority to order minor changes in the Work not involving adjustments in the Contract Sum or extension of the Contract Time that is not inconsistent with the intent of the Contract Documents. Such changes will be affected by written order signed by the Architect/Engineer and shall be binding on the Owner and Contractor.

§ 7.4.2 Minor changes in the Work shall be affected by meeting memos, or an Architect/Engineer's Supplemental Instruction.

§ 7.4.3 The Work described therein shall be promptly executed in accordance with the Contract Documents. Proceeding with the Work indicates the Contractor's acknowledgement that there will be no change in the Contract Sum or Contract Time.

§ 7.4.4 If the Contractor concludes that the Work described therein requires an adjust to his Contract Sum, or of the Contract Time, the Contractor shall promptly notify Architect/Engineer and Owner and shall issue a fully itemized proposal within three (3) working days. When it is deemed by the Architect/Engineer and Owner that the Work alters the Contract Sum or Contract Time, the Work shall not be executed without Change Order signed by Architect/Engineer and Owner. Failure to issue a proposal or written notification to the Architect/Engineer and Owner within the appropriate time frame shall indicate the Contractor's acknowledgement that there will be no change in the Contract Sum or 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. It shall not be postponed by the failure of the Contractor or of persons or entities for whom the Contractor is responsible.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect/Engineer 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, and as indicated on the Contract Documents.

### § 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/Engineer, 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/Engineer determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect/Engineer may determine.

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

**§ 8.3.3** This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents. Extensions of time shall be the sole recourse for delays and shall not act as an entitlement for damages or increase in Contract Sum and owing the Contractor for said delays.

**§ 8.3.4** The Contractor hereby expressly warrants and represents that he shall make no claim for increased costs, charges, expenses or damages against the Owner for any delays or hindrances experienced in the performance of the Work, whether caused by an act or omission of Owner or from any cause whatsoever. In the event completion of any portion of the Work is delayed through no fault or neglect of the Contractor the project completion date may be extended at no additional cost to the Owner, in the Owner's sole discretion, as further provided herein

**§ 8.3.5** The Contractor shall promptly report to the Project Coordinator, Architect/Engineer, and Owner any delays or anticipated delays as soon as he, or any of his supervisory employees, become aware of the same, and Contractor's estimate and basis of it as to probable duration of delay.

**§ 8.3.6** In the event that the Contractor decides to claim any extension of time as a result of delays, the Contractor shall submit to the Project Coordinator a written Time Impact Analysis illustrating the influence of each delay on the construction schedule completion date. Each Time Impact Analysis shall include a network analysis demonstrating how the Contractor proposes to incorporate the delay into the detailed progress schedule. Additionally, the analysis shall demonstrate the time impact based on the date the delay occurs, the status of construction at that point in time, and the event time computation of all affected activities. The Time Impact Analysis shall also include a concise narrative stating the cause(s) of the delay and action taken or proposed to minimize or eliminate the delay. Each Time Impact Analysis shall be submitted by the Contractor within fifteen (15) days after a delay occurs unless a longer period is requested, with sufficient justification, by the Contractor and approved, in writing, by the Owner. In cases where the contractor does not submit a Time Impact Analysis for a specific delay within the specified period of time, then it is mutually agreed that the particular delay has no time impact on the contract completion date and no time extension is required.

**§ 8.3.7** The Owner shall be the sole judge of whether any such extensions shall be granted. In the event that an extension of the Substantial Completion Date is granted, the Owner's right to Liquidated Damages, as stated in Section 9.11, shall be accrued as of the extended Substantial Completion Date.

**§ 8.3.8** In no event shall Contractor be entitled to extra payment on account of any delay in the Work, regardless of whether the Owner elects to grant an extension of time to the Contractor.

**§ 8.3.9** Notwithstanding any other provision contained in this Contract, and superseding any contrary term expressed herein, Contractor agrees that if in the event of any strike, picket, sympathy strike, work stoppage, or other form of labor dispute at the jobsite, whether that dispute or picket is in connection with the Owner, the Contractor or any other Contractor or Separate Contractor on the jobsite, Contractor will continue to perform the Contractor's Work required herein without interruption or delay.

- .1 In the event the Contractor fails to continue the performance of the Contractor's Work included herein, without interruption or delay, because of such picket or other form of labor dispute, Contractor shall be in default of its obligations under the Contract, and there upon, the Owner may terminate the services of Contractor after giving twenty-four (24) hours written notice of an intent to do so.
- .2 Additionally, should the Contractor be party to one or more labor agreements, he shall take all reasonable action to avoid any work stoppage and, in the event a work stoppage should occur, he shall, within twenty-four (24) hours, take any and all legal action provided for, or permitted by, such labor agreements in order to expedite resumption of work on this Project.
- .3 It is contemplated hereby that Contractor shall, if necessary, utilize to the fullest extent possible, all contractual provisions contained in Contractor's labor agreements which allow for the hiring of replacement employees, should the hiring hall of the Contractor be unable or unwilling to meet the needs of the Contractor.
- .4 Contractor will not be required to violate labor agreements, but at the Owner's directive may be required to add additional hours, or manpower to avoid delays in the schedule at no additional cost to the Owner.

**§ 8.4** Any delay attributable to the lack of coordination and cooperation by and between the Separate Contractors among themselves or their subcontractors will not be the basis for any claim for increase in any Contract Sum but shall be settled as provided in Section 15.1.7, or Article 21, AIA A107, Standard Form of Agreement Between Owner and

Contractor. The Contractor hereby agrees to indemnify, defend and hold harmless Owner from and against any and all claims attributable to delays in completion of the Contractor's work caused by any other contractor and/or their subcontractors, employees and/or agents performing work at the project.

§ 8.5 As the Work covered under this Contract takes place at a working educational facility, no time extensions will be granted for any work, or Phases of work, that extend more than one week prior to the start of a new school calendar year.

## 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.~~ § 9.2.1 Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect/Engineer, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect/Engineer may require. This schedule, unless objected to by the Architect/Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.2.2 The schedule of values shall be prepared in such a manner that each major item of Work and each subcontracted item of Work is shown as a line item on AIA Document G703, Application and Certificate for Payment, Continuation Sheet. Each major item of work shall be further broken down into separate line items for work, subject to the Architect/Engineer's review and request for additional detail.

### § 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/Engineer 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 no later than the 25<sup>th</sup> day of each month for work of that month. Such application shall be notarized.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect/Engineer, 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.

§ 9.3.2 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 Materials Stored Onsite

Materials properly stored at the construction site may be included in the Contractor's application for payment, subject to the following conditions:

- .1 All materials shall be stored in strict compliance with the manufacturer's recommendations in secure, dry, and where appropriate, temperature controlled enclosures;
- .2 Contractor shall provide property insurance covering materials stored at the construction site to the extent that the Owner's property insurance does not provide coverage;
- .3 Contractor shall provide an accurate inventory of all materials included for payment with each application for payment. Contractor shall maintain the inventory until the materials are installed or otherwise incorporated into the Work; and
- .4 Payment for the materials stored on the construction site shall be limited to the actual invoiced cost to the Contractor, F.O.B. the construction site. Contractor shall warrant that all suppliers are promptly paid in full for all materials included for payments, and that materials are not encumbered by any lien, claim, or mortgage that would prevent the Owner from taking full possession of the materials. Contractor shall produce satisfactory evidence of same to Owner.

### 9.3.2.2 Materials Stored Offsite

Materials stored off the construction site shall not be included for payment in the Contractor's application for payment unless prior approval of the Owner has been obtained. Payment for materials stored off the construction site shall be subject to the conditions in Section 9.3.2.1 and the following additional conditions:

- .1 Contractor shall provide property insurance for the full cost of the materials stored off the construction site;
- .2 Contractor shall provide a bill of sale for the materials granting clear title for materials to the Owner;
- .3 Contractor shall provide waivers of liens when applicable, encumbrances, or claims relating to the bailment of the materials stored offsite, or as otherwise required by the Owner;
- .4 Contractor shall provide Owner all information necessary for the filing of any notices under the Uniform Commercial Code relating to the materials stored off the construction site as may be required by Owner;
- .5 The materials stored off the construction site shall be clearly and conspicuously labeled so as to identify Owner's title to the materials and shall be segregated and not commingled with other materials at the storage location;
- .6 Contractor shall pay all storage costs, shall be responsible for any damage or deterioration of the materials while in storage or in transit to the construction site, and shall pay the costs of inspection of the materials in storage by the Owner.
- .7 Contractor shall be responsible for and shall pay all costs of transportation of the materials to the construction site; and
- .8 Neither Owner's payment for materials stored off the construction site nor the transfer of title to Owner shall in any way reduce Contractor's liability for the complete installation and construction relating to said materials, the value of the materials, or liability under any performance bond provided for the Project.

**§ 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.

**§ 9.3.4** The Contractor warrants and certifies with the submission of each Application for Payment that he has or will supply the Owner, Wage Certifications that comply with the Secretary of Labor and Industry's requirements. The Contractor is to substantiate that all Wage Certificates have been received from all subcontractors. Failure to submit Wage Certificates will be deemed reason to withhold all or part of the Application for Payment and place the Contractor in default of the Contract. The Contractor, or the Contractor's subcontractor, who for any reason fails to provide Wage Certification, or who is found through the Department of Labor and Industry to be in noncompliance, will be considered in default of the Contract.

## § 9.4 Certificates for Payment

§ 9.4.1 The Architect/Engineer will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect/Engineer determines is properly due, and notify the Contractor and Owner of the Architect/Engineer'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/Engineer'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/Engineer to the Owner, based on the Architect/Engineer's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect/Engineer's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect/Engineer. However, the issuance of a Certificate for Payment will not be a representation that the Architect/Engineer has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract ~~Sum~~-Sum; (5) not withstanding any other required provisions of the agreement.

§ 9.4.2.1 No previous inspection or certificate of payment shall be held as an acceptance of defective work or materials or to relieve Contractor from the obligation to furnish sound materials and to perform good satisfactory work. The Architect/Engineer shall be the sole judge of the materials and work furnished.

§ 9.4.2.2 If the Architect/Engineer deems it inexpedient to correct defective work not otherwise performed or completed in strict accordance with the Contract Documents, the difference in value between such work and that of the work, materials and conditions as specified, together with a fair allowance for damage shall be deducted from the Contract price.

§ 9.4.3 Commonwealth Procurement Code empowers the Architect/Engineer to reject the reduction in Retainage if the Contractor is not making satisfactory progress, or there is a specific cause for greater withholding. The following are some of the items, but may not be the only criteria considered used to determine the acceptability of reduction in Retainage:

- .1 Satisfactory performance of the work.
- .2 Satisfactory maintenance of the project schedule.
- .3 Proper manning of the project.
- .4 Satisfactory completion of the work.
- .5 Satisfactory organization of the project.
- .6 Proper organization and coordination of the subcontractors.
- .7 Proper coordination with other Separate Contractors.
- .8 All defective work has been remedied or is in the process of being remedied.
- .9 Work completed is not in contention.
- .10 Satisfactory follow through of paperwork, change order proposals, or construction change directives.
- .11 Satisfactory payment to the subcontractors and suppliers.
- .12 Submission of Weekly Wage Certifications.

§ 9.4.4 Only after this request is received and approved in writing, may it be incorporated into the appropriate Applications for Payment.

§ 9.4.5 After the reduction in Retainage is approved, the Owner will pay 95% of the amount due the Contractor on account of monthly progress payments provided that the Architect/Engineer approves the Application for Payment,, the Contractor is making satisfactory progress and there is no specific cause for greater withholding until final payment is due.



## § 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect/Engineer may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect/Engineer's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect/Engineer is unable to certify payment in the amount of the Application, the Architect/Engineer will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect/Engineer cannot agree on a revised amount, the Architect/Engineer will promptly issue a Certificate for Payment for the amount for which the Architect/Engineer is able to make such representations to the Owner. The Architect/Engineer 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/Engineer'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; or
- .8 failure to comply with governmental statutes, regulations, and laws.

§ 9.5.1.1 The Architect/Engineer may withhold a Certificate for Payment if the Contractor's Application for Payment is incomplete. Reasons for incompleteness include

- .1 failure to sign Contractors' Construction Schedule or provide monthly updates of the Contractors' Construction Schedule;
- .2 failure to submit Wage Certification as required by Labor and Industry;
- .3 failure to submit shop drawings, product data, and other information as required by the submittal schedule;
- .4 failure to complete items on the punch list established at Substantial Completion; or
- .5 failure to submit Operation and Maintenance Manuals and Record Documents.

§ 9.5.2 When either party disputes the Architect/Engineer'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/Engineer 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/Engineer.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. Contractor and each subcontractor shall comply with the payment obligations of Section 3933 of the Pennsylvania Commonwealth Procurement Act, 62 PA C.S. § 3933.



§ 9.6.3 The Architect/Engineer 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/Engineer 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/engineer 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

9.7.1 If the Architect/Engineer does not issue a Certificate for Payment, through no fault of the Contractor, within fourteen (14) days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect/Engineer or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect/Engineer, 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.

§ 9.7.2 The Contractor shall not stop the work or terminate the Contract if the Architect/Engineer should refuse to issue any certificate for payment pursuant to the provisions of Section 9.3, 9.4, 9.5, or 9.6.

## § 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated phase thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy in an acceptable condition, or utilize the Work for its intended use. A Certificate of use and Occupancy, or temporary certificate in lieu of a Final Certificate of Use and Occupancy, does not necessarily constitute Substantial Completion for acceptance and use by the Owner. In no event will the Project, or designated portion of the Project, be certified as Substantially Complete, allowing the Owner to utilize the space, until at least 95% of the Work of the Project, or designated portion of the Project, is completed to the satisfaction of the Architect/Engineer. Refer to Section 01 7000 – Closeout Procedures for additional Substantial Completion procedures.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, entire Work, or the Work of a separate Phase (as defined in Division 01 Section "Summary", or on Phasing Drawings) is substantially complete, the Contractor shall prepare and submit to the Architect/Engineer a comprehensive list of items to be completed or corrected prior to final payment. (punch list) along with an application by the Contractor for Certification of Substantial Completion by the Architect/Engineer. The Contractor shall proceed

to promptly complete and correct items on the list. 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.

**§ 9.8.2.1** In accordance with Pennsylvania State law, items not completed or corrected at the time of Substantial Completion shall have a value of 150% of their worth (as determined by the Architect/Engineer) affixed to them and this amount withheld from any payment due to the Contractor until the items are completed or corrected.

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

**§ 9.8.3.1** Following the initial Substantial Completion inspection, the Architect/Engineer will either prepare a Certificate of Substantial Completion or will advise the Contractor of work that must be performed before the certificate can be issued. Results of the completed inspection will form the initial "punch list" for the portion of the work completed. The punch list will be created by the Architect/Engineer with input from the Owner, and any sub-consultants of the Architect/Engineer, and distributed to the contractor within seven days of the inspection. The punch list will identify separately those items that are required for the Owner to utilize the work or designated portion thereof for its intended use. The Contractor shall complete or correct those items before issuance of the Certificate for Substantial Completion. In such case, the Contractor shall then submit a request for another inspection by the Architect/Engineer to determine Substantial Completion. If the Architect/Engineer or any of its subconsultants are required, because of the Contractor's inability to complete these items, to make more than one follow-up inspection, then according to Section 12.2.1, the Contractor will be responsible for such costs. The Owner will back charge the Contractor for such additional costs and deduct the amount from the retainage or Application for Payment.

**§ 9.8.3.2** The remaining work items on the punch list, which are not required for substantial completion, must be completed within 30 days of issuance of the punch list or be subject to liquidated damages.

**§ 9.8.4** When the Work or designated portion thereof is substantially complete, the Architect/Engineer 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. Final 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/Engineer 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/Engineer.

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

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

#### § 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect/Engineer will promptly make such inspection. When the Architect/Engineer finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect/Engineer will promptly issue a final Certificate for Payment stating that to the best of the Architect/Engineer's knowledge, information and belief, and on the basis of the Architect/Engineer'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/Engineer'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/Engineer will perform no more than one (1) final inspection and one (1) reinspection to determine whether the Work, or a designated portion thereof, has attained Final Completion in accordance with the Contract Documents. The Owner will be entitled to seek reimbursement from the Contractor for the costs of additional reinspection's made by the Architect/Engineer. Refer to Specification Section 01 7000 – Closeout Procedures for additional Final Completion procedures.

§ 9.10.1.2 The Architect/Engineer shall make final inspection within seven (7) days following receipt of the Contractor's request for final inspection and final Application for Payment.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect/Engineer (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/Engineer so confirms, the Owner shall, upon application by the Contractor and certification by the Architect/Engineer, 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/Engineer 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.

- .5 terms and/or breach of any warranties, expressed or implied, made by Contractor under applicable law or as required under the Contract Documents;
- .6 matters arising following such payment which were not within the reasonable contemplation of Owner when payment was made.

**§ 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.~~ Except as provided under Section 9.5.1 and 9.10.2 and sections relating to retainage, if the Work is completed the Architect/Engineer shall issue a certificate of completion and a final certificate for payment and the Owner shall make payment in full within 45 days thereafter.

## **§ 9.11 Liquidated Damages**

**§ 9.11.1** Actual damages for delay in the time of completion are impossible of determination, thus, said sum is a measure only of liquidated damages the Owner will sustain for each delay and shall not be construed as a penalty. Accordingly, the Contractor and the Contractor's Surety shall be liable for, and shall pay to the Owner as fixed, agreed and liquidated damages, the sum indicated for each calendar day which the actual time of completion shall be delayed beyond the time of completion indicated on the schedule of completion included as part of the Contract Documents and Form of Agreement. All areas are scheduled to be substantially completed on or before the date as indicated on the Contract Documents and on the Form of Agreement. The Contractor and the Contractor's Surety shall also be liable for failure to correct "Punch List" items within the time limit indicated.

**§ 9.11.1.11** The Owner shall have the right to assess liquidated damages if the Contractor is not able to complete their work per any and each phase as indicated in the Contract Documents.

**§ 9.11.2** The actual time of completion shall be the date upon which the work reaches Substantial Completion in accordance with provisions of the Contract Documents.

**§ 9.11.3** The Owner shall have the right to deduct the total amount of any fixed, agreed and/or liquidated damages for which the Contractor may be liable from any moneys otherwise due to the Contractor under the contract, including any retained percentage which may be under the control of the Owner.

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

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

~~The Contractor~~ All Contractors shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. safety programs in connection with the Work. All of the Contractor's and subcontractor's employees shall have all the necessary certifications to be at the public school facility in accordance with applicable law and Section 01 4100 – Regulatory Requirements.

#### **§ 10.1.1 Asbestos**

- .1 If any asbestos containing materials or materials that are believed to contain asbestos are encountered by a Contractor during the Work, the Contractor should immediately notify the Owner and the Architect/Engineer.
- .2 The Owner will make necessary measures to have the material tested, then removed if deemed to be asbestos-containing material.
- .3 If materials are found not to contain asbestos then the Contractor shall continue with the originally scheduled work.

**§ 10.1.2** Neither the Owner nor the Architect/Engineer will be responsible for providing a safe working place for the Contractors, their Subcontractors or their employees, or any individual responsible to them for the work.

**§ 10.1.3** Neither the professional activities of the Architect/Engineer, nor the presence of the Architect/Engineer or the Architect/Engineer's employees and sub-consultants at a construction site, shall relieve the Contractor and any other entity of their obligations, duties, and responsibilities including, but not limited to, construction means, methods, sequences, techniques, or procedures necessary for performing, superintending, or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Architect/Engineer and Architect/Engineer's personnel have no authority to exercise any control over any construction contractor or other entity of their employees in connection with their work or any health or safety precautions. The Contractor is solely responsible for job site safety, and warrants that this intent shall be



made evident in the Owner's agreement with the Contractor. The Owner, the Architect/Engineer and the Architect/Engineer's consultants shall be indemnified and shall be made additional insureds under the Contractor's general liability insurance policy.

## **§ 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.
- .4 work of other Separate Contractors on site.

**§ 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,~~ and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

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

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

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

**§ 10.2.9** The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services, and shall comply with all reasonable recommendations of the fire insurance company carrying insurance on the Work, or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean and all combustible rubbish shall be promptly removed from the Project site.

**§ 10.2.10** The Contractor shall at all times protect excavations, trenches, buildings, and materials from rainwater, groundwater, back up or leakage of sewers, drainage, or other piping, and from water of any other origin and shall

remove any accumulation of water promptly. Contractor shall provide and operate all pumps, piping and other equipment necessary to this end.

**§ 10.2.11** The Contractor shall take precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner, whether forming part of the Work or located in those areas of the Project to which the Contractor has access. The Contractor shall have full responsibility for the security of such property of the Owner located in such areas and shall reimburse the Owner for any such loss, damage or injury, including Owner's deductible on Builder's Risk, except such as may be directly caused by agents or employees of the Owner.

**§ 10.2.12** The Contractor shall conform to requirements of the Federal Occupational Safety and Health Act, and the Construction Safety Code. The requirements of the State, Local and Association Codes shall apply where they are equal to or more restrictive than the requirements of the Federal Act.

**§ 10.2.13** The Contractor shall follow best practices for preventing the formation of mold in the Project. If mold becomes present in finished work, remediation shall be performed by mold remediation experts hired by the Contractor.

**§ 10.2.14** The Contractor shall protect all materials and equipment for which he is responsible, which is stored at the Project Site for incorporation in the work, or which has been incorporated into the work. He shall replace all such materials and equipment which may be lost, stolen or damaged at its expense, whether or not such materials or equipment have been entirely or partially paid for by the Owner.

**§ 10.2.15** The Contractor shall submit Material Safety Data Sheets (MSDS) to the Project Coordinator for all material to be used on site and prior to material being brought on site. The Project Coordinator shall maintain Material Safety Data Sheets and make them available or inspection to everyone as required by law.

**§ 10.2.16** The Contractor shall hold weekly safety meetings to provide for the safeguarding of persons and property. The Contractor shall record minutes of the meetings and submit copies to the Owner on a weekly basis for record.

**§ 10.2.17** The Contractor shall provide the Owner, at the initial project meeting, a written safety program and hazard communication program as required by OSHA.

### **§ 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/Engineer of the condition. In the event the Contractor encounters on the site material reasonably believed to be asbestos or PCB or other hazardous or toxic substance which has not been rendered harmless, the Contractor shall immediately stop the Work in the affected area and report the condition to the Owner and Architect/Engineer in writing. The Work in the affected areas shall not be resumed, if in fact the material is asbestos or PCB or other hazardous or toxic substance and has not been rendered harmless except as authorized by any government agency having jurisdiction over such matter (e.g. DEP, EPA...) and upon written recommendation of properly licensed environmental consultant retained by Owner. The Work in the affected areas shall be resumed in the absence of asbestos, PCB, hazardous, or toxic substance, or when it is rendered harmless and removed. The Contract Time may be extended appropriately. Contractor shall not be entitled to any compensation or recovery of any damages in connection with any delay, as more fully set forth in Section 8.3.3.

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



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

**§ 10.3.3** 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. The Owner shall not be responsible under this Section 10.3 for 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 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.

**§ 10.3.4** The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance 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 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.

**§ 10.3.5** 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. 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 indemnify the Contractor for all cost and expense thereby incurred.

**§ 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.

## **§ 10.5 Contractor's Obligations**

**§ 10.5.1** The Contractor must assume all risks and bear any loss occasioned by neglect or accident during the progress of the work until same shall have been completed and accepted by the Owner. The Contractor agrees to indemnify, defend and save harmless the Owner, and Architect/Engineer from all suits and claims for damages, loss or injury to persons or property received or sustained from the Contractor or his agents in the performance of the work under his contract. The indemnification and save harmless provision does not limit the Architect/Engineer's Liability in matters concerning design and professional responsibility. The Contractor must properly protect all adjacent work during the

progress of construction and make good all damage that may occur to any work herein specified or to adjacent property in consequence of the work herein specified. He must also assume all blame or loss by reason of neglect or violation of local or state laws, ordinances and regulations, encroachments upon neighbors, or from any other cause.

**§ 10.5.2** The Work in every respect shall be under the care of the Contractor and at his risk, he shall properly safeguard against any or all injury or damage to the public, to any property, materials, or thing, except where stipulated otherwise in the specifications, and also be responsible for any such damage or injury from his undertaking of this work to any person or persons or thing connected therewith. He shall indemnify and save harmless the Owner, and Architect/Engineer from all claims, suits, damages, actions or law, in equity or otherwise, (including the cost of defense thereof which shall be assumed by the Contractor) or any kind whatsoever in connection with this work and agreement and shall, if required, show evidence of settlement of any such action before final payment is made hereunder by the Owner.

## **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. Documents, and to which the Owner has no reasonable objection. 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. Such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

**§ 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.~~ The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents, governing municipality, or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

**§ 11.1.2.1** The During the term of the Contract, and for the Completed Operations Liability and Excess Liability for one year after the completion of the Work, the Contractor and each subcontractor shall, at their own expense, purchase and maintain the following insurance in companies properly licensed and satisfactory to the owner.

The minimum amounts of coverage shall be as follows or greater where required by law:

- A. Worker's Compensation
- |                                       |           |
|---------------------------------------|-----------|
| 1. Worker's Compensation – Coverage A | Statutory |
| 2. Employer's Liability – Coverage B  |           |
| a. Each Accident                      | \$100,000 |
| b. Disease – Policy Limit             | \$500,000 |
| c. Disease – Each Employee            | \$100,000 |
- B. Comprehensive General Liability including coverage for premises, operations, independent contractors, elevators, contractual liability, products, completed operations, Broad Form property damage, explosion, collapse and underground property damage, personal injury. No deductible permitted. Coverage amount is aggregate limit per project.
- |  |             |
|--|-------------|
| 1. Each Occurrence                         | \$1,000,000 |
| 2. Products/Completed Operations Aggregate | \$1,000,000 |
| 3. Personal/Advertising Injury             | \$1,000,000 |
| 4. General Aggregate                       | \$2,000,000 |
- C. The policy shall be endorsed to have the General Aggregate apply to this project only.
- D. Comprehensive Automobile Liability Insurance including coverage for owned, non-owned and hired autos, Bodily Injury, Property Damage, Basic First Party Benefits and Uninsured/Underinsured Motorists coverage as required by Law. Coverage amount limit shall be a minimum of one million dollars (\$1,000,000.00), combined single limit, each occurrence.
- E. Excess (Umbrella) Liability Insurance:
1. Bodily Injury and Property Damage following the form of the aforementioned Comprehensive General Liability, Comprehensive Automobile Liability, and Employer's Liability. Coverage amount limit shall be a minimum of five million dollars (\$5,000,000.00) Bodily Injury and Property Damage combined. No deductible. No "gaps" between primary and excess.
  2. The Owner shall be named as Certificate Holder. The Owner and Architect/Engineer and the Township shall be named as Additional Insured under this policy for this Project.

Contractor shall submit evidence of required insurance coverage on ACORD25 form "Certificate of Insurance" which shall be modified to state "all policies of insurance shown on this form will not be cancelled or materially changed or renewal refused until at least thirty (30) days prior written notice has been given to Owner, Architect, Engineer, and to each additional insured".

Language such as "will endeavor to mail..." or "but failure to mail...shall impose no obligation or liability...upon the company, its agents or representative..." is not acceptable within the Cancellation Clause.

**§ 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.~~ Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

**§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within ~~three (3)~~thirty (30) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.1.5 Certificates called for herein shall be furnished in duplicate and shall specifically set forth evidence of all coverage required by Sections 11.1.1 and 11.1.2 and the Contractor shall furnish to the Owner copies of all endorsements that are subsequently issued. Contractor shall furnish to the Owner and Architect/Engineer written notice as evidenced by return receipt of registered mail any endorsements, reductions or cancellations that are subsequently issued amending coverage or limits.

~~§ 11.1.6 The Owner will provide standard Builders Risk Insurance.~~

## § 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.~~

§ 11.2.1 The Owner will provide standard Builders Risk Insurance. The Contractor's deductible will be in accordance with the policy in affect at the time of the Contract Phase One start date. The Owner will furnish a copy to the Contractor upon written request. The Owner's Builders Risk Insurance policy shall have a maximum \$10,000 deductible.

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

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) thirty (30) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.2.4 Unless otherwise provided, the Owner 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, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis less per event deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or 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 11.2 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.2.5 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without



duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, 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/Engineer's and Contractor's services and expenses required as a result of such insured loss.

**§ 11.2.6** If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then affect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

**§ 11.2.7** This property insurance shall cover portions of the Work stored off the site, after written approval of the Owner is granted and a value established for the value of that property, and also portions of the Work in transit.

**§ 11.2.8** Rebuilding, replacement, or repair after any loss shall be performed promptly by the Contractor without awaiting the collection of the proceeds of insurance or the determination of the distribution thereof. The occurrence of a loss by fire or other casualty shall in no way relieve the Contractor from the responsibility of completing his portion of the Work in accordance with the Contract.

**§ 11.2.9** If the Contractor requests in writing that insurance for risks other than those described herein, or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

### **§ 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/Engineer and Architect/Engineer'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/Engineer, Architect/Engineer's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

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

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

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

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

**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and

Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

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

#### **§11.6 Performance Bond and Payment Bond**

**§11.6.1** The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract. Bonds must be obtained through a source acceptable to the Owner and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to 100 percent of the Contract Sum.

**§11.6.2** The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the Power of Attorney, Surety or Attorney-in-fact executing the required bonds shall be organized and existing under the laws of the Commonwealth of Pennsylvania and are held and firmly bound unto West Chester Area School District in the full and just sum of 100% Contract Sum.

**§11.6.3** If any surety makes any assignments for the benefit of creditors or commits any act of bankruptcy, or is declared bankrupt, or files a voluntary petition for bankruptcy, or in the reasonable opinion of the Owner is insolvent, the Contractor shall immediately furnish and maintain another surety satisfactory to the Owner.

**§11.6.4** The bonds shall be dated on or before the date of the Contract.

**§11.6.5** All insurance and bonds required pursuant to Article 11 and the Contract Documents must be issued by insurance providers that are licenses and authorized to conduct business in the Commonwealth of Pennsylvania. Insurance carriers and Sureties of whom the Contractor has purchased coverage are to have an “A-“ or better rating, plus a financial rating of “VI” or better with the A.M. Best’s Company Rating Guide – latest edition.

**§11.6.6** 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.

#### **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/engineer’s request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect/Engineer, be uncovered for the Architect/Engineer’s examination and be replaced at the Contractor’s expense without change in the Contract Time.

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



## **§ 12.2 Correction of Work**

### **§ 12.2.1 Before or After Substantial Completion**

The Contractor shall promptly correct Work rejected by the Architect/Engineer or failing to conform to the requirements of the Contract Documents, whether discovered before or after 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/Engineer's services and expenses made necessary thereby, shall be at the Contractor's expense.

**§ 12.2.1.1** All items called for by the Contract Documents to be installed, supplied, or otherwise incorporated into the Project, but which at the time of inspection are found not to be in compliance with the Contract Documents, shall be considered punch list items. It shall be clearly understood that "Punch List" items and "Maintenance" items are different categories. All items, which at any time after completion inspection are found to be in compliance with the Contract Documents, shall be considered maintenance items to be corrected by the Contractor under the one-year warranty terms of the Contract.

**§ 12.2.1.2** Work that is rejected or fails to conform to the requirements of the Contract Documents, that requires any review, research, recommendation, meetings or direction by the Architect/Engineer, any of his consultants in order to substantiate same or to approve remedies or alternate solution will be subject to Section 12.1.1. The Architect/Engineer will be compensated for such additional work at standard prevailing rates by the Owner. The Owner will duly back charge the Contractor for such additional costs and deduct same from retainage or subsequent Application for Payment.

### **§ 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** The obligation under this Section 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. Nothing contained in this section shall decrease the liability of Contractor and/or Surety as set forth in the Performance Bond.

**§ 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.

**§ 12.2.3.1** If the Contractor fails to correct non-conforming Work within a reasonable time, the Owner may correct it in accordance with Section 2.5. If the Contractor does not proceed with correction of such non-conforming Work within a reasonable time fixed by written notice from the Architect/Engineer, the Owner may remove it and store the salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay for costs of such removal and storage within ten (10) days written notice, the Owner may upon ten (10) additional days' notice sell such materials and equipment at auction or private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect/Engineer's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have

borne, the Contract Sum shall be reduced by the deficiency. If payments entered thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference due 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.

**§ 13.1.1** The Contract shall be governed by the laws of the Commonwealth of Pennsylvania.

### **§ 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/Engineer, 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. Where Specifications require testing by an independent testing laboratory, the Owner will retain and pay for the services of a testing laboratory. The Contractor~~

shall be responsible for coordinating the scheduling of all tests with the testing laboratory. Reports will be delivered to the Owner, Architect/Engineer and Contractor simultaneously.

§ 13.4.2 Other tests, inspections and approvals of portions of the Work required by the laws, ordinances, rules, regulations or orders or public authorities or municipalities having jurisdiction shall be made at an appropriate time. The Contractor shall make arrangements for such tests, inspections and approvals with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall be solely responsible for such tests. The Contractor shall give the Owner and Architect/Engineer timely notice of when and where tests and inspections are to be made so the Architect/Engineer may observe such procedures.

§ 13.4.3 If the Architect/Engineer, 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/Engineer 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/Engineer of when and where tests and inspections are to be made so that the Architect/Engineer may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

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

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

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

§ 13.4.7 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, Work under direct or indirect contract with the Contractor, 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/Engineer has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- 4 ~~The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.~~

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

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

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

## § 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 ~~repeatedly~~ refuses or fails to supply enough properly skilled workers or proper materials; materials, or to increase working hours, or to increase the number of working days per week in order to keep up with the Contractors' Construction Schedule;
- .2 fails to make payment to Subcontractors or suppliers for materials and/or labor in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 ~~repeatedly~~ disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of ~~substantial breach of a provision of the Contract Documents.~~ Documents;
- .5 if the Contractor is adjudged bankrupt or files for bankruptcy or credit protection under the laws of this United States. Contractor shall provide Owner thirty (30) days written notice before filing.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect/Engineer 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~~ Activate the Surety's 45-day period within which the Surety shall staff the Project with a new Contractor and sufficient resources to maintain the Contractors' Construction Schedule;
- .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/Engineer's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the ~~Initial Decision Maker,~~ Architect/Engineer upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.2.5 If the Owner terminates the Contract with the Contractor and it is determined that the Contractor has forfeited the Performance Bond, the Owner will not approve the bonding company's use of the Terminated Contractor to complete the Project.

§ 14.2.6 In the event the Owner terminates the Contract for cause, and such cause was determined to be valid and justified in addition, and without prejudice to all other rights, remedies, and relief which the owner may obtain under this Agreement and pursuant to the law, the Owner shall be entitled to payment by Contractor of all reasonable professional fees, including attorneys' fees, architectural/engineering and consulting fees (together with reasonable expenses and disbursements incurred in connection therewith) which the Owner may incur in connection with any

legal proceedings or action (including professional fees rendered in anticipation of such proceedings or action). This provision shall create no rights to the Contractor or to any other person or entity for payment of such costs or expenses.

#### **§ 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.~~ Contractor shall suspend the progress of the Work, or any part thereof, for the operational necessity or convenience of the Owner whenever he shall be required by written order of the Owner. Such suspensions shall be for such reasonable periods of time as the Owner may order; provided that, in the event of such Suspension(s) of the progress of Work or any part thereof, the Completion Date of the Work so suspended or delayed by such Suspension(s) shall be extended by the Owner for a period equivalent to the time lost by reason of such Suspension(s). Such order of the Owner will not otherwise modify, or invalidate in any way, any of the other provisions of the Contract, and the Contractor shall not be entitled to any damages or compensation from the Owner, except as otherwise provided in the Contract Documents, on account of such delay(s) or Suspension(s).

#### **§ 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.

**§ 14.4.1.1** Termination by the Owner under this Section shall be by Notice of Termination delivered to the Contractor specifying the extent of the termination and the effective date.

**§ 14.4.2** Upon receipt of notice from the Owner of such termination (pursuant to Section 14.4) 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; and
- .4 proceed to complete the performance of the Work not terminated.

**§ 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 on the same basis provided in Section 14.1.3.

### **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/Engineer. ~~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~~ ten (10) days after occurrence of the event giving rise to such Claim or within ~~21~~ ten (10) 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~~ Architect/Engineer 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. The Architect Engineer will prepare Change Orders and issue Certificates for Payment in accordance with those decisions.

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

### § 15.1.5 Claims for Additional Cost

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

### § 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. ~~In the case of a continuing delay, only one Claim is necessary.~~ Submission of a time impact analysis per Section 8.3.6 will be required to illustrate delay claim by Contractor and the delay's effect on the Contractors' Construction Schedule.

§ 15.1.6.2 ~~If adverse~~ Adverse weather conditions are ~~the not an acceptable 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.~~

### § 15.1.7 Waiver of Claims for Consequential Damages

The Contractor ~~and Owner waive Claims against each other~~ waives Claims against the Owner 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, including but not limited to, damages incurred by the Contractor for principal office expenses including the compensation of the personnel stationed there, for losses of financing, rental expenses, loss of use, business and reputation, and for loss of profit, except for anticipated profit arising directly from the Work.

### § 15.1.7 Claims Against Separate Contractors

§ 15.1.7.1 Should the Contractor cause, or allow to be caused, damage to any persons, property, or Work of another Contractor working on this Project, he shall upon due notice from Owner, Architect/Engineer, or other party to the damage, arrange for prompt and amicable settlement. It is agreed by all parties such disputes shall not delay completion of the Work, nor cause claims against the Owner. Work shall be continued by party claiming damage at this expense, subject to damages as may be obtained by due course of the law.



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. **§ 15.1.7.2**

Should Contractor, either itself or by its subcontractor or subcontractors or their respective agents, servants or employees, cause damage or injury to the property or work of any other Contractor, or by failing to perform its work (including work of its subcontractor or subcontractors) with due diligence, delay any other Contractor which suffers additional expense or damage as a result, the parties involved in such disputes shall settle by agreement or arbitrate said claim, dispute, or disputes by referring same to Pennsylvania Uniform Arbitration Act, 42 Pa CSA 7301. Dispute or disputes shall be determined pursuant to Pennsylvania Uniform Arbitration Act, 42 Pa CSA 7301. It is agreed by parties that disputes or actions between Separate Contractors concerning additional expense or damage will not delay completion of Work, which will be continued by the parties, subject to rights herein before provided. It is agreed by parties to Contract (Owner as promisee or Contractor as promisor) that intent of clause is to benefit other Contractors on the project or related projects and to serve as an indication of mutual intent of Owner and Contractor that this clause raise such other Contractors to the status of third party beneficiaries only as to terms and conditions of Sections 6.2.3, 6.2.4, and 6.2.5. Contractor agrees Sections 6.2.3, 6.2.4, and 6.2.5 are provided as a benefit to Contractor and, they specifically exclude claims against Owner for delay or other damages.

**§ 15.1.7.3** Contractor agrees that claims, disputes and other matters in question between other Separate Contractors, which arise out of, or are related to this contract or breach thereof, as provided in Section 6.2.5, shall be settled by agreement or resolved by arbitration, in accordance with Pennsylvania Uniform Arbitration Act, 42 Pa CSA 7301, then in effect, unless parties mutually agree otherwise. This agreement to arbitrate is in consideration of fact that other Contractors agree to this same arbitration provision, as provided in each separate Contract required for construction of this project, and is specifically enforceable under prevailing arbitration law. Award rendered by arbitrators shall be final, and judgement may be entered upon it in accord with applicable law in any court having jurisdiction. Owner shall not be a party to this arbitration.

## **§ 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 Architect/Engineer for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker Architect/Engineer, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered make a claim in accordance with Article 15. Unless the Initial Decision Maker Architect/Engineer and all affected parties agree, the Initial Decision Maker Architect/Engineer will not decide disputes between the Contractor and persons or entities other than the Owner.

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

**§ 15.2.3** In evaluating Claims, the Initial Decision Maker Architect/Engineer 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 Architect/Engineer in rendering a decision. The Initial Decision Maker Architect/Engineer may request the Owner to authorize retention of such persons at the Owner's expense.

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

**§ 15.2.5** The Initial Decision Maker Architect/Engineer will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker Architect/Engineer 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. 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.

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

**§ 15.2.7** In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy. Claims, disputes, or other matters in question between the parties to the Contract arising out of or relating to the Contract, or breach thereof, shall be exclusively litigated in the Court of Common Pleas of Chester County, Pennsylvania and shall not be subject to arbitration. Pending resolution of any claim and/or dispute, unless otherwise agreed in writing the Contractor shall proceed diligently with the performance of the Work so as to avoid delay in the Contractors' Construction Schedule.

**§ 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**

Disputes arising out of or related to the Contract will not be subject to resolution by mediation. All disputes not settled between the parties will be litigated in the Court of Common Pleas of Chester County, Pennsylvania.

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

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

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

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

## § 15.4 Arbitration

Disputes arising out of or related to the Contract will not be subject to resolution by arbitration. All disputes not settled between the parties will be litigated in the Court of Common Pleas of Chester County, Pennsylvania.

~~§ 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.~~

DOCUMENT 007346 - WAGE DETERMINATION SCHEDULE

PART 1 GENERAL

1.1 DOCUMENT INCLUDES

- . Pennsylvania Prevailing Wage Rates.

1.2 RELATED DOCUMENTS

- A. General and Supplementary Conditions of the Contract.
- B. Section 014100 - Regulatory Requirements

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 WAGE RATES

- A. See attached Prevailing Wage Rate predetermination for rates. This regulation and the general Pennsylvania prevailing minimum wage rates, (Act 442 of 1961, P.L. 987, amended), as determined by the Secretary of Labor and Industry, which shall be paid for each craft or classification of all workers needed to perform the Contract during the anticipated term therefore in the locality in which public work is performed, are made part of this Specification.

END OF DOCUMENT 007346

**BUREAU OF LABOR LAW COMPLIANCE  
PREVAILING WAGES PROJECT RATES**

Project Name:	Mary C. Howse Elementary School Additions and Renovations
Awarding Agency:	West Chester Area School District
Contract Award Date:	1/30/2024
Serial Number:	23-08531
Project Classification:	Building
Determination Date:	10/24/2023
Assigned Field Office:	Philadelphia
Field Office Phone Number:	(215)560-1858
Toll Free Phone Number:	
Project County:	Chester County

# BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 23-08531 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	6/1/2023		\$57.84	\$43.36	\$101.20
Boilermakers	3/1/2018		\$45.89	\$33.73	\$79.62
Bricklayer	5/1/2023		\$47.50	\$31.42	\$78.92
Carpenter - Chief of Party (Surveying & Layout)	5/1/2023		\$50.57	\$29.02	\$79.59
Carpenter - Chief of Party (Surveying & Layout)	5/1/2024		\$52.58	\$29.02	\$81.60
Carpenter - Chief of Party (Surveying & Layout)	5/1/2025		\$54.59	\$29.02	\$83.61
Carpenter - Instrument Person (Surveying & Layout)	5/1/2023		\$43.97	\$29.02	\$72.99
Carpenter - Instrument Person (Surveying & Layout)	5/1/2024		\$45.72	\$29.02	\$74.74
Carpenter - Instrument Person (Surveying & Layout)	5/1/2025		\$47.47	\$29.02	\$76.49
Carpenter - Rodman (Surveying & Layout)	5/1/2023		\$21.99	\$20.62	\$42.61
Carpenter - Rodman (Surveying & Layout)	5/1/2024		\$22.86	\$20.62	\$43.48
Carpenter - Rodman (Surveying & Layout)	5/1/2025		\$23.74	\$20.62	\$44.36
Carpenters	5/1/2023		\$43.97	\$29.02	\$72.99
Carpenters	5/1/2024		\$45.72	\$29.02	\$74.74
Carpenters	5/1/2025		\$47.47	\$29.02	\$76.49
Cement Finishers & Plasterers	5/1/2022		\$38.57	\$32.39	\$70.96
Cement Masons	5/1/2023		\$44.20	\$32.96	\$77.16
Dockbuilder, Pile Drivers	5/1/2023		\$50.48	\$37.99	\$88.47
Dockbuilder, Pile Drivers	5/1/2024		\$52.98	\$37.99	\$90.97
Dockbuilder, Pile Drivers	5/1/2025		\$55.23	\$37.99	\$93.22
Dockbuilder, Pile Drivers	5/1/2026		\$56.98	\$37.99	\$94.97
Dockbuilder/Pile Driver Diver	5/1/2023		\$58.41	\$41.74	\$100.15
Dockbuilder/Pile Driver Diver	5/1/2024		\$61.54	\$41.74	\$103.28
Dockbuilder/Pile Driver Diver	5/1/2025		\$64.35	\$41.74	\$106.09
Dockbuilder/Pile Driver Diver	5/1/2026		\$66.54	\$41.74	\$108.28
Dockbuilder/pile driver tender	5/1/2023		\$50.48	\$37.99	\$88.47
Dockbuilder/pile driver tender	5/1/2024		\$52.98	\$37.99	\$90.97
Dockbuilder/pile driver tender	5/1/2025		\$55.23	\$37.99	\$93.22
Dockbuilder/pile driver tender	5/1/2026		\$56.98	\$37.99	\$94.97
Drywall Finisher	5/1/2023		\$38.77	\$31.12	\$69.89
Electricians	5/29/2023		\$49.24	\$36.04	\$85.28
Elevator Constructor	1/1/2023		\$66.21	\$43.64	\$109.85
Floor Coverer	5/1/2023		\$50.12	\$29.21	\$79.33
Floor Coverer	5/1/2024		\$52.19	\$29.21	\$81.40
Glazier	5/1/2023		\$46.68	\$36.62	\$83.30
Interior Finish	5/1/2019		\$30.20	\$25.80	\$56.00
Interior Finish	5/1/2023		\$34.60	\$25.80	\$60.40
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	1/1/2023		\$50.70	\$39.51	\$90.21
Iron Workers (Riggers)	7/1/2017		\$39.83	\$27.92	\$67.75
Iron Workers (Riggers)	7/1/2023		\$42.53	\$34.14	\$76.67
Ironworker (Rodman)	7/1/2020		\$44.82	\$31.60	\$76.42
Ironworker (Rodman)	7/1/2023		\$45.70	\$34.77	\$80.47
Laborers (Class 01 - General)	5/1/2020		\$32.05	\$25.25	\$57.30
Laborers (Class 01 - See notes)	5/1/2022		\$33.35	\$25.65	\$59.00



# BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 23-08531 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 01 - See notes)	5/1/2023		\$34.60	\$25.80	\$60.40
Laborers (Class 02 - See notes)	5/1/2022		\$36.70	\$27.00	\$63.70
Laborers (Class 02 - See notes)	5/1/2023		\$37.95	\$27.30	\$65.25
Laborers (Class 03 - See notes)	5/1/2022		\$33.77	\$25.83	\$59.60
Laborers (Class 03 - See notes)	5/1/2023		\$35.02	\$25.98	\$61.00
Laborers (Class 04 - See notes)	5/1/2022		\$33.77	\$25.83	\$59.60
Laborers (Class 04 - See notes)	5/1/2023		\$35.02	\$25.98	\$61.00
Laborers (Class 05 - See notes)	5/1/2022		\$33.35	\$25.65	\$59.00
Laborers (Class 05 - See notes)	5/1/2023		\$34.60	\$25.50	\$60.10
Landscape Laborer	5/1/2020		\$26.55	\$23.13	\$49.68
Landscape Laborer	5/1/2023		\$29.45	\$23.98	\$53.43
Marble Finisher	5/1/2023		\$39.52	\$29.30	\$68.82
Marble Mason	5/1/2023		\$47.20	\$31.95	\$79.15
Mason Tender, Cement	5/1/2019		\$30.52	\$25.98	\$56.50
Mason Tender, Cement	5/1/2023		\$35.02	\$25.98	\$61.00
Millwright	5/1/2023		\$51.60	\$35.81	\$87.41
Millwright	5/1/2024		\$54.67	\$35.81	\$90.48
Millwright	5/1/2025		\$57.39	\$35.81	\$93.20
Millwright	5/1/2026		\$60.20	\$35.81	\$96.01
Operators (Building, Class 01 - See Notes)	5/1/2023		\$52.20	\$32.81	\$85.01
Operators (Building, Class 01A - See Notes)	5/1/2023		\$55.20	\$33.70	\$88.90
Operators (Building, Class 02 - See Notes)	5/1/2023		\$51.95	\$32.74	\$84.69
Operators (Building, Class 02A - See Notes)	5/1/2023		\$54.97	\$33.61	\$88.58
Operators (Building, Class 03 - See Notes)	5/1/2023		\$47.87	\$31.53	\$79.40
Operators (Building, Class 04 - See Notes)	5/1/2023		\$47.57	\$31.44	\$79.01
Operators (Building, Class 05 - See Notes)	5/1/2023		\$45.85	\$30.93	\$76.78
Operators (Building, Class 06 - See Notes)	5/1/2023		\$44.85	\$30.65	\$75.50
Operators (Building, Class 07A- See Notes)	5/1/2023		\$63.33	\$37.68	\$101.01
Operators (Building, Class 07B- See Notes)	5/1/2023		\$63.04	\$37.59	\$100.63
Painters Class 1 (see notes)	5/1/2023		\$42.32	\$32.91	\$75.23
Painters Class 4 (see notes)	5/1/2023		\$44.41	\$32.91	\$77.32
Plasterers	5/1/2023		\$39.32	\$32.64	\$71.96
plumber	5/1/2023		\$64.73	\$37.61	\$102.34
Pointers, Caulkers, Cleaners	5/1/2022		\$47.64	\$30.06	\$77.70
Pointers, Caulkers, Cleaners	5/1/2023		\$48.80	\$30.70	\$79.50
Roofers (Composition)	5/1/2023		\$42.63	\$34.62	\$77.25
Roofers (Shingle)	5/1/2021		\$30.50	\$21.55	\$52.05
Roofers (Slate & Tile)	5/1/2021		\$33.50	\$21.55	\$55.05
Sheet Metal Workers	5/1/2023		\$57.31	\$48.97	\$106.28
Sign Makers and Hangars	7/15/2022		\$30.54	\$24.35	\$54.89
Sign Makers and Hangars	7/15/2023		\$31.76	\$24.63	\$56.39
Sprinklerfitters	1/1/2023		\$62.23	\$31.99	\$94.22
Steamfitters	5/1/2023		\$67.37	\$41.99	\$109.36
Stone Masons	5/1/2023		\$47.20	\$31.95	\$79.15

**BUREAU OF LABOR LAW COMPLIANCE  
PREVAILING WAGES PROJECT RATES**

<b>Project: 23-08531 - Building</b>	<b>Effective Date</b>	<b>Expiration Date</b>	<b>Hourly Rate</b>	<b>Fringe Benefits</b>	<b>Total</b>
Terrazzo Finisher	5/1/2023		\$43.75	\$27.86	\$71.61
Terrazzo Grinder	5/1/2023		\$44.02	\$27.86	\$71.88
Terrazzo Mechanics	5/1/2023		\$50.26	\$29.56	\$79.82
Tile Finisher	5/1/2023		\$39.52	\$29.30	\$68.82
Tile Setter	5/1/2023		\$50.26	\$29.56	\$79.82
Truckdriver class 1(see notes)	5/1/2022		\$35.60	\$20.74	\$56.34
Truckdriver class 1(see notes)	5/1/2023		\$36.29	\$21.55	\$57.84
Truckdriver class 2 (see notes)	5/1/2022		\$35.70	\$20.74	\$56.44
Truckdriver class 2 (see notes)	5/1/2023		\$36.39	\$21.55	\$57.94
Truckdriver class 3 (see notes)	5/1/2022		\$35.95	\$20.74	\$56.69
Truckdriver class 3 (see notes)	5/1/2023		\$36.64	\$21.55	\$58.19
Window Film / Tint Installer	6/1/2019		\$24.52	\$12.08	\$36.60

# BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 23-08531 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Carpenter - Chief of Party (Surveying & Layout)	5/1/2023		\$63.24	\$29.06	\$92.30
Carpenter - Chief of Party (Surveying & Layout)	5/1/2024		\$65.19	\$29.06	\$94.25
Carpenter - Chief of Party (Surveying & Layout)	5/1/2025		\$67.15	\$29.06	\$96.21
Carpenter - Chief of Party (Surveying & Layout)	5/1/2026		\$69.10	\$29.06	\$98.16
Carpenter - Instrument Person (Surveying & Layout)	5/1/2023		\$54.99	\$29.06	\$84.05
Carpenter - Instrument Person (Surveying & Layout)	5/1/2024		\$56.69	\$29.06	\$85.75
Carpenter - Instrument Person (Surveying & Layout)	5/1/2025		\$58.39	\$29.06	\$87.45
Carpenter - Instrument Person (Surveying & Layout)	5/1/2026		\$60.09	\$29.06	\$89.15
Carpenter - Rodman (Surveying & Layout)	5/1/2023		\$43.99	\$22.41	\$66.40
Carpenter - Rodman (Surveying & Layout)	5/1/2024		\$45.35	\$22.41	\$67.76
Carpenter - Rodman (Surveying & Layout)	5/1/2025		\$46.71	\$22.41	\$69.12
Carpenter - Rodman (Surveying & Layout)	5/1/2026		\$48.07	\$22.41	\$70.48
Carpenter	5/1/2023		\$54.99	\$29.06	\$84.05
Carpenter	5/1/2024		\$56.69	\$29.06	\$85.75
Carpenter	5/1/2025		\$58.49	\$29.06	\$87.55
Carpenter	5/1/2026		\$60.19	\$29.06	\$89.25
Cement Masons	5/1/2023		\$43.20	\$32.91	\$76.11
Dockbuilder, Pile Drivers	5/1/2023		\$50.48	\$37.99	\$88.47
Dockbuilder, Pile Drivers	5/1/2024		\$52.98	\$37.99	\$90.97
Dockbuilder, Pile Drivers	5/1/2025		\$55.23	\$37.99	\$93.22
Dockbuilder, Pile Drivers	5/1/2026		\$56.98	\$37.99	\$94.97
Dockbuilder/Pile Driver Diver	5/1/2023		\$58.41	\$41.74	\$100.15
Dockbuilder/Pile Driver Diver	5/1/2024		\$61.54	\$41.74	\$103.28
Dockbuilder/Pile Driver Diver	5/1/2025		\$64.35	\$41.74	\$106.09
Dockbuilder/Pile Driver Diver	5/1/2026		\$66.54	\$41.74	\$108.28
Dockbuilder/pile driver tender	5/1/2023		\$50.48	\$37.99	\$88.47
Dockbuilder/pile driver tender	5/1/2024		\$52.98	\$37.99	\$90.97
Dockbuilder/pile driver tender	5/1/2025		\$55.23	\$37.99	\$93.22
Dockbuilder/pile driver tender	5/1/2026		\$56.98	\$37.99	\$94.97
Electric Lineman	5/29/2023		\$60.48	\$32.77	\$93.25
Electric Lineman	6/3/2024		\$62.07	\$33.96	\$96.03
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	1/1/2023		\$50.70	\$39.51	\$90.21
Ironworker (Rodman)	7/1/2020		\$44.82	\$31.60	\$76.42
Laborers (Class 01 - See notes)	5/1/2022		\$36.30	\$27.20	\$63.50
Laborers (Class 01 - See notes)	5/1/2023		\$37.55	\$27.45	\$65.00
Laborers (Class 02 - See notes)	5/1/2022		\$36.50	\$27.20	\$63.70
Laborers (Class 02 - See notes)	5/1/2023		\$37.75	\$27.45	\$65.20
Laborers (Class 03 - See notes)	5/1/2022		\$36.50	\$27.20	\$63.70
Laborers (Class 03 - See notes)	5/1/2023		\$37.75	\$27.45	\$65.20
Laborers (Class 04 - See notes)	5/1/2022		\$31.10	\$27.20	\$58.30
Laborers (Class 04 - See notes)	5/1/2023		\$32.35	\$27.45	\$59.80
Laborers (Class 05 - See notes)	5/1/2022		\$37.15	\$27.20	\$64.35
Laborers (Class 05 - See notes)	5/1/2023		\$38.40	\$27.45	\$65.85
Laborers (Class 06 - See notes)	5/1/2022		\$37.20	\$27.20	\$64.40

# BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 23-08531 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 06 - See notes)	5/1/2023		\$38.40	\$27.45	\$65.85
Laborers (Class 07 - See notes)	5/1/2022		\$37.05	\$27.20	\$64.25
Laborers (Class 07 - See notes)	5/1/2023		\$38.30	\$27.45	\$65.75
Laborers (Class 08 - See notes)	5/1/2022		\$36.80	\$27.20	\$64.00
Laborers (Class 08 - See notes)	5/1/2023		\$38.05	\$27.45	\$65.50
Laborers (Class 09 - See notes)	5/1/2022		\$36.65	\$27.20	\$63.85
Laborers (Class 09 - See notes)	5/1/2023		\$37.90	\$27.45	\$65.35
Laborers (Class 10- See notes)	5/1/2022		\$36.80	\$27.20	\$64.00
Laborers (Class 10- See notes)	5/1/2023		\$38.05	\$27.45	\$65.50
Laborers (Class 11 -See Notes)	5/1/2022		\$36.70	\$27.20	\$63.90
Laborers (Class 11 -See Notes)	5/1/2023		\$37.95	\$27.45	\$65.40
Laborers (Class 12 -See Notes)	5/1/2022		\$38.40	\$27.20	\$65.60
Laborers (Class 12 -See Notes)	5/1/2023		\$39.65	\$27.45	\$67.10
Laborers (Class 13 -See Notes)	5/1/2022		\$40.43	\$27.20	\$67.63
Laborers (Class 13 -See Notes)	5/1/2023		\$41.65	\$27.45	\$69.10
Laborers (Class 14 -See Notes)	5/1/2022		\$36.55	\$27.20	\$63.75
Laborers (Class 14 -See Notes)	5/1/2023		\$38.25	\$27.45	\$65.70
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2022		\$30.17	\$19.18	\$49.35
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2023		\$31.42	\$19.43	\$50.85
Laborers Utility (PGW ONLY)	5/1/2022		\$37.20	\$19.18	\$56.38
Laborers Utility (PGW ONLY)	5/1/2023		\$38.45	\$19.43	\$57.88
Landscape Laborer	5/1/2022		\$27.73	\$23.65	\$51.38
Landscape Laborer	5/1/2023		\$29.03	\$23.80	\$52.83
Millwright	5/1/2023		\$51.60	\$35.81	\$87.41
Millwright	5/1/2024		\$54.67	\$35.81	\$90.48
Millwright	5/1/2025		\$57.39	\$35.81	\$93.20
Millwright	5/1/2026		\$60.20	\$35.81	\$96.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2023		\$52.20	\$32.81	\$85.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2024		\$53.36	\$33.65	\$87.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2025		\$54.52	\$34.49	\$89.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2026		\$55.67	\$35.34	\$91.01
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2023		\$55.20	\$33.70	\$88.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2024		\$56.37	\$34.53	\$90.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2025		\$57.52	\$35.38	\$92.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2026		\$58.68	\$36.22	\$94.90
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2023		\$51.95	\$32.74	\$84.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2024		\$53.11	\$33.58	\$86.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2025		\$54.27	\$34.42	\$88.69

# BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 23-08531 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Highway)					
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2026		\$55.43	\$35.26	\$90.69
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2023		\$54.97	\$33.61	\$88.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2024		\$56.13	\$34.45	\$90.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2025		\$57.29	\$35.29	\$92.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2026		\$58.44	\$36.14	\$94.58
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2023		\$47.87	\$31.53	\$79.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2024		\$49.03	\$32.37	\$81.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2025		\$50.18	\$33.22	\$83.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2026		\$51.34	\$34.06	\$85.40
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2023		\$47.57	\$31.44	\$79.01
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2024		\$48.73	\$32.28	\$81.01
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2025		\$49.88	\$33.13	\$83.01
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2026		\$51.04	\$33.97	\$85.01
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2023		\$45.85	\$30.93	\$76.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2024		\$47.00	\$31.78	\$78.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2025		\$48.16	\$32.62	\$80.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2026		\$49.32	\$33.46	\$82.78
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2023		\$44.85	\$30.65	\$75.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2024		\$46.02	\$31.48	\$77.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2025		\$47.17	\$32.33	\$79.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2026		\$48.34	\$33.16	\$81.50
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2023		\$63.33	\$37.68	\$101.01
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2024		\$64.80	\$38.61	\$103.41
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2025		\$66.26	\$39.55	\$105.81
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2026		\$67.73	\$40.48	\$108.21
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2023		\$63.04	\$37.59	\$100.63

**BUREAU OF LABOR LAW COMPLIANCE  
PREVAILING WAGES PROJECT RATES**

<b>Project: 23-08531 - Heavy/Highway</b>	<b>Effective Date</b>	<b>Expiration Date</b>	<b>Hourly Rate</b>	<b>Fringe Benefits</b>	<b>Total</b>
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2024		\$64.50	\$38.53	\$103.03
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2025		\$65.97	\$39.46	\$105.43
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2026		\$67.44	\$40.39	\$107.83
Painters Class 2 (see notes)	2/1/2023		\$48.82	\$32.09	\$80.91
Painters Class 3 (see notes)	2/1/2023		\$59.78	\$32.13	\$91.91
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2022		\$61.34	\$40.28	\$101.62
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2023		\$64.00	\$41.68	\$105.68
Steamfitters	5/1/2018		\$56.37	\$34.39	\$90.76
Truckdriver class 1(see notes)	5/1/2022		\$35.45	\$20.74	\$56.19
Truckdriver class 1(see notes)	5/1/2023		\$36.14	\$21.55	\$57.69
Truckdriver class 2 (see notes)	5/1/2022		\$35.55	\$20.74	\$56.29
Truckdriver class 2 (see notes)	5/1/2023		\$36.24	\$21.55	\$57.79
Truckdriver class 3 (see notes)	5/1/2022		\$35.80	\$20.74	\$56.54
Truckdriver class 3 (see notes)	5/1/2023		\$36.49	\$21.55	\$58.04



## SECTION 011100 – SUMMARY OF WORK

### PART 1 GENERAL

#### 1.01 PROJECT INFORMATION

- A. Project Identification: Mary C. Howse Elementary School, West Chester, PA.
  - 1. Project Location: 641 Boot Road, West Chester, PA 19380.
  - 2. Owner: West Chester Area School District, 782 Springdale Drive, Exton, PA 19341.
  - 3. Owner's Contact: Wayne Birster - West Chester Area School District, (484) 266-1265.
  - 4. Owner's On-site Contact: Tim Burns – West Chester Area School District, (484) 266-1281.
- B. Architect/Engineer: Blackney Hayes Architect/Engineers, 150 S. Independence Mall West, Suite 1200, Philadelphia, PA 19106. Contact: Darin C. Jellison, AIA (215) 829.0922, Ext. 133.

#### 1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of the Project is defined by the Contract Documents and consists of the following:
  - 1. Renovation of the existing 1-story, 59,550 SF elementary school, as well as the construction of a 7,500 SF classroom and corridor addition, the construction of a 630 SF custodial office addition, and the removal of mobile classrooms in their entirety.
- B. Type of Contract
  - 1. Project will be constructed under coordinated, concurrent multiple contracts. See Division 01 Section "Multiple Contract Summary" for a description of work included under each of the multiple contracts and for the responsibilities of the Project Coordinator. Contracts for this Project include the following:
    - a. General Construction.
    - b. Mechanical.
    - c. Plumbing.
    - d. Electrical.
    - e. Roofing.
    - f. Sprinkler.
    - g. Sitework.
- C. The term "Prime Contractor" is used throughout Division 01 to refer to the Separate Contractors who hold the contracts listed above.
  - 1. Each Prime Contractor is responsible for his entire Scope of Work indicated in the Contract Documents. Each Prime Contractor is responsible to review ALL drawings and specifications to determine his scope of work.
  - 2. Each Prime Contractor is responsible for coordinating their Work with the other Prime Contractors and the Owner's own forces.
  - 3. Local custom and trade union jurisdictional settlement do not control the Scope of Work included in each sub-contract. When a potential jurisdictional dispute or similar interruption of construction activities is first identified or threatened, the affected sub-contracts shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and its delays.

### 1.03 OWNER-FURNISHED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.
- B. Owner-Furnished Products:
  - 1. Furniture: The Owner will furnish and install the furniture. The Owner will coordinate delivery and building access with the furniture vendor.
  - 2. Kitchen Equipment: The Owner will furnish and install the kitchen equipment, except for the triple-bowl sink, prep sink, hand sink, exhaust hood, and existing equipment that shall be relocated. See kitchen equipment schedule located on the drawings for Prime Contractor responsibility.
  - 3. Limited Toilet, Custodial Accessories, and Classroom Accessories: The Owner's cleaning product vendor will furnish the soap dispensers, toilet paper holders, sanitary napkin disposal units, and paper towel dispensers for the General Contractor to install. Note that classroom accessories include paper towel dispensers and soap dispensers.
  - 4. Interior Room Signage: The Owner to furnish and install interior door and room signage throughout.
  - 5. Projectors: The Owner to furnish and install projectors where indicated on the Drawings. The EC to provide pathways, power and data wiring to the Projectors.
  - 6. Metal Shelving: The Owner to furnish and install metal shelving where indicated on the Drawings.
  - 7. Window Shades: The Owner to furnish and install window shades where indicated on the Drawings.
  - 8. Existing Modular Classrooms: The Owner responsible for hiring the modular company to remove the temporary modular classrooms.
    - a. Refer to Section 011200 "Multiple Contract Summary" for each Prime Contractor's scope of work related to demolition and construction activities to the Owner's removal of the modular classrooms.
  - 9. Refer to the Drawings for additional scope items in which the Owner is responsible for. All Prime Contractors to coordinate their scope of Work with the Owner's scope.

### 1.04 CONTRACTOR USE OF SITE AND PREMISES

- A. School District Badge Identification System: All Workers are required to display their ID badges at all times, whether working inside or outside of the school building. Badges will be issued to each Prime Contractors' employees whose clearances have been received and approved by the school district.
  - 1. All badges to be returned to the School District at the end of the project.
  - 2. The Prime Contractors shall reimburse the School District \$250.00 for each badge that needs to be replaced or not returned to the School District at the end of the Project.
- B. The building and property will be open and operational throughout the duration of this Project. Each Prime Contractor and his Subcontractor's, Sub-Subcontractor's, and material men shall have access to the Work area during normal working hours, but will be responsible to coordinate all demolition and construction with the Owner and their operations. Noisy, objectionably odiferous, or potentially disruptive Work shall be coordinated with the Owner's class schedule and events. The Work area must remain protected and safe.

1. Each Prime Contractor shall not be permitted use, access, or cross the playground during school hours (7:00 a.m. to 3:30 p.m.).
  2. Each Prime Contractor shall limit demolition or construction activities during scheduled school state testing days and times. No Work that would cause a disruption will be permitted during these times.
  3. Weekend Hours: Subject to approval by the Owner and further subject to ordinances and regulations by local and governing authorities having jurisdiction.
  4. Evening Hours: Subject to approval by the Owner and further subject to ordinances and regulations by local and governing authorities having jurisdiction.
- C. Prior to commencing work on site, each Prime Contractor shall meet with the Architect and Owner to review work to be completed, determine its impact on occupied areas and adjacent properties, etc. to distribute necessary guidelines.
- D. Designated areas will be established, as necessary, for parking, toilet facilities, special trailers and deliveries, etc.
- E. Each Prime Contractor are authorized to be on grounds only during the performance of work related to the project.
- F. Obey speed limits as posted, or if not posted, not to exceed 10 mph on grounds. Yield to all pedestrian traffic. Do not blow horn unless absolutely necessary. Not all persons on site can be expected to possess good pedestrian skills.
- G. Vehicles and operating equipment shall be turned off, locked and secure whenever not in use. All tools and equipment, not removed from the site on a daily basis, shall be secured and kept in the work staging area at the end of each work day. The Owner will not assume responsibility for any missing articles.
- H. Do not fraternize with Owner's employees, students or building occupants while working on site.
- I. Building occupants and employees are not allowed in work areas. Active work areas shall be secured and/or enclosed at all times to prevent occupants and employees from wandering inside.
- J. Safety shall be maintained by each Prime Contractor at the job site at all times.
- K. Possession and/or consumption of alcoholic beverages or drugs are strictly prohibited on site at all times.
- L. Smoking, including vaping, is prohibited on the property.
- M. Possession of firearms is strictly prohibited on site at all time.
- N. Radios are prohibited during school hours.
- O. Limits: Confine construction operations on site to areas where work is required to complete scope of work defined in the Project Manual and Drawings.

- P. Driveways and Entrances: Keep driveways, parking areas, loading areas and entrances serving premises clear and available to Owner, Owner's employees, the public and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
- Q. Schedule deliveries to minimize use of driveways and entrances. No deliveries or waste removal will be permitted during the hours of student pick up or drop off.
- R. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- S. Each Prime Contractor is not permitted to use any parking spaces designated for the Owner's staff or visitors without Owner's written permission. Each Prime Contractor shall review available on-site parking locations prior to submitting its bid.
- T. Maintain all existing utilities to the existing building throughout construction period. Repair damage caused by construction operations. Each Prime Contractor must notify the Owner seven (7) business days minimum in advance of any utility shut-downs. Utility tie-ins, cut-ins, or activities that require shutting down utilities to the occupied portion of the building will only be permitted off business hours when the existing building or property is not occupied by the Owner.
- U. Removal of non-fixed, movable items will be completed by the Owner prior to the start of construction, unless otherwise indicated on the Contract Documents. Fixed or built-in items shall be removed and/or salvaged, and relocated, by the Contractor and disconnects by appropriate trades as indicated and/or directed and as required to perform the work.
- V. All Personnel shall dress in clothing appropriate to the work they perform. All Personnel are to wear shirts, hardhats, safety shoes, glasses, gloves, masks or respirators, noise protection devices, and other protective clothing and equipment as required by OSHA standards.
- W. Each Prime Contractor must notify the Owner seven (7) business days minimum in advance of any crane/lifting activities. No lifting activities may occur over any part of the building below the lift area while the building is occupied.

#### 1.05 KNOWLEDGE OF CONTRACT REQUIREMENTS

- A. Each Prime Contractor and his Subcontractor's, Sub-Subcontractor's, and material men shall consult in detail the General Conditions, all Divisions and Sections of the Specifications, all Drawings, and all Addenda for instructions and requirements pertaining to the Work, and at his and their cost, shall provide all labor, materials, equipment, and services necessary to furnish, install, and complete the work in strict conformance with all provisions thereof.
- B. Each Prime Contractor will be held to have examined the site of the Work prior to submitting his proposal and informed himself, his Subcontractors, Sub-Subcontractors, and material men of all existing conditions affecting the execution of the work.
- C. Each Prime Contractor will be held to have examined the Contract Documents, and Modifications thereto, as they may affect subdivisions of the work and informed himself, his Subcontractors, Sub-Subcontractors, and material men of all conditions thereof affecting the execution of the work.

- D. Each Prime Contractor will be held to be thoroughly familiar with all conditions affecting labor in the neighborhood of the project including, but not limited to, Unions, incentive pay, procurement, living, and commuting conditions and to have informed his Subcontractors and Sub-Subcontractors thereof.

#### 1.06 CONTRACT DOCUMENTS INFORMATION

- A. The Contract Documents are prepared in accordance with available information as to existing conditions and locations. If, during construction, conditions are revealed at variance with the Contract Documents, notify the Architect/Engineer immediately so that supplementary instructions may be issued.
- B. Should an item of work appear in the Specifications and not on the Drawings, and vice versa, all related work items associated with this scope is to be included in the contract at no additional cost to the Owner unless omitted during the bid process.
- C. The techniques or methods of specifying to record requirements varies throughout text, and may include "prescriptive", "open generic/descriptive", "compliance with standards", "performance", "proprietary", or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work. The interpretation of these techniques or methods shall be governed by Division 01 Section "Regulatory Requirements."
- D. With the approval of the Architect/Engineer and without additional cost to the Owner, make all necessary changes or modifications to locations as may be necessary to suit requirements and conditions at the building and for the proper and conveniently accessible location of all parts of the system.
- E. The Scope of Work for the Contract is not necessarily limited to the description of each Section of the Specifications and the illustrations shown on the Drawings. Include all minor items not expressly indicated in the Contract Documents, or as might be found necessary as a result of field conditions, in order to complete the work as it is intended, without any gaps between the various subdivisions of work of each Prime Contractor and his Subcontractors.
  - 1. Small details and blocking not usually shown or specified, but necessary for the proper installation and operation of the work, shall be provided at no additional cost or time to the contract.
- F. Cap all incomplete pipes, ducts, conduits, openings, etc., until ready for final connection, after which they shall be thoroughly cleaned and left unobstructed.

PART 2 PRODUCTS (Not applicable).

PART 3 EXECUTION (Not applicable).

END OF SECTION 011100

## SECTION 011200 – MULTIPLE CONTRACT SUMMARY

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section includes a summary of each contract, including responsibilities for coordination and temporary facilities and controls.
- B. Specific requirements of each contract are also indicated in individual Specification Sections and on Drawings.
- C. Related Sections include the following:
  - 1. Division 1 Section "Summary" for the Work covered by the Contract Documents, Owner-furnished products, Owner-occupancy requirements, and knowledge of Contract requirements.
  - 2. Division 1 Section "Project Coordination" for general coordination requirements.

#### 1.02 COORDINATION

- A. Project Coordinator shall be provided by the General Contractor.
  - 1. Project Coordinator shall be a full-time person experienced in administration and supervision of building construction, including but not limited to mechanical, plumbing, and electrical work.
  - 2. Project Coordinator shall be responsible for coordination between the General Construction, Plumbing, Mechanical, Electrical, Sprinkler, Roofing, and Sitework Contracts.
  - 3. Activities of Project Coordinator include, but are not limited to, the following:
    - a. Provide overall coordination of the Work.
    - b. Coordinate Township inspections of all Primes work and ascertain inspection requirements with Township and each Prime Contractor, and schedule Township inspections as required.
    - c. Coordinate shared access to workspaces.
    - d. Coordinate product selections for compatibility.
    - e. Provide overall coordination of temporary facilities and controls.
    - f. Coordinate and schedule interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
    - g. Coordinate construction and operations of the Work with work performed by each contract and other entities on site.
    - h. Coordinate sequencing and scheduling of the Work in conformance with Division 01 Section "Construction Progress Schedule." Include the following:
      - 1) Initial Coordination Meeting: At earliest possible date, arrange and conduct a meeting with contractors for sequencing and coordinating the Work; negotiate reasonable adjustments to schedules.
      - 2) Prepare combined Contractors' Construction Schedule for entire Project. Secure time commitments for performing critical construction activities from contractors.
    - i. Schedule and conduct contractor Progress Meetings as specified in Division 01 Section "Project Meetings." Record all Progress Meetings.



- j. Schedule, conduct, and record Coordination Meetings as specified in Division 01 Section "Project Meetings."
- k. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
- l. Locate existing permanent benchmarks, control points, and similar reference points, and establish permanent benchmarks on Project site.
- m. Provide field surveys of in-progress construction and site work. Provide certification that work is located in accordance with the drawings.
- n. Provide progress cleaning of common areas and coordinate progress cleaning of areas or pieces of equipment where more than one contractor has worked.
- o. Coordinate protection of the Work.
- p. Coordinate through-penetration firestopping and acoustic sealants installation.
- q. Coordinate completion of interrelated punch list items.
- r. Print and submit Record Drawings if installations by more than one Prime Contractor are indicated on the same Contract Drawing or Shop Drawing.
- s. Coordinate preparation of operation and maintenance manuals if information from more than one Prime Contractor is to be integrated with information from other contractors to form one combined record.
- t. Collect, maintain, and make available Material Safety Data Sheets for the Project.
- 4. Temporary Facilities and Controls: Provide the following temporary facilities and controls in accordance with Division 01 Section "Temporary Facilities and Controls":
  - a. Provide common-use field office for use by all personnel engaged in construction activities.
- B. MEP Coordinator shall be provided by Mechanical Contractor.
  - 1. MEP Coordinator shall be a full-time person experienced in coordination of mechanical, plumbing, and electrical work, including coordination of type of operations required for this Project.
  - 2. Activities of MEP coordinator include, but are not limited to, the following:
    - a. Schedule and sequence mechanical, plumbing, fire protection, and electrical activities.
    - b. Coordinate sharing access to workspaces by mechanical, plumbing and fire protection, and electrical contractors.
    - c. Coordinate integration of mechanical, plumbing and fire protection, and electrical work into limited spaces.
    - d. Coordinate protection of mechanical, plumbing and fire protection, and electrical contractors' work.
    - e. Coordinate cutting and patching for mechanical, plumbing, fire protection, and electrical work.
    - f. Prepare coordination drawings of ceiling cavities and mechanical rooms demonstrating the spatial relationship and necessary clearances within the available space above ceilings and within rooms for mechanical, plumbing, fire protection, electrical, and structural systems. Comply with the requirements for coordination drawings as specified in Division 01 Section "Project Coordination."
    - g. Coordinate tests and inspections for mechanical, plumbing, fire protection, and electrical work.
    - h. Coordinate mechanical, plumbing, fire protection, and electrical temporary services and facilities.

### 1.03 GENERAL REQUIREMENTS OF CONTRACTS

- A. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the Work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
  2. Trenches and other excavation for the Work of each contract shall be the work of each contract for its own Work.
  3. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the responsibility of each Prime Contractor for its own work.
  4. Roof-mounted equipment curbs for the work of each contract shall be provided by the responsibility of each Prime Contractor for its own work.
  5. Through-penetration firestopping at fire-rated assemblies for the work of each contract shall be the responsibility of each Prime Contractor for its own work.
  6. Acoustic sealants required for through-penetrations at sound-rated assemblies for the work of each contract shall be the responsibility of each Prime-Contractor for its own work.
  7. Furnishing and installation of access panels for the work of each contract shall be the responsibility of each Prime Contractor for its own work.
  8. Painting for the work of each contract shall be the work of the General Construction Contract.
  9. Furnishing and installation of covers for exposed piping, conduit, and similar services shall be the responsibility of each Prime Contractor for its own work.
  10. Cutting and Patching:
    - a. Floors:
      - 1) Each Contractor to cut floor as required to execute their respective scopes of Work. Each Contractor to repair subfloor level, and to prepare a smooth substrate for final flooring finish when Work is complete.
      - 2) Where existing floor finishes are scheduled to be removed, the General Contractor to remove floor finishes and any existing mastics, adhesives, primers, etc. down to existing concrete subfloor.
      - 3) General Contractor to provide subfloor patching and preparation as required to install scheduled finish floor materials.
      - 4) Where existing flooring has tested positive for containing hazardous materials and is scheduled for removal, a licensed hazardous materials contractor hired by the Owner shall remove/encapsulate asbestos containing mastic and provide a level substrate for installation of new floor by General Contractor.
    - b. Walls:
      - 1) All wall openings in visible areas of the final design will be patched by the General Contractor.
      - 2) For all openings in areas not visible in final design (i.e. above finished ceilings), the Mechanical Contractor, Plumbing Contractor, Electrical Contractor, and Sprinkler Contractor will cut holes and patch for their respective scopes of work.
      - 3) General Contractor to patch walls at existing light switch locations thermostat locations, and similar device locations. General Contractor to coordinate with Mechanical Contractor and Electrical Contractor.
    - c. Ceilings:

- 1) Sprinkler Contractor to remove existing sprinkler heads, and any other items covered under Division 21 of the Specifications.
  - 2) Plumbing Contractor to remove existing plumbing equipment and devices covered under Division 22 of the Specifications.
  - 3) Mechanical Contractor to remove existing diffusers, grilles, vents, and any other items covered under Division 23 of the Specifications.
  - 4) Electrical Contractor to remove existing lighting, fire alarm devices, speakers, clocks, data devices and wiring, and any other items covered under Division 26 through 28.
  - 5) General Contractor to remove all ceiling tiles and grid and any other remaining ceiling equipment and materials.
  - 6) General Contractor to reinstall new ceiling and grid in all scope of work areas after Plumbing Contractor, Mechanical Contractor, Electrical Contractor, and Sprinkler Contractor work is complete.
  - 7) Each individual prime contractor will be required to cut their own ceiling tiles for their respective devices.
- d. Roof:
- 1) Each Contractor to cut roof as required to execute their respective scopes of Work.
  - 2) Each Contractor is responsible for coordinating their required roof penetrations with the General Contractor. General Contractor to supply and install required roof deck supporting steel at openings including roof dunnage steel.
  - 3) Roofing Contractor to patch and flash new roof system around all curbs, supports, penetrations and openings.
  - 4) Roofing Contractor to provide temporary weather protection as required at all penetrations and openings.
- e. Modular Classroom Removal:
- 1) Plumbing Contractor to cut any plumbing work at the modular classroom foundation. Plumbing Contractor to remove abandoned sections of plumbing piping from foundation out to the nearest active pipe or line.
  - 2) Electrical Contractor to cut any electrical work at the modular classroom foundation. Electrical Contractor to remove abandoned sections of electrical conduit and ductbanks from foundation out to the nearest active conduit or line.
  - 3) Once all utilities are disconnected at the modular classrooms, removal of the modular classroom to be completed by the Owner.
  - 4) Building foundations for the modular classroom to be removed in their entirety by the General Contractor. The General Contractor shall restore the area of the modular classroom to grade with fill material and top soil, and stabilize using permanent seed mix.
- B. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Section 015000 "Temporary Facilities and Controls," each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
  2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
  3. Temporary enclosures for its own construction activities.

4. Staging and scaffolding for its own construction activities.
5. General hoisting facilities for its own construction activities.
6. Waste disposal facilities, including collection and legal disposal of its own demolition and construction debris, hazardous, dangerous, unsanitary, or other harmful waste materials.
7. Progress cleaning of work areas affected by its operations on a daily basis.
8. Secure lockup of its own tools, materials, and equipment.
9. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
10. Dehumidification and Ventilation Equipment required to perform installation of contractor's work, if required by that installation process.
11. Provide dust control to prevent unnecessary air-borne dust from dispersing through construction operations.
12. First Aid Supplies.
13. Fire Extinguishers.
14. Each Prime Contractor is responsible for providing temporary facilities, measures, protection, etc. of the existing and new construction, materials, property, etc. as a part of their own demolition and construction activities. This temporary Work also includes the coordination and scheduling of providing the temporary facilities with other Prime Contractors as to not delay their Work.
15. Temporary Field Office Trailers and Temporary Storage and Fabrication Sheds.
  - a. General Contractor:
    - 1) Maximum size permitted: 8 foot by 40 foot.
    - 2) General Contractor will be responsible to provide tables, chairs, and plan table for use during project meetings.
  - b. Other Prime Contractors:
    - 1) Maximum size permitted: 8 foot by 20 foot.
    - 2) Only one trailer permitted is permitted for either temporary office use or temporary storage and fabrication.
  - c. Each Prime Contractor will be responsible for providing their own temporary power and data to their trailers and sheds.
  - d. Each Prime Contractor will be responsible for the delivery, maintenance, and removal of their trailers and sheds.
  - e. Each Prime Contractor will be responsible for restoring the existing site to its original condition prior to the start of the Work.
  - f. Each Prime Contractor shall be responsible for its own furniture, internet, and phone service.

#### 1.04 GENERAL CONSTRUCTION CONTRACT

- A. Work in the General Construction Contract (Contract No. GC-1) includes, but is not limited to, Divisions 03 through 14 and the following:
  1. Remaining work not identified as work under other contracts.
  2. Foundations, including footings and foundation walls.
  3. Slabs-on-grade, including insulation.
  4. Below-grade building construction, including excavation, backfill, and insulation and waterproofing/dampproofing.
  5. Concrete pads at exterior doors.
  6. Superstructure, including floor and roof construction, except roof systems, and sprayed fire-resistive materials.
    - a. Coordinate the size and location of floor and roof openings with all Contractors.

7. Exterior closure, including walls, parapets, doors, and windows.
  8. Dumpster enclosure walls, foundations, and footings.
  9. Interior construction, including partitions, doors, interior glazed openings, and fittings.
    - a. Coordinate the size and location of wall openings with all contractors.
  10. Fire-protection specialties.
  11. Railings and finishes.
  12. Roof ladders and hatches.
  13. Interior finishes: Finish carpentry, architectural woodwork, interior specialties, floor and ceiling finishes, and painting.
  14. Miscellaneous items, including:
    - a. Concrete equipment pads, except where noted by other Prime Contractors.
    - b. Painting of exposed mechanical, plumbing, sprinkler, and electrical work.
- B. Temporary facilities and controls in the General Construction Contract include, but are not limited to, the following:
1. Temporary facilities and controls that are not otherwise specifically assigned to other contracts.
  2. Unpiped temporary toilet fixtures, wash facilities, and drinking water facilities, including disposable supplies from Notice to Proceed through the completion of construction.
  3. Temporary enclosure for building exterior, except as indicated.
  4. Dewatering facilities and drains.
  5. Project identification and temporary signs.
  6. Pest control.
  7. Temporary stairs.
  8. Temporary site enclosure fencing.
  9. Stormwater control.
  10. Temporary fire-protection facilities.
  11. Barricades, warning signs, and lights.
    - a. Provide for protection of workmen and public as required by applicable regulations, and for the protection of streets, lighting, hydrants, walks, curbs, and adjacent grounds and planting, for the duration of such operations. Repair all damage to the barricades, regardless of who caused the damage.
    - b. Warning lights shall be blinker type, battery or electrically operated. Open flame torches are not permitted.
  12. Security enclosure and lockup.
  13. Maintenance and restoration of Owner's existing facilities used as temporary facilities.
  14. Provide for all snow removal as required to access the construction site and work areas in order to maintain productivity after Notice to Proceed through the end of construction. Areas for snow removal also includes construction area and material lay-down area.
  15. Provide temporary staging/laydown space with temporary fencing and gates.

#### 1.05 MECHANICAL CONSTRUCTION CONTRACT

- A. Work in the Mechanical Construction Contract (Contract No. MC-1) includes, but is not limited to, Division 23 and the following:
1. Central hot water and chilled water plants and piping systems.
  2. HVAC systems and equipment.
  3. HVAC instrumentation and controls.
  4. HVAC testing, adjusting, and balancing.
  5. Building automation system.
  6. Mechanical connections to equipment furnished by other contractors.

7. Kitchen Exhaust hood and ANSUL system.
8. Removal of refrigerant from HVAC equipment to be removed or demolished.
9. Concrete and maintenance pads required for mechanical equipment.
10. Install duct smoke detectors that are furnished under the Electrical Construction Contract. Refer to Electrical Drawings for locations where duct smoke detectors are located. Wiring to shut down the unit and close damper provided as part of this contract. Wiring to the fire alarm panel provided under the Electrical Construction Contract.

#### 1.06 PLUMBING CONSTRUCTION CONTRACT

- A. Work in the Plumbing Construction Contract (Contract No. PC-1) includes, but is not limited to, Divisions 21 and 22 and the following:
  1. Plumbing fixtures.
  2. Domestic hot water heaters.
  3. Domestic and Fire water service extensions to new building addition.
  4. Domestic water distribution.
  5. Domestic water and fire services outside the building are existing to remain.
  6. Grease interceptor and concrete relieving pad.
  7. Sanitary waste within building to 5 feet beyond the exterior wall of the building.
  8. Stormwater drainage within building to 5 feet beyond the exterior wall of the building.
  9. Gas service from gas meter into the building and throughout the building by the Plumbing Contractor. Connection to the gas meter provided by the Plumbing Contractor.
  10. Special plumbing systems.
  11. Plumbing connections to equipment furnished by other contractors.
  12. Furnish roof drains, to be installed by Roofing Construction Contract.
  13. Concrete and maintenance pads required for plumbing equipment.
- B. Plumbing scope extends to no less than 5 feet beyond the exterior walls of the building unless noted otherwise.
- C. Temporary Facilities and Controls: Provide the following temporary facilities and controls for all Separate Contractors in accordance with Division 01 Section "Temporary Facilities and Controls":
  1. Temporary Construction Water.

#### 1.07 ELECTRICAL CONSTRUCTION CONTRACT

- A. Work in the Electrical Construction Contract (Contract No. EC-1) includes, but is not limited to, Divisions 26 through 28 and the following:
  1. Site Electrical Distribution:
    - a. Remove utility poles, primary cabling, conduits, and concrete as shown on the contract documents and coordinate new utility service drop location with PECO.
    - b. Provide new primary service conductors, conduits, concrete, trenching, and backfill from new utility pole drop location as shown on the contract documents to the existing PECO secondary transformer.
    - c. Utilize existing secondary conduits for new secondary conductors from existing secondary transformer to existing switchboard inside the existing building.
    - d. Provide new telecom conduits, concrete, trenching, and backfill from utility pole to inside building as shown on the contract documents.
    - e. Provide new conduits, cabling, concrete, trenching, and backfill from existing generator to new emergency electrical equipment inside building.



2. Site Lighting:
    - a. Disconnect existing site lighting fixtures.
    - b. Remove existing lighting poles and concrete bases.
    - c. Remove existing wiring and conduit.
    - d. Install new light fixtures, poles, wiring, conduit, and concrete bases as per Drawings.
  3. Power and lighting at the flagpole lighting.
  4. Site communications and security.
  5. Electrical service and distribution.
  6. Exterior and interior lighting and light pole bases.
  7. Communication and security.
  8. Special electrical systems.
  9. Electrical connections to equipment furnished by other contractors.
  10. Temporary removal and relocation of the existing roof mounted EMS cell phone booster system. Relocation must be coordinated with the Owner and local authorities having jurisdiction. Final location will be identified by the Owner. Electrical Construction Contractor to anticipate a minimum of three moves of the booster system for the phasing of the Work.
  11. Concrete and maintenance pads required for electrical equipment.
  12. Furnish duct smoke detectors. Installation of duct smoke detectors to be completed under the Mechanical Construction Contract. Wiring to shut down the unit and close damper provided under the Mechanical Construction Contract. Wiring to fire alarm panel provided under this Contract.
- B. Temporary Facilities and Controls: Provide the following temporary facilities and controls for all Separate Contractors in accordance with Division 01 Section "Temporary Facilities and Controls":
1. Electric power service and distribution.
  2. Lighting, including site lighting.
  3. Electrical connections to existing systems and temporary facilities and controls furnished by the other contractors.

#### 1.08 ROOFING CONSTRUCTION CONTRACT

- A. Work in the Roofing Construction Contract (Contract No. RC-1) includes, but is not limited to Section 074113.13 "Formed Metal Roof Panels", Section 074213.13 "Formed Metal Wall Panels", Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing", Section 076200 "Sheet Metal Flashing and Trim", Section 077100 "Roof Specialties".
1. Demolition of the existing roof system, including but not limited to, copings, flashings, counterflashings, existing roof curbs scheduled for demolition, etc.
  2. Provide copings at dumpster enclosure, including blocking.
  3. Roofing, including roof insulation, coverings, flashings, roof specialties, and roof accessories.
    - a. At Roof Areas Cut by Another Contractor: Patch and flash new roof around all penetrations and openings.
  4. Create temporary tie-ins of rainwater conductors, temporary vents and other roof penetrations as required.
  5. Roofing Contractor to install roof drains (furnished by Plumbing Contractor) and all associated steel and materials for proper installation of roof drains. Plumbing Contractor to install piping for rainwater from roof drains, through floor and to 10'-0" from exterior of building.

6. Where Formed Metal Wall Panels and Formed Metal Roof Panels are indicated on the Drawings, the Roofing Construction Contract shall provide the metal wall panels, and shall also provide the sheathing, weather barrier, mineral wool insulation, and support framing and furring behind metal panels.
7. Where exterior signage is shown to be mounted over Formed Metal Wall Panels on the Drawings, the General Construction Contract shall be responsible for furnishing the signage, and the Roofing Construction Contract shall be responsible for installing the exterior signage over the Formed Metal Wall Panels.
8. Roofing Contractor to provide all roof blocking.
9. Roofing Contractor to provide all temporary roof protection.

#### 1.09 SPRINKLER CONSTRUCTION CONTRACT

- A. Work in the Sprinkler Construction Contract (Contract No. SPC-1) includes, but is not limited to, Division 21 and the following:
  1. New fire protection service distribution piping to all areas of the building. The entire building will be sprinkled.
  2. Concrete and maintenance pads required for fire sprinkler equipment.

#### 1.10 SITEWORK CONSTRUCTION CONTRACT

- A. Work in the Site Construction Contract (Contract No. SC-1) includes, but is not limited to, Divisions 31 through 33 and the following:
  1. Site preparation, including clearing, earthwork, and subdrainage systems.
  2. Site improvements, including roadways, parking lots, pedestrian paving, site development furnishings and equipment, flagpole, and landscaping.
  3. Sanitary sewerage and storm drainage from utility connection points to no less than 5 feet of the exterior walls of the building.
  4. Underground gas service from utility to the existing gas meter, including trenching and backfilling is by the Utility Company. Restoration of paving, hardscaping, landscaping, etc. from the utility to the gas meter and from the gas meter to the building provided by Sitework Contractor.
  5. Provide all of the subgrade areas under the building within 9" (+/-) of the GC's concrete pad elevation and 10'-0" out from the exterior wall/perimeter. Note: the "subgrade" will be a roughly graded area to receive the GC's concrete pad and stone base with a tolerance of +/- 1".
  6. Flagpole, foundation, and flag.
  7. Provide field surveys of in-progress construction and site work. Provide certification that the Work is in accordance with the drawings.
  8. Provide and maintain Erosion and Sediment Controls throughout duration of construction.
  9. Dumpster enclosure slab.
- B. Temporary facilities and controls in the Site Construction Contract include, but are not limited to, the following:
  1. Mow grass to maintain maximum height of 6 inches in areas bound by construction fencing.
  2. Provide unpiped sewers and drainage, including drainage ditches, dry wells, stabilization ponds, and containers.
  3. Tree and Plant Protection.
  4. Temporary roads and paved areas.

5. Snow removal.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION 011200

## SECTION 01 2200 - UNIT PRICES

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. List of unit prices, for use in preparing Bids.

#### 1.02 COSTS INCLUDED

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

#### 1.03 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the individual specification sections are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

#### 1.04 MEASUREMENT OF QUANTITIES

- A. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.
- B. Assist by providing necessary equipment, workers, and survey personnel as required.
- C. Measurement by Area: Measured by square dimension using mean length and width or radius.

#### 1.05 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price. Areas must be reviewed onsite prior to repairs to verify need and quantities. Any repairs or leveling not approved by Architect will not be reimbursed.
- B. Payment will not be made for any of the following:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined as unacceptable before or after placement.
  - 3. Products not completely unloaded from the transporting vehicle.
  - 4. Products placed beyond the lines and levels of the required Work.
  - 5. Products remaining on hand after completion of the Work.
  - 6. Loading, hauling, and disposing of rejected Products.

#### 1.06 SCHEDULE OF UNIT PRICES

- A. Unit Price GC-1: Repair floor slab surface and prepare for scheduled floor finishes.
  - 1. Description: Where concrete subfloors require leveling, infill, and patching less than one half inch in depth, as required by the specified floor finishes to prepare the subfloors to facilitate finish flooring installation, General Contractor shall clean, prep, and install

hydraulic cement underlayment as specified in Section 035416 "Hydraulic Cement Underlayment".

2. Unit of Measurement: Cost per square foot of area.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 012200

## SECTION 012300 – ALTERNATES

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for Alternates.
- B. Definition: An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that is added to the Base Bid when selected by the Owner in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.
- C. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project. Costs for the coordination, modification, or adjustment necessary for each alternate are to be included in the costs for each Alternate as well as any work required by other Prime contractors on the project affected by the use of the Alternate.
- D. Notification: The Owner to indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date.
- E. Schedule: A "Schedule of Alternates" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each Alternate.
  - 1. Include as part of each Alternate, miscellaneous devices, accessory objects, any modifications or customization or additional devices required, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

### PART 2 EXECUTION

#### 3.1 SCHEDULE OF ALTERNATES

- A. Alternate PC-A: State the price to be added to the base bid to include the materials and labor to remove the existing grease trap interceptor and install a new grease trap interceptor. Price to include the removal and replacement of underground piping as required to facilitate the Work. Price to include the removal and replacement of the hardscaping as required to complete the Work. Price to include all incidental labor and materials to complete the Work.
  - 1. See Specification Section 223000 "Plumbing Equipment."
- B. Alternate MC-B: State the price to be added to or deducted from the base bid to provide underground chiller piping systems manufactured by Aquatherm or Perma-Pipe in lieu of Schedule 40 PVC piping. Price to include all incidental labor and materials to complete the Work.
  - 1. See Specification Section 232113 "Hydronic Piping."
- C. Alternate EC-C: State the price to be added to or deducted from the base bid to provide Siemens Cerebrus Fire Alarm system installed by a licensed 3rd party. Price to include all incidental labor and materials to complete the Work.



1. See Specification Section 283100 "Fire Alarm Emergency Voice Communications System."
- D. Alternate EC-D: State the price to be added to or deducted from the base bid to provide Simplex/JCI 4100 ES Fire Alarm system installed by Simplex. Price to include all incidental labor and materials to complete the Work.
  1. See Specification Section 283100 "Fire Alarm Emergency Voice Communications System."

END OF SECTION 012300

## SECTION 012600 – CONTRACT MODIFICATION PROCEDURES

### PART 1 GENERAL

#### 1.01 PROJECT DIRECTIVE

- A. Project Directive: When the Owner and Contractor are not in total agreement on the scope of work outlined in the construction documents, the Architect/Engineer may issue a Project Directive, instructing the Contractor to proceed with the Work as outlined by the Architect/Engineer. The Contractor, may file a claim with the owner in accordance with the General Conditions of the Contract. if there is a disagreement as to the Architect/Engineer's decision and interpretation of the work referenced above.
  - 1. The Project Directive will contain a complete description of the Work to be performed as per the contract documents.

#### 1.02 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect/Engineer, with a detailed description of the proposed change and supplemental or revised Drawings and Specifications, if necessary.
  - 1. Proposal requests issued by the Architect/Engineer are for information only. Do not consider them an instruction either to stop work in progress, or to execute the proposed change.
  - 2. Unless otherwise indicated in the proposal request, within seven (7) days of receipt of the proposal request, submit to the Architect/Engineer for the Owner's review an estimate of cost necessary to execute the proposed change.
    - a. Include a list of quantities of products to be purchased and unit costs, along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time. If additional time is requested, the Contractor is required to provide a time impact analysis for review by the Architect/Engineer and Owner.
- B. Contractor-Initiated Change Order Proposal Requests: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect/Engineer.
  - 1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
  - 2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

4. Comply with requirements in Section "Product Substitutions" if the proposed change in the Work requires the substitution of one product or system for a product or system specified.

#### 1.03 CHANGES IN THE WORK

- A. Tabulate cost breakdown into subcontracts and trades for each of which the quantity, labor, material, other cost, and resulting final cost per unit shall be indicated. Quantity, labor, material, other cost, and cost per unit generally include but are not necessarily limited to the following:
  1. Quantity; total number of items for each portion or unit of work as determined from the change.
  2. Labor; on site labor for the handling and installation of material from point of delivery at site.
  3. Material; cost of material as delivered to the site for installation and erection.
  4. Other cost; rental equipment, testing survey and layout, samples, bonds, insurance, overhead and profit, and all other costs not included in labor and material.
- B. When a change in the work includes a category or categories of work both added to and deducted from the Contract, the total quantities of added work and of deleted work shall be determined separately for each category, and the appropriate unit price or net cost of the work shall be applied to the difference between the two total quantities.
- C. Unit prices shall be inclusive of all costs and shall be applied to units of measure as defined in the specifications for each category of work.

#### 1.04 CONSTRUCTION DIRECTIVE

- A. Construction Directive: When the Owner and Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Architect/Engineer may issue a Construction Directive, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  1. The Construction Directive will contain a complete description of the change in the Work and designate the method to be followed to determine change in the Contract Sum or Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

#### 1.05 CHANGE ORDER PROCEDURES

- A. Upon the Owner's approval of a Change Order Proposal Request, the Architect/Engineer will issue a Change Order for signatures of the Owner and Contractor on AIA Form G701, as provided in the Conditions of the Contract.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 012600

## SECTION 012900 – PAYMENT PROCEDURES

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
  - 1. Coordinate the Schedule of Values and Applications for Payment with the Contractors' Construction Schedule, List of Subcontractors, and Submittal Schedule.

#### 1.02 SCHEDULE OF VALUES

- A. Coordinate preparation of the Schedule of Values with preparation of the Construction Schedule.
  - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
    - a. Contractors' Construction Schedule.
    - b. Application for Payment form.
    - c. List of subcontractors.
    - d. Schedule of alternates.
    - e. List of products.
    - f. List of principal suppliers and fabricators.
  - 2. Submit the Schedule of Values to the Architect/Engineer and Owner at the earliest feasible date, but in no case later than seven (7) days before the date scheduled for submittal of the initial Application for Payment.
    - a. Submit three (3) copies of Schedule of Values to Architect/Engineer and Owner.
- B. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values.
  - 1. Identification: Include the following Project identification on the Schedule of Values:
    - a. Project name and location.
    - b. Name of the Architect/Engineer.
    - c. Project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
    - a. Generic name.
    - b. Related Specification Section.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that have affected value.
    - g. Dollar value.
    - h. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total one hundred percent (100%).
  - 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items. The Schedule of Values must be broken down to

reflect the scope of work in each phase of construction as delineated in the Contract Documents.

4. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
5. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
6. Tabulate schedule into subcontracts and trades for each of which the quantity, labor, materials, other cost, and resulting final cost per unit shall be indicated. Quantity, labor, materials, other cost, and cost per unit generally include but are not necessarily limited to the following:
  - a. Quantity; total number of times for each portion or unit of work as determined from the Contract Documents.
  - b. Labor; on site labor for the handling and installation of material from point of delivery at site.
  - c. Material; cost of materials as delivered to the site for installation and erection.
  - d. Other cost; rental equipment, depreciation, site office, administration, overhead and profit, testing, survey and layout, samples, and all other costs not included in labor and material.
  - e. Cost per unit; total of labor, material, and other Cost for each portion or unit of work derived from the total quantity of same.
7. The schedule of values shall include separate line items for "As-Built Drawings" and "Closeout Documents". Each line item shall carry a cost of one percent (1%) of the contract value.

#### 1.03 PROGRESS PAYMENTS

- A. Based upon application for payments submitted to the Architect/Engineer and Owner, by the Contractor, on the specified day of each month and Certificate of Payment certified by the Architect/Engineer, the Owner will make progress payments on account of the Contract Sum to the Contractor as follows:
  1. In making progress payments, there shall be retained ten percent (10%) of the approved amount until final completion and acceptance of all work covered by the Contract, including the completion of all corrective or punch list items.
    - a. Retainage shall be reduced to five percent (5%) of the approved amount when fifty percent (50%) of the total work has been completed as stated in the Phasing Plans as shown on the Drawings.
  2. For each day delay in the Contractor's submission of an application for payment acceptable to the Architect/Engineer and Owner, the Owner may delay one day in making his progress payment.

#### 1.04 APPLICATIONS FOR PAYMENT:

- A. The Contractor's monthly application for payment shall be in the same schedule form as the schedule of values, reflecting the same items. Unit costs shall be realistic for their part of the work.
- B. Each Application for Payment shall be consistent with previous applications and payments as approved by and paid for by the Owner.
  1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.



- C. Payment Application Times: The date for each progress payment application shall be decided in the pre-construction meeting. The period of construction Work covered by each Application for Payment is the period ending to the 15<sup>th</sup> of each month.
- D. Payment Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Application for Payment.
- E. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Contractor. Incomplete applications will be returned without action.
  - 1. Entries shall match data on the Schedule of Values and Contractors' Construction Schedule. Use updated schedules if revisions have been made.
  - 2. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.
- F. Transmittal: Submit three (3) executed copies of each Application for Payment to the Owner by means ensuring receipt within twenty four (24) hours; each copy shall be complete, including waivers of lien and similar attachments, when required.
  - 1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect/Engineer.
- G. Waivers of Mechanics Lien: Submit waivers of mechanics lien from every entity who may lawfully be entitled to file a mechanics lien arising out of the Contract, and related to the Work covered by the payment.
  - 1. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.
  - 2. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
  - 1. List of staff names.
  - 2. List of subcontractors.
  - 3. Schedule of Values.
  - 4. Contractors' Construction Schedule.
  - 5. Submittal Schedule, Final.
  - 6. Copies of authorizations and licenses from governing authorities for performance of the Work.
  - 7. Initial progress report.
- I. Monthly Applications for Payment: The following are to be included as attachments to each monthly application for payment:
  - 1. Transmittal Letter
  - 2. Attachment to Application for Payment
  - 3. Partial Waiver of Lien from all Subcontractors and Vendors
  - 4. PA State Certified Payroll Reports- sent to owner directly.
  - 5. Consent of Surety of Reduction in Retainage (only when retainage is reduced).
  - 6. Updated CPM Schedule. Monthly applications for payment will not be approved for payment until the monthly CPM schedule update is approved by the Owner.

- J. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
1. Completion of Project closeout requirements.
  2. Completion of punch list items.
  3. Transmittal of required Project construction records to Owner.
  4. Proof that taxes, fees, and similar obligations have been paid.
  5. Removal of temporary facilities and services.
  6. Removal of surplus materials, rubbish, and similar elements.
  7. Contractor's Affidavit of Payments of Debts & Claims - AIA Document G706.
  8. Contractor's Affidavit of Release of Liens - AIA Document G706A.
  9. Consent of Surety to Final Payment - AIA Document G707.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 012900

## SECTION 013113 – PROJECT COORDINATION

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
  - 1. Coordination as a responsibility of the contractor.
  - 2. Coordination drawings
  - 3. Administrative and supervisory personnel.
- B. Progress meetings, coordination meetings, and pre-installation conferences are included in Section "Project Meetings".
- C. Requirements for the Contractors' Construction Schedule are included in Section "Submittals".

#### 1.02 COORDINATION

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
  - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
  - 2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.

#### 1.03 COORDINATION DRAWINGS

- A. Coordination Drawings: Prepare and submit coordination Drawings based on appropriate information from each subcontractor, where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.
  - 1. Show the interrelationship of components shown on separate Shop Drawings.
  - 2. Indicate required installation sequences.
  - 3. Comply with requirements contained in Section "Submittal Procedures."

#### 1.04 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. List of Staff Names: Within fourteen (14) days of Notice to Proceed, submit a list of principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
  - 1. Post copies of the list in the Project meeting room and in the temporary field office.

PART 2 PRODUCTS (Not Applicable).

PART 3 EXECUTION (Not Applicable).

END OF SECTION 013113

## SECTION 013119 – PROJECT MEETINGS

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:
  - 1. Pre-Construction Conference.
  - 2. Pre-Installation Conferences.
  - 3. Coordination Meetings.
  - 4. Progress Meetings
  - 5. CCCD (Chester County Conservation District) Preconstruction Meeting.

#### 1.02 PRE-CONSTRUCTION CONFERENCE

- A. The Owner will schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 10 days after execution of the Agreement and prior to commencement of construction activities.
- B. Attendees: The Owner, Architect/Engineer and their consultants, each Prime Contractor and its superintendent, major subcontractors, manufacturers, suppliers, and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.
- C. Agenda: Items of significance that could affect progress, including such topics as:
  - 1. Responsibilities and personnel assignments
  - 2. Tentative construction schedule.
  - 3. Critical Work sequencing.
  - 4. Designation of responsible personnel.
  - 5. Procedures for processing field decisions and Change Orders.
  - 6. Procedures for processing Applications for Payment.
  - 7. Distribution of Contract Documents.
  - 8. Submittal of Shop Drawings, Product Data and Samples.
  - 9. Preparation of record documents.
  - 10. Use of the site and premises.
  - 11. Office, Work, and storage areas.
  - 12. Equipment deliveries and priorities.
  - 13. Safety procedures.
  - 14. First aid.
  - 15. Security.
  - 16. Housekeeping.
  - 17. Working hours.

#### 1.03 PRE-INSTALLATION CONFERENCES

- A. Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with

other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect/Engineer of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:
  - a. Contract Documents.
  - b. Options.
  - c. Related Change Orders.
  - d. Purchases
  - e. Deliveries.
  - f. Shop Drawings, Product Data, and quality control Samples.
  - g. Possible conflicts.
  - h. Compatibility problems.
  - i. Time schedules.
  - j. Weather limitations.
  - k. Manufacturer's recommendations.
  - l. Compatibility of materials.
  - m. Acceptability of substrates.
  - n. Temporary facilities.
  - o. Space and access limitations.
  - p. Governing regulations.
  - q. Safety.
  - r. Inspection and testing requirements.
  - s. Required performance results.
  - t. Recording requirements.
  - u. Protection.
2. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect/Engineer.
3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

#### 1.04 CONTRACTOR COORDINATION MEETINGS

- A. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings.
  1. The Project Coordinator shall preside at each meeting and shall record results of meetings and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- B. Provide representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.



#### 1.05 PROGRESS MEETINGS

- A. Conduct progress meetings at the Project site bi-weekly, except during the months of June, July and August when meetings shall be weekly. Notify the Owner and Architect/Engineer of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
  - 1. The Project Coordinator shall preside at each meeting, and the Architect/Engineer shall record results of meetings and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- B. Attendees: In addition to representatives of the Owner, Architect/Engineer, and each Prime Contractor, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.
  - 1. Scheduling Review Meeting: Review progress since the last meeting. Determine where each activity is in relation to the Contractors' Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  - 2. Review the present and future needs of each entity present, including such items as:
    - a. Interface requirements.
    - b. Time.
    - c. Sequences.
    - d. Deliveries.
    - e. Off-site fabrication problems.
    - f. Access.
    - g. Site utilization.
    - h. Temporary facilities and services.
    - i. Hours of Work.
    - j. Hazards and risks.
    - k. Housekeeping.
    - l. Quality and Work standards.
    - m. Change Orders.
    - n. Documentation of information for payment requests.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 013119

## SECTION 013216 – CONSTRUCTION PROGRESS SCHEDULE

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for construction progress scheduling.

#### 1.02 CONTRACTORS' CONSTRUCTION SCHEDULE

- A. The Contractors' Construction Schedule shall be a Critical Path Method (CPM) schedule as described below.
- B. DEFINITIONS
  1. Critical Path Method (CPM) - Critical Path Method is the scheduling management technique that derives the critical path from a group of project-related activities/tasks and also identifies the earliest and latest time activities/tasks can start and finish without impacting the project end date.
  2. Activity/Task – any item required to complete each prime contractors' work. These include submittals, delivery times, and work tasks, at a minimum.
  3. Schedule Logic – interaction of all work activities of all prime contractors designed in a way that ensures logical connection between schedule elements such as activities/tasks and phased milestones.
  4. Critical Path - schedule path determined by identifying the longest stretch of dependent activities and measuring the time required to complete them from start to finish.
  5. Float - the amount of time that an activity can be delayed without having to reschedule the project completion date.
  6. Baseline CPM Schedule – the list of contractor-related work activities/tasks, supplemented by schedule logic, to ensure the completion of the project within the designated timeframes provided, prior to construction start.
  7. Schedule Update - schedule which provides new calculated start and finish dates for all remaining work based on the relationship logic assigned during the baseline CPM schedule development process, and the progress to-date with the expected production rates of in-progress activities.
  8. Recovery Schedule – when requested by Owner, a recovery schedule will review remaining activities from the baseline, or schedule update, that will provide a logical progression of all activities behind schedule needing additional support to get the project back on track. Owner will request a recovery schedule when updates during summer months show 7 or more days behind scheduled completion, or 28 days behind in months September -May.
  9. Predecessor/Successor Report – report containing the logic ties for the project schedule's activities/tasks and milestone dates.
  10. Time Impact Analysis (TIA) – an analysis of any change order requesting additional time to complete. The change order must be accompanied by a review of all schedule activities affected by the change. Time extensions will only be granted if the TIA reveals the change will have an adverse affect on the phased or final contract completion dates, and no other means of acceleration will complete the change order work by the required completion date.

C. SCHEDULE PREPARATION

1. The Project Coordinator shall provide all scheduling services as detailed in this section.
2. The Contractors' work shall be progressed consistent with the contract dates included in the Contract, work by phase included in the Contract Documents, and the Contractors' Construction Schedule.
3. Baseline Schedule shall be submitted for review by Owner and Architect/Engineer within 45 days of Contract Award.
4. Schedule shall not contain finish to start logic, nor use negative lag. Retained logic scheduling method shall be utilized.
5. Baseline schedule and each schedule update shall be accompanied by a predecessor/successor report.

D. Project Coordinator's Scheduling Responsibility

1. The General Contractor shall prepare a Critical Path Method (CPM) schedule utilizing the latest version of Primavera software or approved equal. Applications for payment will not be processed by the Owner until the Contractors' Construction Schedule has been submitted to, and reviewed and accepted by the Architect/Engineer, Owner, and all Prime Contractors. The CPM schedule is to be updated on a monthly basis, and bi-weekly during the months of June, July, and August.
2. The Project Coordinator shall employ a Professional Scheduler with offices located within fifty (50) miles of the jobsite.
  - a. The Professional Scheduler must meet with all of the Prime Contractors to develop the baseline schedule.
  - b. The Professional Scheduler must visit the project site monthly to update the Construction Schedule with each of the Prime Contractors. For the months of June, July and August, the Professional Scheduler must visit the project site bi-weekly to update the Construction Schedule with each of the Prime Contractors.
3. The Contractors' Construction Schedule shall be based upon the Contractors' logic and activity/task time estimates and shall indicate all activities with a maximum duration of 30 working days, except June through August, which will have a maximum of 10 working days. Schedule should include significant features of the work, including the placing of orders and anticipated delivery dates for equipment and material items, submissions and approvals of shop drawings and all work activities to be performed including start dates, completion dates, and overall duration of each activity.
4. Seasonal weather conditions shall be considered in the planning and scheduling of work which is influenced by high or low ambient temperatures, so that contract work is completed within the allotted contract time. In addition, appropriate allowances shall be made for anticipated time losses due to normal rain and snow conditions by statistically expanding the estimated time duration for weather sensitive activities. Extensions of time will not be granted for delays caused by unfavorable weather, unsuitable ground conditions, inadequate construction force, or failure of the Contractor to place orders for equipment or materials sufficiently in advance to ensure delivery when needed.

E. Adherence to Schedule

1. Furnish sufficient labor, construction plant and equipment to insure the execution of the work in accordance with the Contractors' Construction Schedule. If the completion time for any significant job does not come within the time allowed by the Contractors' Construction Schedule, the sequence schedule of jobs and the time for performance of jobs shall be revised and resubmitted for approval by the Project Coordinator showing accomplishment through concurrent operations, additional manpower, additional shifts, overtime, etc., to assure that the Contract completion date will be met. No additional

charges to the Owner will be allowed for overtime, additional manpower, equipment, additional shifts, etc., (except as may be provided elsewhere in the Contract) if such expediting procedures or measures are necessary to meet the Contract phasing milestones, Contractors' Construction Schedule, or completion date.

2. Each Prime Contractor agrees that he will make no claim for, and have no right to, additional payment or extension of time for completion of the work, or any other concession because of any misinterpretation or misunderstanding on his part of the project CPM schedule, his failure to attend the pre-bid conference, or because of any failure on his part to fully acquaint himself with all conditions relating to the project CPM schedule and the manner in which it will be used on the project or because of any other failure to participate properly in the development of the schedule or to perform his contract work in accordance with the schedule.

F. Monthly Schedule/Coordination Meetings

1. Each month the Project Coordinator shall conduct a Scheduling Review Meeting as part of the Progress Meeting with all Prime Contractors, sub-contractors, the Architect/Engineer, and Owner. The purpose of this meeting is to review the Contractors' construction progress as compared to the approved Contractors' Construction Schedule. The Project Coordinator's Professional Scheduler will attend and be required to review and update the project CPM schedule based on current job status more frequently if deemed necessary by the Architect/Engineer and Owner.
2. Each Prime Contractor shall bring updated schedule information for discussion at the Scheduling Review Meeting. This information shall include:
  - a. Actual activity start and completion dates.
  - b. Status of outstanding shop drawing submittals or re-submittals for approval.
  - c. Status of equipment and material purchase orders.
  - d. Status of equipment and material delivery dates.
  - e. Review of sequencing changes or changes in duration.
  - f. Project Coordinator's Professional Scheduler will update the Contractors' Construction Schedule at the meeting.
3. Each Prime Contractor shall report the progress actually achieved for each activity that was scheduled to be performed during the previous one month, including the actual dates on which the work was performed. Each Prime Contractor shall agree that this information constitutes the official historical record of project progress.
4. At each Schedule Review Meeting, each Prime Contractor shall document any current delays to work operations. In addition, each Prime Contractor shall provide all available information regarding any potential delays which they anticipate. Each Prime Contractor shall be represented at the monthly scheduling meeting by his project manager who shall have complete authority to provide the information required for the development of the schedule update, documentation of past progress, documentation of delays, and to authorize any increase in manpower required to meet phased and final completions dates. Contractor and subcontractor representatives shall also be authorized to discuss at these meetings corrective action planned to overcome delaying conditions.
  - a. The Project Coordinator shall assemble this documentation into a Progress Report. If the apparent delay affects any critical path, Project Coordinator will work with affected Prime Contractors on mitigation of delay by revising logic ties, requesting additional manpower, additional shift work, and/or concurrent work to meet phased or final contract completion dates.
5. The Project Coordinator shall update the Contractors' Construction Schedule every month for submittal to the Architect/Engineer and Owner with the monthly Application

for Payment along with the current Progress Report. Payment requisitions will not be processed by the Owner until the Project CPM Schedule updates have been submitted.

- a. No payments will be made to any Prime Contractor if updates are not provided to the Project Coordinator's Professional Scheduler.

G. Responsibility for Completion

1. Each Prime Contractor agrees that whenever it becomes apparent that any scheduled activities fall behind schedule by seven days or more, or that the Contract completion date will not be met, he will take some or all of the following actions:
  - a. Increase construction manpower in such trades and numbers as will substantially eliminate the backlog of work;
  - b. Increase the number of working hours per shift, shifts per working days, working days per week, or the amount of construction equipment, or any combination of the foregoing sufficient to substantially eliminate the backlog of work.
  - c. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.

H. Coordination

1. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
2. Coordinate the Contractors' Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other schedules.
3. Indicate completion in advance of the date established for Substantial Completion. Indicate Phased or Final Substantial Completion dates on the schedule to allow time for the Architect/Engineer's procedures necessary for certification of Substantial Completion.

- I. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by requirements for phased completion to permit Work by Separate Contractors and partial occupancy by the Owner prior to Substantial Completion.

- J. Work Stages: Indicate important stages of construction for each major portion of the Work, including testing and installation.

- K. Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the Work. Indicate where each element in an area must be sequenced or integrated with other construction activities.

END OF SECTION 013216

## SECTION 013300 – SUBMITTAL PROCEDURES

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;
  - 1. Project Schedule.
  - 2. Submittal schedule.
  - 3. Daily construction reports.
  - 4. Shop Drawings.
  - 5. Product Data.
  - 6. Samples.
- B. Administrative Submittals: Refer to other Division-01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:
  - 1. Applications for payment.
  - 2. Performance and payment bonds.
  - 3. Insurance certificates.
  - 4. List of Subcontractors.
- C. The Schedule of Values submittal is included in Section "Applications for Payment."
- D. Inspection and test reports are included in Section "Quality Control Services."

#### 1.02 SUBMITTAL PROCEDURES

- A. Shop drawings, product data and samples will not be processed by Architect/Engineer until list of subcontractors, material suppliers, and fabricators is submitted as required by General Conditions.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
    - a. The Architect/Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
  - 3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
    - a. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect/Engineer will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
    - b. If an intermediate submittal is necessary, process the same as the initial submittal.
    - c. Allow two weeks for reprocessing each submittal.



- d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect/Engineer sufficiently in advance of the Work to permit processing.
  - e. If a substantial quantity of submittals is transmitted within the same time period, note what submittals must be returned within the two week review time since all submittals will not be reviewed and returned within two weeks.
- C. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
  - 1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
  - 2. Include the following information on the label for processing and recording action taken.
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect/Engineer.
    - d. Name and address of Contractor.
    - e. Name and address of subcontractor.
    - f. Name and address of supplier.
    - g. Name of manufacturer.
    - h. Number and title of appropriate Specification Section.
    - i. Drawing number and detail references, as appropriate.
- D. Submittal Transmittal: Submit submittals other than materials samples in PDF format via the Architect/Engineer's FTP site. File names must correlate with line items on the submittal schedule, and an email notification must be sent out to notify the Project Team that submittals are available for review. Submittals received from sources other than the Prime Contractor will be ignored.
  - 1. On a covering transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
- E. Print and distribute to all interested subcontractors and suppliers. After Architect/Engineer's review, forward prints bearing Architect/Engineer's review stamp directly to Owner, Owner's Representative and Contractor's Superintendent at site. Forward additional approved copies to all interested Contractors, subcontractors, and suppliers on project.
- F. When revised for resubmission, clearly identify all changes made since the previous submission.
- G. Schedule delays that may result from the rejection of submittals for non-conformance to the contract documents are the responsibility of the Contractor to recover.
- H. An approval of a submittal by the Architect/Engineer does not constitute an approval of a deviation from the contract requirements. Any deviation from the contract documents must be clearly identified in the submittal for review and approval by the Architect/Engineer. Should a deviation not be clearly identified in the submittal and the submittal is approved by the Architect/Engineer and the work is put in place, the Contractor will be responsible to remove, replace, and/or correct the work in place at no additional cost to the Owner to adhere to the contract documents.

### 1.03 SUBMITTAL SCHEDULE

- A. Submit Submittal Schedule within fifteen (15) days after receiving the executed Contract. All submittals shall be made within sixty (60) days of the date of Notice to Proceed.
  - 1. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractors' Construction Schedule.
  - 2. Prepare the schedule in chronological order; include submittals required during the first sixty (60) days of construction. Provide the following information:
    - a. Scheduled date for the first submittal.
    - b. Related Section number.
    - c. Submittal category.
    - d. Name of subcontractor.
    - e. Description of the part of the Work covered.
    - f. Submittals shall be submitted in order of priority.
- B. Distribution: Following response to initial submittal, print and distribute copies to the Architect/Engineer, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
- C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

### 1.04 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report recording the following information concerning events at the site; and submit duplicate copies to the Architect/Engineer and Owner at weekly intervals:
  - 1. List of subcontractors at the site.
  - 2. Approximate count of personnel at the site.
  - 3. High and low temperatures, and general weather conditions.
  - 4. Accidents and unusual events.
  - 5. Meetings and significant decisions.
  - 6. Stoppages, delays, shortages, losses.
  - 7. Meter readings and similar recordings.
  - 8. Emergency procedures.
  - 9. Orders and requests of governing authorities.
  - 10. Change Orders received, implemented.
  - 11. Services connected, disconnected.
  - 12. Equipment or system tests and start-ups.
  - 13. Partial Completions, occupancies.
  - 14. Substantial Completions authorized.

### 1.05 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings.
  - 1. Include the following information:
    - a. Dimensions.

- b. Identification of products and materials included.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
  2. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 36" x 48".
  3. Initial Submittal: Submit PDF files for the Architect/Engineer's review; a reviewed PDF file will be returned.
    - a. One of the prints returned shall be marked-up and maintained as a "Record Document".
  4. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.
- C. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended. The Contractor is responsible to fully coordinate all areas of work with others. This coordination is to be formalized in a set of coordination drawings signed off by all necessary trades and submitted to the Architect/Engineer. This process is to define areas of conflict which can be resolved prior to the start of material / equipment fabrication. The conflicts are to be brought to the Architect/Engineer's immediate attention in writing for resolution. Should a conflict arise after issuance of the coordination drawings to the Architect/Engineer, the Owner will not be responsible for any costs that may be necessary to resolve the conflict.
  1. Preparation of coordination Drawings is specified in section "Project Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
  2. Submit coordination Drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.

#### 1.06 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
  1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
    - a. Manufacturer's printed recommendations.
    - b. Compliance with recognized trade association standards.
    - c. Compliance with recognized testing agency standards.
    - d. Application of testing agency labels and seals.
    - e. Notation of dimensions verified by field measurement.
    - f. Notation of coordination requirements.
  2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
  3. Submittals: Submit PDF files of each required submittal; The Architect/Engineer or Engineer will return the PDFs marked with action taken and corrections or modifications required.

4. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
  - a. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
  - b. Do not permit use of unmarked copies of Product Data in connection with construction.

#### 1.07 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
  1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Include the following:
    - a. Generic description of the Sample.
    - b. Sample source.
    - c. Product name or name of manufacturer.
    - d. Compliance with recognized standards.
    - e. Availability and delivery time.
  2. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
    - a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the variations.
    - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
  3. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.
    - a. Preliminary submittals will be reviewed and returned with the Architect/Engineer's mark indicating selection and other action.
  4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets; one will be returned marked with the action taken.
  5. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.
    - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
    - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
  1. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.

- a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.08 ARCHITECT/ENGINEER'S ACTION

- A. Except for submittals for record, information, or similar purposes, where action and return is required or requested, the Architect/Engineer will review each submittal, mark to indicate action taken, and return promptly.
  1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Architect/Engineer will stamp each submittal with a uniform, self-explanatory action stamp.
- C. Unsolicited Submittals: Unsolicited Submittals and Submittals not required by the Contract Documents may not be reviewed, may be discarded, or returned to the sender without action.

PART 2 PRODUCTS (Not Applicable).

PART 3 EXECUTION (Not Applicable).

END OF SECTION 013300

## SECTION 014000 – QUALITY REQUIREMENTS

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect/Engineer.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
  - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
  - 2. Inspections, tests, and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
  - 3. Requirements for the Contractor to provide quality control services required by the Architect/Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

#### 1.02 RESPONSIBILITIES

- A. Contractor Responsibilities: Provide inspections, tests, and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.
  - 1. Employ and pay an independent agency, to perform specified quality control services.
    - a. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, do not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.
  - 2. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
    - a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility.
  - 3. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests, and similar services and provide reasonable auxiliary services as



requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:

- a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
- b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
- c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
- d. Providing security and protection of samples and test equipment at the Project site.

B. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Architect/Engineer and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect/Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
3. The agency shall not perform any duties of the Contractor.

C. Coordination: The Contractor and each agency engaged to perform inspections, tests, and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

### 1.03 SUBMITTALS

A. Submit a certified written report of each inspection, test or similar service, to the Architect/Engineer, in duplicate.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
  - 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. Location of sample or test in project.
  - k. Ambient conditions at the time of sample-taking and testing.
  - l. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
  - m. Name and signature of laboratory inspector.
  - n. Recommendations on retesting.

1.04 QUALITY ASSURANCE

- A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
  - 1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

1.05 TRADESMEN & WORKMANSHIP

- A. Ensure that tradesmen performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality levels for workmanship in completed work. Remove and replace work which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

3.02 REPLACEMENT OF WORK

- A. Within twenty four (24) hours after rejection of work pursuant to the General Conditions, remove all materials and equipment so rejected and immediately replace work, at the Contractor's cost, to the satisfaction of the Architect/Engineer. Should the work of the Owner or other Contractors be damaged by such removal or replacement, reimburse the Owner or other Contractors for all costs incurred for correcting damage.

END OF SECTION 014000

## SECTION 014100 – REGULATORY REQUIREMENTS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. General Safety and Health Regulations.
- B. Labor Requirements.
  - 1. Discrimination Prohibition.
  - 2. Non-Discrimination Clause.
  - 3. Human Relations Act.
  - 4. PA Prevailing Wage Rates.
  - 5. Harassment Policy.
- C. Environmental Statutes and Regulations.
- D. Miscellaneous Regulations.
  - 1. Buy America Clause.
  - 2. Provision for the Use of Aluminum and Steel Products made in the United States.
  - 3. Standard of Quality.
  - 4. Cash Allowances.
- E. Tax Exemption.
- F. Asbestos Containing Materials Prohibited
- G. Background Checks
  - 1. Department of Human Services Child Abuse History Clearance {Act 151 of 1994}.
  - 2. Pennsylvania State Police Request for Criminal Records Check {Act 34 of 1985}.
  - 3. Federal Criminal History Record Information (CHRI) {Act 114 of 2006}.
  - 4. Pennsylvania Department of Education Form 6004 {Act 24 of 2011, amended 2016}.

#### 1.02 GENERAL SAFETY AND HEALTH REGULATIONS.

- A. Nothing contained in the Contract shall be construed as relieving Contractor in any way of Contractor's responsibility for strict compliance with all governmental requirements pertaining to health and safety.
- B. The Contract is to be governed at all times by applicable provisions of federal law, including but not limited to the following:
  - 1. Williams-Steiger Occupational Safety and Health Act of 1970, Public Law 91-596.
  - 2. Part 1910 - Occupational Safety and Health Standards, Chapter XIII of Title 29, Code of Federal Regulations.
- C. Adhere to project safety procedures and policies for construction activities at all times.

#### 1.03 LABOR REQUIREMENTS

- A. Discrimination Prohibited: Each Contract entered into by a government agency for the construction, alteration, or repair of any public building or public work shall contain the following provisions:

Discrimination Prohibited: According to Commonwealth Procurement Code, 62 Pa. C.S.A. Section 3701, the Contractor agrees that:

1. In the hiring of employees for the performance of the Work under the Contract, or any subcontract, no such Contractor or subcontractor, shall by reason of gender, race, creed or color, discriminate against any citizen of the Commonwealth who is qualified and available to perform the work to which the employment relates.
2. No Contractor, sub-contractor, nor any person on their behalf, shall in any manner discriminate against or intimidate any employee hired for the performance of work under the Contract on account of gender, race, creed or color;
3. This Contract may be canceled or terminated by the government agency and all money due or to become due under the contract may be forfeited, for a violation of the terms or conditions of that portion of the Contract.

- B. Non-Discrimination Clause: During the term of the Contract, Contractor agrees to comply with all nondiscrimination provisions of the Contract Documents and all state and federal laws and regulation prohibiting discrimination in hiring and employment opportunities.
- C. Human Relations Act: The provisions of the Pennsylvania Human Relations Act, Act 222 of October 27, 1955 (P.L. 744) (43 P.S. Section 951, et. seq.) of the Commonwealth of Pennsylvania prohibit discrimination because of race, color, religious creed, ancestry, age, sex, national origin, handicap or disability, by employers, employment agencies, labor organizations, contractors, and others. The Contractor agrees to comply with the provisions of this Act as amended and said act is hereby a part of the Contract Documents. Your attention is directed to the language of the Commonwealth's non-discrimination clause in 16 PA. Code 49.101.
- D. Pennsylvania Prevailing Wage Rates: This regulation and the general Pennsylvania prevailing minimum wage rates, (Act 422 of 1961, P.L. 987, amended), as determined by the Secretary of Labor and Industry, which shall be paid for each craft or classification of all workers needed to perform the Contract during the anticipated term therefor in the locality in which public work is performed, are made part of this Specification.
- E. The School District has an established Harassment Policy prohibiting harassment. The Owner's policy indicates their strong commitment to prohibit and prevent unlawful harassment, and to set forth a procedure for investigating and resolving internal complaints of unlawful harassment. The Contractor will be required to establish and maintain a similar policy against harassment for all employees at the Project site. The Owner will not tolerate harassment at the Project Site, and the Contractor will be expected to deal swiftly with any employee who violates the harassment Policy.

#### 1.04 ENVIRONMENTAL STATUTES AND REGULATIONS

- A. Comply with all applicable provisions of federal and state laws dealing with the prevention of environmental pollution and the preservation of natural resources, including but not limited to the Federal Air Quality Act of 1967; the Clean Air Act; the Clean Water Restoration act; the Water Pollution Control Act Amendments of 1956; the Water Quality Act of 1965; the Water Quality Improvement Act of 1970; the Water Pollution Control Act Amendments of 1972; the Water Facilities Act (see Consolidated Farmer's Home Administration Act of 1961); the Watershed Protection and Flood Prevention Act; the Pennsylvania Air Pollution Control Act; the Clean Streams Law; the Solid Waste Management Act; the Municipal Waste Planning, Recycling, and Waste Reduction Act; A.H.E.R.A; and all rules and regulations thereunder, including but not limited to, those formulated by the United States Environmental Protection Agency, the Pennsylvania Department of Environmental Resources and the Department of Environmental Protection. Nothing contained in the Contract shall be construed as relieving

Contractor in any way of Contractor's responsibility for strict compliance with all governmental requirements pertaining to environmental protection.

- B. Commonwealth Procurement Code, 62 Pa. C.S.A. Section 3302 provides that if the successful bidder must undertake additional work due to enactment of new or the amendment of existing statutes, rules or regulations occurring after the submission of the successful proposal, the School District shall issue a Change Order setting forth the additional work that must be undertaken, which shall not invalidate the Contract. The cost of such a Change Order to the School District shall be determined in accordance with the provisions of the Contract for Change Orders or force accounts or, if no such provision is set forth in the Contract, then the cost to the School District shall be the Contractor's costs for wages, labor costs other than wages, wage taxes, materials, equipment rentals, insurance, and subcontractors' costs attributable to the additional activity plus a reasonable sum for overhead and profit; provided however, that such additional costs to undertake work not specified in the invitation for proposal shall not be approved unless written authorization is given the successful bidder prior to his undertaking such additional activity.
- C. Nothing contained in the Contract Documents for construction shall be construed by the Contractor as relieving him in any way of his responsibility for strict compliance with the statutes, rules and regulations contained in the above mentioned Environmental Protection Act.

#### 1.05 MISCELLANEOUS REGULATIONS

- A. Buy American Clause: Contractor shall comply with the provisions of Pennsylvania Law 53-PS-312F, which states, "Every contract for the construction, reconstruction, repair, improvement or maintenance of public work shall contain a provision that any steel products used or supplied in the performance of the contract or any subcontracts thereunder shall be from steel made in the United States." Also PA. Law 773.103 with similar provisions.
- B. Provision for the Use of Aluminum and Steel Products made in the United States: In accordance with Act No. 3 of 1978 General Assembly of the Commonwealth of Pennsylvania, if any steel or steel products are to be used or supplied in the performance of the Contract, only those produced in the United States as defined therein shall be used or supplied in the performance of the Contract or any subcontracts thereunder.

In accordance with Act 161 of 1982, cast iron products shall also be included and produced in the United States. Act 144 of 1984 further defines "steel products" to include machinery and equipment. The Act also provides clarifications and penalties.

The Contractor and subcontractors shall comply with 71P.S. Section 773.110 dealing with aluminum or steel products made in a foreign country which has been determined to discriminate.

- C. Standard of Quality: The various materials and products specified in the specifications by name or description are given to establish a standard of quality and of cost for bid purposes. It is not the intent to limit the acceptance to any one material or product specified, but rather to name or describe it as the absolute minimum standard that is desired and acceptable. A material or product of lesser quality would not be acceptable. Where proprietary names are used, and followed by the words "or as approved equal", they shall be subject to equals only as approved by the Architect/Engineer in accordance with substitution procedures specified in Section 01 60 00. Substitutions considered by Owner or Architect/Engineer shall be limited to those proposed before bids are due unless products or systems become unavailable through no fault of the Contractor.

- D. Standards of quality for the work are as established by description, by reference to trade name, manufacturer's names or by catalog model or figure numbers and color selection.
  - 1. Wherever a sole source manufacturer is listed or identified in the documents, no substitutions will be accepted.
  - 2. Work specified which becomes unavailable due to strike, loss of plant through fire or flood, bankruptcy, or other unforeseeable cause, shall be substituted equally at no cost to the Owner from another source subject to substitution procedures in the Contract Documents.
  - 3. Substitute work offered and approved shall not be a basis for contingent extra charges or additional charges due to changes in related work, such as rough-in, changes in supporting foundations, and other related work.
  - 4. The Contractor shall assume full responsibility for adequacy of substitute work.

- E. Cash Allowances: Cash allowances are not to be included in the bid specifications.

#### 1.06 ASBESTOS CONTAINING MATERIALS PROHIBITED

- A. Certify that "no asbestos containing materials" (ACM) and no "asbestos containing building materials" (ACBM) are used in this installation.
- B. A Contractor installing asbestos containing building materials (ACBM) will be exclusively responsible for all costs related to the removal of this material. This material will be removed by the designee of the School District in accordance with the guidelines of the Asbestos Hazard Emergency Response Act of 1987 (P.L. 99-519).
- C. If at any time in the future it is discovered that there are any "asbestos containing material" (ACM) or any "asbestos containing building materials" (ACBM) in this installation, the Contractor installing such material will be exclusively responsible for all costs related to the removal of this material. This material will be removed by the designee of the School District in accordance with the guidelines of the Asbestos Hazard Emergency Response Act of 1987 (P.L. 99-519).

#### 1.07 TAX EXEMPTION

- A. Owner is exempt (excluded) from sales or use tax in Pennsylvania on certain transactions. Each Prime Contractor and subcontractors shall bid and shall purchase as exempt (excluded) from Pennsylvania sales and use tax all tangible personal property within the definition of "building machinery and equipment" as that term is defined in Act 45-1998. In order to facilitate such purchases free of sales and use tax in Pennsylvania, the Owner agrees to execute a certification properly limited to the project and prepared by the Contractor or subcontractors as may be required by the regulations of the Pennsylvania Department of Revenue.
- B. Assignment of Tax Refund Rights: The Contractor agrees to assign and transfer to the Owner all its rights to sales and use taxes which may be refunded as a result of a claim for refund for materials purchased in connection with this contract. The Contractor further agrees that it will not file a claim for refund for any sales or use tax which is the subject of this assignment. The contractor for this project will not be signed until the Owner receives a written Assignment by the Contractor of all rights to appeal any Sales and Use Tax payment questions to the Department of Revenue.
- C. Access to Accounting Records: The Contractor shall check all materials, equipment and labor entering into the Work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Agreement, and the system shall be satisfactory to the



Owner. The Owner or its representative shall be afforded access to all the Contractor's record, books, correspondence, instruction, drawings, receipts, vouchers, memoranda, and similar data relating to this Contract, and the Contractor shall preserve all such records for a period of three (3) years, or for such longer period as may be required by law, after the final payment.

- D. Contracts with subcontractors: The Contractor agrees to include "Access to Accounting Records" and "Assignment of Tax Refund Rights" paragraphs in any contracts with subcontractors.
- E. The following definition is quoted from Act No. 45-1998 and has been included to assist the Contractor. Each Contractor is responsible for complying the full Act 45-1998 as applicable as to this Project.
  - 1. "Building machinery and equipment." Generation equipment, storage equipment, air conditioning equipment, distribution equipment and termination equipment which shall be limited to the following:
    - a. air conditioning limited to heating, cooling, purification, humidification, dehumidification and ventilation;
    - b. electrical;
    - c. plumbing;
    - d. communications limited to voice, video, data, sound, master clock, and noise abatement.
    - e. alarms limited to fire, security, and detection;
    - f. control system limited to energy management, traffic and parking lot, and building access;
    - g. medical system limited to diagnosis and treatment equipment, medical gas, nurse call, and doctor paging;
    - h. laboratory system;
    - i. cathodic protection system, or
    - j. furniture, cabinetry, and kitchen equipment.
  - 2. The term shall include boilers, chillers, air cleaners, humidifiers, fans, switchgear, pumps, telephones, speakers, horns, motion detectors, dampers, actuators, grills, registers, traffic signals, sensors, card access devices, guardrails and medical devices, floor troughs and grates, and laundry equipment, together with integral coverings and enclosures, whether or not the item constitutes a fixture or is otherwise affixed to the real estate; whether or not damage would be done to the item or its surroundings upon removal; or whether or not the item is physically located within a real estate structure. The term "building machinery and equipment" shall not include guardrail posts, pipes, fittings, pipe supports and hangers, valves, underground tanks, wire conduit, receptacle and junction boxes, insulation, ductwork, and coverings thereof.

#### 1.08 BACKGROUND CHECKS

- A. Pursuant to The Public School Code of 1949, Act of March 10, 1949, P.L. 30, No. 14, as amended, 24 P.S. §1-111: all applicants for employment in public and private schools, employees of independent contractors seeking business with public and private schools, and student teacher candidates shall undergo background checks if they will have direct contact with students.
  - 1. Reports shall be no more than one year old at the time of bid submission.
  - 2. All employees on the project site must have background check prior to entering the site.
- B. Department of Human Services Child Abuse History Clearance {Act 151 of 1994}.
  - 1. The Pennsylvania Child Abuse History Clearance can be submitted and paid for online through the Child Welfare Information Solution (CWIS) self-service portal, <http://www.compass.state.pa.us/cwis>.

- C. Pennsylvania State Police Request for Criminal Records Check {Act 34 of 1985}.
1. The Pennsylvania State Police has also established a web-based computer application called "Pennsylvania Access To Criminal History," (PATCH):  
<https://epatch.state.pa.us/Home.jsp>.
- D. Federal Criminal History Record Information (CHRI) {Act 114 of 2006}.
1. Registration: The applicant must register prior to going to the fingerprint site. Walk in service is allowed but all applicants are required to complete pre-enrollment in the new Universal Enrollment system. Pre-enrollment can be completed online or over the phone. The registration website is available online 24 hours/day, seven days per week at <https://uenroll.identogo.com>. Telephonic registration is available at 1-844-321-2101 Monday through Friday, 8am to 6pm EST. During the pre-enrollment process, all demographic data for the applicant is collected (name, address, etc.) along with notices about identification requirements and other important information.
    - a. When registering on-line, use the agency specific Service Code "1KG6XN" to ensure the application is processed for the correct agency and/or applicant type. Using the correct service code ensures the background check is submitted for the correct purpose. Fingerprint requests processed through any other agency or purpose cannot be accepted and are not transferrable. If an applicant enters the wrong code by mistake, the incorrect applicant type will appear at the top of the screen. The applicant should select the "Back to Home" button and begin the process again, by reentering the correct Service Code. If the applicant proceeds with the process under the incorrect code, the pre-enrollment and/or results cannot be transferred to another state agency and the applicant will have to start the process over and pay for the background check again.
  2. Payment: The applicant will pay a fee for the fingerprint service and to secure an unofficial copy of the Criminal History Record. Major Credit Cards as well as Money orders or cashier's checks payable to MorphoTrust will be accepted on site for those applicants who are required to pay individually. No cash transactions or personal checks are allowed.
    - a. IDEMIA has also established a payment option for fingerprinting services for entities interested in paying the applicant's fee. This new option provides a payment 'coupon' that the entity will provide to each applicant for use. Each coupon is unique and may only be used one time. Account applications must be completed prior to the applicant visiting the fingerprint site. The authorized representative must complete the account application. To establish a billing account, visit the website <https://www.identogo.com/locations/pennsylvania> and download an application.
  3. Fingerprint Locations: After registration, the applicant proceeds to the fingerprint site of their choice for fingerprinting. The location of the fingerprint sites and days and hours of operation for each site are posted on IDEMIA's website at <https://uenroll.identogo.com>. The location of fingerprint sites may change over time; applicants are encouraged to confirm the site location nearest to their location. PDE encourages entities where access to the fingerprint location is more than 25 miles away to contact IDEMIA and suggest areas where another closer site could be established.
    - a. You will need to bring the required documentation and form of payment to one of the locations listed below. Please contact the fingerprinting site for specific hours of operation.
      - 1) Chester County Intermediate Unit  
455 Boot Road  
Downingtown, PA 19335  
484-237-5018

- 2) Five Points Insurance, Inc.  
814 Paoli Pike  
West Chester, PA 19380  
610-738-4100
4. Fingerprinting: At the fingerprint site the Enrollment Agents (EA) manages the fingerprint collection process. The fingerprint transaction begins when the EA reviews the applicant's qualified State or Federal photo ID before processing the applicant's transaction. Applicants will not be processed if they cannot produce an acceptable photo ID. After the identity of the applicant has been established, all ten fingers are scanned to complete the process. The entire fingerprint capture process should take no more than three to five minutes.
5. Report Access: For the public or private school or higher education institution to access the official report via the electronic system, applicants must present their UEID to the hiring entity (as shown on the receipt provided after fingerprint capture). This process allows an applicant to provide multiple potential employers with their UEID, as the report is linked to the UEID number and not assigned to a specific school. If an applicant has lost their receipt or needs to confirm UEID, the applicant may visit the UEP website (<https://uenroll.identogo.com/>) and simply check status of their file by providing alternate personal information. Applicants will enter their personal information after clicking in the lower portion of that screen to obtain their receipt with the UEID.

Applicants will receive an unofficial copy of their report. However, the school is required to review the official CHRI online and print a file copy of the CHRI if the applicant is hired by the school or their contractor, or if the applicant is approved for student teaching.

- E. Pennsylvania Department of Education Form 6004 {Act 24 of 2011, amended 2016}.
  1. In addition to the unofficial CHRI report, an applicant must complete and submit to a prospective employer the PDE Form 6004 (attached), required by Section 111(j)(1) of the School Code, indicating that the applicant has not been disqualified from employment.
  2. As required by subsection (c.4) and (j)(2) of 24 P.S. §1-111, this form shall be completed and submitted by all current and prospective employees of said institutions to provide written reporting of any arrest or conviction for an offense enumerated under 24 P.S. §§1-111(e) and (f.1) and to provide notification of having been named as a perpetrator of a founded report of child abuse within the past five (5) years as defined by the Child Protective Services Law.
  3. As required by subsection (j)(4) of 24 P.S. §1-111, this form also shall be utilized by current and prospective employees to provide written notice within seventy-two (72) hours after a subsequent arrest or conviction for an offense enumerated under 24 P.S. §§1-111(e) or (f.1).

## PART 2 PRODUCTS

Not Used.

## PART 3 EXECUTION

### 3.01 SAFETY REQUIREMENTS

- A. Perform all work in accordance with rules, regulations, procedures and safe practices, and OSHA and all other Government agencies having jurisdiction over the project.

3.02 SAFETY PRECAUTIONS AND PROGRAMS:

- A. Be responsible for initiating, maintaining, and supervising safety precautions and programs in connection with the work.
- B. Comply with the provisions of the "Occupational Safety and Health Act" and Federal, State, and local requirements.
- C. If a Contractor fails to maintain the safety precautions required by law or directed by authorities having jurisdiction, the Owner may take such action as necessary and charge the Contractor therefore. The failure of the Owner to take any such action shall not relieve the Contractor of his obligations.
- D. Be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods and for any damage which may result from their failure or their improper construction, maintenance or operation.
- E. Prior to mobilizing to the job, submit, in writing, a description of his safety program. During the conduct of the work, immediately notify the Owner in writing of all accidents and submit a written report describing in detail the circumstances of each accident within 24 hours of an accidental death and within 48 hours for all other occurrences.
- F. Notify the Owner of any flammable, combustible, and toxic materials intended for use on the project and shall furnish literature pertinent to the use and control of all materials, including, but not limited to M.S.D.S. sheets.
- G. Delegate one representative who shall be responsible to maintain all safety requirements of the Contractor.

3.03 SAFETY OF PERSONS AND PROPERTY:

- A. Take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage or loss to:
  - 1. All school personnel, employees on the work site, and all other persons who may be affected thereby.
  - 2. All the work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-Subcontractors.
  - 3. Other property at the site or adjacent thereto, including but not limited to trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction, and underground property.
- B. Give all notices and comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority, including the Owner's requirements bearing on the Safety of persons or property or their protection from damage, injury or loss.
- C. Erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including danger signs and other warnings against hazards.
- D. Promptly remedy all damage or loss to any property caused in whole or in part by the Contractor, his Subcontractors, his Sub-Subcontractors, or anyone directly employed by any of them, or by anyone for whose acts any of them be liable.

- E. Do not load or permit any part of the work to be loaded so as to endanger its integrity and safety.
- F. If using a method of blasting to perform work on the project, use all proper methods, including adequate safety matting and overburden, progressive time sequences, and scaled distances, in accordance with all governmental regulations.
- G. The use of audio equipment and headsets will not be permitted on the construction site.

### 3.04 PERSONAL PROTECTION REQUIREMENTS

- A. All persons entering the project shall wear hard hats that are in good condition and meet ANSI Z89.1-1981 and ANSI Z89.2-1971. Hard hats shall be worn in the proper manner.
- B. All persons entering the project shall wear proper work boots, clothing, and attire, including long trousers (short pants will not be allowed) and shirts.
- C. All job site personnel shall strictly adhere to the following rules and regulations:
  - 1. Use of approved eye protection by all Contractor personnel shall be required during all types of percussion and reciprocating work or when other requirements govern.
  - 2. Approved respiratory equipment shall be worn by all personnel exposed to hazardous volumes of toxic or noxious dusts, fumes, mists, or gases.
  - 3. Personal protective equipment is to be used under unusual conditions, such as high temperature work, handling caustic or corrosive liquids, or molten metals.
  - 4. As defined in the occupational Safety & Health Act, safety belts, complete with lanyards, or parachute-style harness, complete with lanyard, are to be used where there is a danger of falling.
- D. Contractor shall provide safety training to all his employees.
- E. All shipments to the site shall have the required documentation and labels attached, and the documentation and labels shall be maintained while the material is on site.

### 3.05 HOUSEKEEPING

- A. Materials and equipment must be piled up or stored in a safe manner. Aisles must be kept clear.
  - 1. Aisles, stairwells, and base areas of ladders are to be kept clear at all times.
- B. Elevate all drop cables and extension cords above the ground, or protect in such a way to allow traffic to pass.
  - 1. The cords and connections at temporary panels must be maintained in an orderly fashion at all times to prevent tripping.
- C. Smoking and tobacco products will not be permitted on school property.
- D. Consumption of food and beverages shall be in designated areas and at specified times.
- E. Glass-bottled refreshments will not be allowed in the workplace.
- F. Welding stubs and shells from explosive activated tools shall be collected and properly disposed of by Contractor.
- G. Nails are to be bent over or removed from wood.

3.06 M.S.D.S.-CONTROLLED PRODUCTS

- A. The Contractor shall notify Owner of any controlled products that he brings or causes to have brought onto the site. The Contractor shall submit copies of the Material Safety Data Sheet (M.S.D.S.) for the controlled product and retain a copy of the M.S.D.S. on site for his own reference. The legal storage, use, and disposal of any controlled product is the responsibility of the Contractor.
- B. Comply with OSHA Communications' Standards 29 CFR 1910-1200 for hazardous materials. Maintain a Material Safety Data Sheet on file at the jobsite for each chemical brought to the site.
- C. Temporary storage of hazardous materials shall be the responsibility of the Contractor. Final cleanup and removal shall be by the Contractor.

3.07 EMERGENCIES

- A. In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury, or loss, and shall immediately notify the Owner of such emergency conditions. Any claims made by the Contractor for additional compensation or extension of time on account of emergency work shall be processed in accordance with the General Conditions of the Contract.

3.08 ATTACHMENTS

- A. Arrest/Conviction Report and Certification Form (PDE-6004 03/01/2016)

END OF SECTION 014100



# ARREST/CONVICTION REPORT AND CERTIFICATION FORM

(under Act 24 of 2011 and Act 82 of 2012)

## Section 1. Personal Information

Full Legal Name: \_\_\_\_\_

Date of Birth: \_\_\_\_/\_\_\_\_/\_\_\_\_

Other names by  
which you have  
been identified: \_\_\_\_\_

## Section 2. Arrest or Conviction

- ☐ By checking this box, I state that I have NOT been arrested for or convicted of any Reportable Offense.
- ☐ By checking this box, I report that I have been arrested for or convicted of an offense or offenses enumerated under 24 P.S. §§1-111(e) or (f.1) ("Reportable Offense(s)"). See Page 3 of this Form for a list of Reportable Offenses.

### Details of Arrests or Convictions

For each arrest for or conviction of any Reportable Offense, specify in the space below (or on additional attachments if necessary) the offense for which you have been arrested or convicted, the date and location of arrest and/or conviction, docket number, and the applicable court.

\_\_\_\_\_  
\_\_\_\_\_

## Section 3. Child Abuse

- ☐ By checking this box, I state that I have NOT been named as a perpetrator of a founded report of child abuse within the past five (5) years as defined by the Child Protective Services Law.
- ☐ By checking this box, I report that I have been named as a perpetrator of a founded report of child abuse within the past five (5) years as defined by the Child Protective Services Law.

## Section 4. Certification

*By signing this form, I certify under penalty of law that the statements made in this form are true, correct and complete. I understand that false statements herein, including, without limitation, any failure to accurately report any arrest or conviction for a Reportable Offense, shall subject me to criminal prosecution under 18 Pa.C.S. §4904, relating to unsworn falsification to authorities.*

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

## INSTRUCTIONS

Pursuant to 24 P.S. §1-111(c.4) and (j), the Pennsylvania Department of Education developed this standardized form (PDE-6004) to be used by current and prospective employees of public and private schools, intermediate units, and area vocational-technical schools.

As required by subsection (c.4) and (j)(2) of 24 P.S. §1-111, this form shall be completed and submitted by all current and prospective employees of said institutions to provide written reporting of any arrest or conviction for an offense enumerated under 24 P.S. §§1-111(e) and (f.1) and to provide notification of having been named as a perpetrator of a founded report of child abuse within the past five (5) years as defined by the Child Protective Services Law.

As required by subsection (j)(4) of 24 P.S. §1-111, this form also shall be utilized by current and prospective employees to provide written notice within seventy-two (72) hours after a subsequent arrest or conviction for an offense enumerated under 24 P.S. §§1-111(e) or (f.1).

In accordance with 24 P.S. §1-111, employees completing this form are required to submit the form to the administrator or other person responsible for employment decisions in a school entity. Please contact a supervisor or the school entity administration office with any questions regarding the PDE 6004, including to whom the form should be sent.

**PROVIDE ALL INFORMATION REQUIRED BY THIS FORM LEGIBLY IN INK.**

## LIST OF REPORTABLE OFFENSES

- **A reportable offense enumerated under 24 P.S. §1-111(e) consists of any of the following:**

- (1) An offense under one or more of the following provisions of Title 18 of the Pennsylvania Consolidated Statutes:
 

<ul style="list-style-type: none"> <li>▪ Chapter 25 (relating to criminal homicide)</li> <li>▪ Section 2702 (relating to aggravated assault)</li> <li>▪ Section 2709.1 (relating to stalking)</li> <li>▪ Section 2901 (relating to kidnapping)</li> <li>▪ Section 2902 (relating to unlawful restraint)</li> <li>▪ Section 2910 (relating to luring a child into a motor vehicle or structure)</li> <li>▪ Section 3121 (relating to rape)</li> <li>▪ Section 3122.1 (relating to statutory sexual assault)</li> <li>▪ Section 3123 (relating to involuntary deviate sexual intercourse)</li> <li>▪ Section 3124.1 (relating to sexual assault)</li> <li>▪ Section 3124.2 (relating to institutional sexual assault)</li> <li>▪ Section 3125 (relating to aggravated indecent assault)</li> <li>▪ Section 3126 (relating to indecent assault)</li> <li>▪ Section 3127 (relating to indecent exposure)</li> <li>▪ Section 3129 (relating to sexual intercourse with animal)</li> <li>▪ Section 4302 (relating to incest)</li> <li>▪ Section 4303 (relating to concealing death of child)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Section 4304 (relating to endangering welfare of children)</li> <li>▪ Section 4305 (relating to dealing in infant children)</li> <li>▪ A felony offense under section 5902(b) (relating to prostitution and related offenses)</li> <li>▪ Section 5903(c) or (d) (relating to obscene and other sexual materials and performances)</li> <li>▪ Section 6301(a)(1) (relating to corruption of minors)</li> <li>▪ Section 6312 (relating to sexual abuse of children)</li> <li>▪ Section 6318 (relating to unlawful contact with minor)</li> <li>▪ Section 6319 (relating to solicitation of minors to traffic drugs)</li> <li>▪ Section 6320 (relating to sexual exploitation of children)</li> </ul>
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- (2) An offense designated as a felony under the act of April 14, 1972 (P.L. 233, No. 64), known as “The Controlled Substance, Drug, Device and Cosmetic Act.”
- (3) An offense SIMILAR IN NATURE to those crimes listed above in clauses (1) and (2) under the laws or former laws of:
  - the United States; or
  - one of its territories or possessions; or
  - another state; or
  - the District of Columbia; or
  - the Commonwealth of Puerto Rico; or
  - a foreign nation; or
  - under a former law of this Commonwealth.

- **A reportable offense enumerated under 24 P.S. §1-111(f.1) consists of any of the following:**

- (1) An offense graded as a felony offense of the first, second or third degree, other than one of the offenses enumerated under 24 P.S. §1-111(e), if less than (10) ten years has elapsed from the date of expiration of the sentence for the offense.
- (2) An offense graded as a misdemeanor of the first degree, other than one of the offenses enumerated under 24 P.S. §1-111(e), if less than (5) five years has elapsed from the date of expiration of the sentence for the offense.
- (3) An offense under 75 Pa.C.S. § 3802(a), (b), (c) or (d) (relating to driving under influence of alcohol or controlled substance) graded as a misdemeanor of the first degree under 75 Pa.C.S. § 3803 (relating to grading), if the person has been previously convicted of such an offense and less than (3) three years has elapsed from the date of expiration of the sentence for the most recent offense.

## SECTION 014200 – REFERENCES

### PART 1 GENERAL

#### 1.01 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Architect/Engineer," "requested by the Architect/Engineer," and similar phrases.
- D. Approve: The term "approved," where used in conjunction with the Architect/Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Architect/Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."
- G. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
- H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."
- I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
  - 1. The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
  - 2. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
  - 3. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and

assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

- a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

J. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

#### 1.02 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 50-Division format and MASTERFORMAT numbering system.

B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mode are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

#### 1.03 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standard in effect as of the date of the Contract Documents.

C. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

- D. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

1.04 SUBMISSIONS

- A. For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION 014200

## SECTION 015000 – TEMPORARY FACILITIES AND CONTROLS

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

#### 1.02 USE CHARGES

- A. Water Service: available at no cost from Owners lines. Practice water conservation. Provide necessary extension hoses.
- B. Electric power from the Owner's existing system may be used.
- C. Other entities using temporary services and facilities include, but are not limited to:
  - 1. Other non-prime Contractors.
  - 2. The Owner's work forces.
  - 3. The Architect/Engineer and his consultants.
  - 4. Testing Agencies
  - 5. Personnel of government agencies.

#### 1.03 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
  - 1. Building Code requirements.
  - 2. Health and safety regulations.
  - 3. Utility company regulations.
  - 4. Police, Fire Department, and Rescue Squad rules.
  - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."
  - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).
  - 2. Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdiction.
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

#### 1.04 PROJECT CONDITIONS

- A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility.



1. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.
- C. Maintain any temporary or support facilities constructed or installed for the duration of the project.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. General: Provide new materials; if acceptable to the Architect/Engineer, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Site Enclosure Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails.
- C. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.
- D. Water: Provide potable water approved by local health authorities.

### 2.02 TEMPORARY FACILITIES

- A. General: Provide incombustible construction for offices, shops, and sheds. Comply with requirements of NFPA 241.
  1. Locate trailers and sheds in location on site as directed by the Owner.
- B. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
  1. Maximum size permitted: 8 foot by 20 foot.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  1. Store combustible materials apart from building.
  2. .

### 2.03 EQUIPMENT

- A. General: Provide new equipment; if acceptable to the Architect/Engineer, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with

ground-fault circuit interrupters, reset button, and pilot light, for connection of power tools and equipment.

- C. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.
- D. Lamps and Light Fixtures: Provide general service lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- E. Dehumidification and Ventilation Equipment: Provide equipment required to provide proper cures, maintain schedule, or protect installed Work. Each Prime Contractor is responsible for providing equipment as needed for its own work.
- F. Sanitary Facilities: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material in accordance with sanitary guidelines. The General Contractor is responsible for facilities from the start of construction through April 1<sup>st</sup>, 2020. The General Construction contractor to provide facilities between April 1<sup>st</sup>, 2020 through the completion of construction.
- G. First Aid Supplies: Comply with governing regulations.
- H. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
  - 1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. General: Use qualified personnel for installation of temporary facilities.
  - 1. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
  - 2. See "SITE PLAN" in the drawings for possible locations of various temporary construction facilities and controls.
  - 3. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access.
  - 4. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

#### 3.02 TEMPORARY UTILITY INSTALLATION

- A. Temporary Construction Water: Provide water to facilitate construction and demands of project (i.e.) masonry, wheel wash etc. Coordinate all water provisions with local water company. Provide and maintain water service and keep from freezing.

- B. Temporary HVAC: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Remove all fuel for heating units from the building at the end of each workday, and secure properly. No fuel shall be left in the building overnight.
- C. Temporary Electrical Power: Provide service to handle the needs for at least as many construction trailers as there are Prime Contractors plus one.
  - 1. Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.
  - 2. Except where overhead service must be used, install electric power service underground.
  - 3. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, AC 20 ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- D. Lighting: Provide temporary lighting that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Temporary safety lighting shall remain on twenty four (24) hours a day, seven (7) days per week, for the duration of the project, to prevent break in and safety hazards.

### 3.03 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION

- A. Temporary Roads and Lay-down Areas: Construct and maintain temporary roads and lay-down areas adequate for construction operations. Locate temporary roads and lay-down areas as shown on site plan.
- B. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
  - 1. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
  - 2. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.
  - 3. Provide constant protection against rain, wind, storms, frost or heat so as to maintain the work, materials, apparatus, and fixtures free from damage. At the end of each day's work, cover work likely to be damaged.
- C. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
  - 1. Provide and operate all hoists and derricks and furnish and erect all ladders and scaffolding, constructed to afford proper protection to craftsmen, their work and other work in progress and previously executed. Hoists, derricks, and other apparatus shall be equipped with safety devices required by law and shall be so placed as not to interfere with, or damage, any work or property.
- D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

### 3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
- G. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- H. Temporary Fire Protection: Install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."
  - 1. Locate fire extinguishers where convenient and effective for their intended purpose.
  - 2. Store combustible materials in containers in fire-safe locations.
  - 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
  - 4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.
  - 5. No welding, cutting by torch, or Work utilizing or causing inflammable waste shall be done unless adequate fire protection is provided and maintained for the duration of the Work in the area or operations.
  - 6. No fires for any purpose will be permitted on the Project. Remove all refuse from the Owner's property.

3.05 OPERATION, TERMINATION AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until removal.
- C. Termination and Removal: Unless the Architect/Engineer requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.
  - 2. If the Contractor fails to carry out his responsibilities in providing temporary utilities, as set forth above, the Owner shall have the right to take such action as he deems proper for the protection and conduct of the Work, and to deduct the cost thereof from the amount due the Contractor.

END OF SECTION 015000

## SECTION 016000 – PRODUCT REQUIREMENTS

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.

#### 1.02 PRODUCTS

- A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- B. Provide interchangeable components of the same manufacture, for existing components being replaced.

#### 1.03 TRANSPORTATION AND HANDLING

- A. Transport and handle Products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.
- C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

#### 1.04 STORAGE AND PROTECTION

- A. Store and protect Products in accordance with manufacturers' instructions, with seals and labels intact and legible.
- B. Store sensitive Products in weather tight, climate controlled enclosures.
- C. For exterior storage of fabricated Products, place on sloped supports, above ground.
- D. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of Product.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

- G. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

#### 1.05 SUBSTITUTIONS PRIOR TO RECEIPT OF BID

- A. Prior to Bidding: In order to be approved prior to bidding request for Substitutions shall be submitted during the bidding period and shall be received 10 days prior to receipt of bids. Comply with the requirements specified in this section.
- B. Document each request with complete data substantiating compliance of proposed
- C. Substitution with Contract Documents.
- D. A request constitutes a representation that the Prime Bidder:
  - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
  - 2. Will provide the same warranty for the Substitution as for the specified Product.
  - 3. That the use of this product will not have an adverse effect on any other trade or Prime Contractor or the Construction Schedule.
  - 4. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
  - 5. Waives claims for additional costs or time extension which may subsequently become apparent.
- E. Substitution Submittal Procedure:
  - 1. Submit request for Substitution for consideration. Limit each request to one proposed Substitution. Identify specification section of Product being considered.
  - 2. Clearly delineate on Contract Document specification section applicable for Product which a proposed substitution is being submitted, differences between substitution and Product specified.
  - 3. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.
  - 4. The Architect/Engineer will notify all bidders in writing of decision to accept or reject request by addendum.
  - 5. Each request shall include all information required to make a technical comparison of the product to be substituted with the specified product. This information shall include color and finish samples if the installed product will be visible after installation.
- F. Submit each request for substitution accompanied by a separate Substitution Request Form, a copy of which is bound in these specifications.

#### 1.06 SUBSTITUTIONS AFTER EXECUTION OF THE AGREEMENT

- A. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.
- B. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request as included above, or when acceptance will require revision to the Contract Documents. All cost associated with making a substitution including revisions to other work, and fees of the Architect/Engineer/Engineer shall be paid by



the Contractor requesting the substitution. A request for substitution shall include a Change Order Form.

- C. Substitution of Materials: No substitutions of materials will be considered after the Execution of the Contract without a Credit Change Order to the Owner, unless a Product becomes unavailable through no fault of the Contractor.
- D. A request constitutes a representation that the Contractor:
  - 1. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
  - 2. Waives claims for additional costs or time extension which may subsequently become apparent due to the request for substitution.

PART 2 PRODUCTS Not Used.

PART 3 EXECUTION Not Used.

END OF SECTION 016000

SUBSTITUTION REQUEST FORM

TO: West Chester Area School District  
782 Springdale Drive  
Exton, PA 19341  
Atten: Wayne Birster  
Fax#: 484.266.1250

PRODUCT INFORMATION:

As a Prime Bidder on the Project referenced at the top of this page, we are requesting the following substitution:

Section No.	Page No.	Paragraph	Specified Manufacturer/ Product
-------------	----------	-----------	---------------------------------

PROPOSED SUBSTITUTION

Manufacturer's Home Office:

Local Representative:

Address: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Telephone: \_\_\_\_\_

Contact: \_\_\_\_\_

Contact: \_\_\_\_\_

Attached to this request is product data, specifications, performance tests and data, and color samples. The attached information also includes any modifications of the Contract Documents which would be required if this substitution is utilized for this Project.

- A. The undersigned states that as a Prime Bidder on the above referenced Project, the following statements are true.
1. The Prime Bidder has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
  2. The product manufacturer will provide the same warranty for the Substitution as for the specified Product.
  3. The use of this product will not have an adverse effect on any other trade or Prime Contractor or the Construction Schedule.
  4. If the use of this product affects the dimensions shown on the Drawings or has a minor effect on any other trade or Prime Contractor, the undersigned has included all costs for making those changes in this substitution request.

B. Reason for Substitution:

\_\_\_\_\_  
\_\_\_\_\_

C. Proposed Credit: \_\_\_\_\_  
(Complete if substitution is requested after Execution of Contract)

D. Approval Signatures: Architect/Engineer: \_\_\_\_\_

Contractor: \_\_\_\_\_

Owner: \_\_\_\_\_

## SECTION 017300 – EXECUTION

### PART 1 GENERAL (Not Applicable).

### PART 2 PRODUCTS (Not Applicable).

### PART 3 EXECUTION

#### 3.01 GENERAL INSTALLATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect/Engineer for final decision.
- F. Recheck measurements and dimensions before starting each installation.
- G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect/Engineer for final decision.

#### 3.02 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
  1. Excessive static or dynamic loading.
  2. Excessive internal or external pressures.
  3. Excessively high or low temperatures.
  4. Thermal shock.
  5. Excessively high or low humidity.
  6. Air contamination or pollution.
  7. Water or ice.
  8. Solvents.
  9. Chemicals.
  10. Light.
  11. Radiation.
  12. Puncture.

13. Abrasion.
14. Heavy traffic.
15. Soiling, staining, and corrosion.
16. Bacteria.
17. Rodent and insect infestation.
18. Combustion.
19. Electrical current.
20. High speed operation,
21. Improper lubrication,
22. Unusual wear or other misuse.
23. Contact between incompatible materials.
24. Destructive testing.
25. Misalignment.
26. Excessive weathering.
27. Unprotected storage.
28. Improper shipping or handling.
29. Theft.
30. Vandalism.

END OF SECTION 017300

## SECTION 017329 – CUTTING AND PATCHING

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

#### 1.02 SUBMITTALS

- A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:
  - 1. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.
  - 2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
  - 3. List products to be used and firms or entities that will perform Work.
  - 4. Indicate dates when cutting and patching is to be performed.
  - 5. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
  - 6. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.
  - 7. Approval by the Architect/Engineer to proceed with cutting and patching does not waive the Architect/Engineer's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

#### 1.03 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
  - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
    - a. Bearing and retaining walls.
    - b. Structural concrete.
    - c. Structural steel.
    - d. Lintels.
    - e. Structural decking.
    - f. Miscellaneous structural metals.
    - g. Equipment supports.
    - h. Piping, ductwork, vessels, and equipment.



- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
  - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
    - a. Primary operational systems and equipment.
    - b. Air or smoke barriers.
    - c. Water, moisture, or vapor barriers.
    - d. Membranes and flashings.
    - e. Fire protection systems.
    - f. Noise and vibration control elements and systems.
    - g. Control systems.
    - h. Communication systems.
    - i. Electrical wiring systems.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect/Engineer's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
  - 1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

### 3.02 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

### 3.03 PERFORMANCE

- A. General: A Contractor, subcontractor or sub-subcontractor requiring changes in existing work shall have such changes performed by the trades skilled in performing the particular work, and such changes shall be at the expense of the Contractor, subcontractor or sub-subcontractor requiring the change. Review changes with the Architect/Engineer prior to proceeding with the work and include installation of such reinforcement of the work as the Architect/Engineer may direct.
- B. Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
  - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- C. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
  - 1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- D. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
  - 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
  - 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  - 3. Firestopping and draftstopping.
    - a. Where fire rated or smoke barrier construction (walls, floors or ceilings) are penetrated, all penetrations shall be fire-safed and sealed using appropriate fire rated materials and approved methods.
    - b. Where non-fire rated construction (walls, floors or ceilings) are penetrated, the penetration shall be sealed tight with approved draftstopping materials.

### 3.04 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty, and items of similar nature. Thoroughly clean piping, conduit, and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 017329

## SECTION 017700 - CLOSEOUT PROCEDURES

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. Section Includes:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Final cleaning.
  - 4. Project record documents.
  - 5. Warranties.
  - 6. Operation and maintenance data.

#### 1.02 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

#### 1.03 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.
- C. Closeout Checklist.

#### 1.04 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

#### 1.05 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items (attic stock): For maintenance material submittal items required by other Sections.

#### 1.06 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer review.
  - 2. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

3. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, as-built drawings, and similar final record information.
  4. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  5. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
  6. Submit testing, adjusting, and balancing records.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Complete startup and testing of systems and equipment, and ensure proper operation as noted in other specification sections and Drawings.
  2. Perform preventive maintenance on equipment used prior to Substantial Completion.
  3. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
  4. Participate with Owner in conducting inspection and walkthrough with local emergency responders and township officials.
  5. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  6. Complete final cleaning requirements (broom cleaning, waste removal, cleaning exterior glass).
  7. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion on the form attached to this Section after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.
- 1.07 FINAL COMPLETION PROCEDURES
- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed

- and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Review Contract Documents, prepare, and submit required certificates of insurance, affidavits, consents of surety, wage certifications, and other documentation with final Application for Payment.
  4. Submit contract closeout submittal documents to Owner with final Application for Payment.
  5. Submit completed Final Closeout Checklist attached to this Section.

- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect and Owner will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.08 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding to interior spaces, listed by room or space number.
  2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect and Construction Manager.
    - d. Name of Contractor.
    - e. Page number.
  4. Submit list of incomplete items in the following format:
    - a. MS Excel Electronic File: Architect, through Construction Manager, will return annotated file.

#### 1.09 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Within limits of Contract, clean site, including paved areas, rake stone areas restore grass areas that were damaged during construction.
- C. Remove waste and surplus materials, rubbish, and temporary construction facilities from the site. Dispose of in a legal manner.
- D. Use cleaning materials and agents recommended by manufacturer or fabricator of surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finished surfaces.
- E. Complete following cleaning operations before requesting inspection for each phase of Substantial Completion.

1. Clean Project Site, yard, and grounds in areas disturbed by construction activities, including landscape development areas, of rubbish, waste materials, litter, and foreign substances. Sweep paved areas broom clean. Remove petro-chemical spills, stains, and other foreign deposits.
2. Remove tools, construction equipment, machinery, and surplus material from Project Site.
3. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances.
4. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, and similar spaces.
5. Broom clean or vacuum floors, removing debris and excess nap. Shampoo or wet mop floors if required.
6. Clean exterior transparent materials, including mirrors and glass. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
7. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
8. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
9. Clean mechanical ducts, blowers, and coils if required.
10. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
11. Clean strainers.
12. Remove labels that are not permanent labels.
13. Leave Project clean and ready for occupancy.

- F. Remove temporary protection and facilities installed during construction to protect previously completed installations during remainder of construction.

#### 1.10 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of Contract Documents including the following:
1. Specifications including any addenda.
  2. Any modifications to the Contract.
  3. Approved Shop Drawings, and Product Data.
  4. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Record Documents and Shop Drawings: Legibly mark any modification to the Contract Document:
1. Field changes of dimension or detail.
  2. Details not in original Contract Documents.

#### 1.11 WARRANTIES

- A. Provide triplicate notarized copies.
- B. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers.
- C. Submit prior to Final Application for Payment.
- D. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

- E. Warranties shall be effective from the date of approval of Final Completion to the Contractor by the Architect/Engineer and Owner.

#### 1.12 OPERATION AND MAINTENANCE DATA

- A. Submit data on 8-1/2 x 11 inch text pages, bound in three D side ring binders with durable plastic covers.
  - 1. Since the data will be necessary for the Owner to have to maintain their facility, the data must be submitted within 30 days of Substantial Completion or be subject to liquidated damages.
  - 2. Submit digital copies of the same information in PDF format.
- B. Prepare binder cover and edge with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS" and title of Project. If more than one volume is required, indicate volume number on edge and cover.
- C. Contents: Table of Contents for each volume, typed on white paper, in three parts as follows:
  - 1. Part 1: Directory
    - a. Names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Part 2: Operation and maintenance instructions.
    - a. List of equipment.
    - b. Parts list for each component.
    - c. Operating instructions.
    - d. Maintenance instructions including recommended cleaning methods.
  - 3. Part 3: Project documents and certificates, including the following:
    - a. Shop drawings and product data.
    - b. Photocopies of warranties and bonds.

#### PART 2 PRODUCTS

##### 2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

#### PART 3 EXECUTION

NOT USED

END OF SECTION 017700





## CERTIFICATE OF SUBSTANTIAL COMPLETION

**Additions and Renovations to Mary C. Howse Elementary School**  
**641 Boot Road**  
**West Chester, PA 19380**  
**BHA Job No. 22-114**

600 Chestnut Street  
Suite 1200  
Philadelphia, PA 19106  
t. 215-829-0922  
f. 215-829-0596  
www.blackneyhayes.com

**DATE OF ISSUANCE:** [Month Day, Year]

**OWNER:** West Chester Area School District  
782 Springdale Drive  
Exton, PA 19341

**CONTRACT FOR:** [General Construction or other Prime Contractor]  
**CONTRACT DATE:** [Month Day, Year]

**FROM ARCHITECT:** [Contract Administrator]  
Blackney Hayes Architects

**TO CONTRACTOR:** [Contractor Name]  
[Contractor Street Address]  
[Contractor City, State, ZIP]

John Hayes, FAIA  
Kevin Blackney, AIA, LEED AP  
Jennifer Crawford, AIA  
Michele Barnett, AAHID  
Megan Hayes Barton, NCIDQ  
Troy C. Hill, AIA, ALEP  
Darin Jellison, AIA  
Traci Luckenbill, AIA  
Chris Stigler, AIA, LEED AP

### ASSOCIATES

Carmen Bushong, AIA  
Tyler Cooney, AIA, LEED AP BD+C  
Patrick Gallagher, RA, CSI, CDT  
John Townsend, NCIDQ

"The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilized the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate."

[Identify the Work, or portion of the Work, that is Substantially Complete]

\_\_\_\_\_  
Architect Signature

\_\_\_\_\_  
Printed Name and Title

\_\_\_\_\_  
Date

[DD/MM/YYYY]

\_\_\_\_\_  
Date of Substantial Completion

### WARRANTIES

The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

[Identify warranties that do not commence of the date of Substantial Completion, if any, and indicate their date of commencement]

### WORK TO BE COMPLETED OR CORRECTED

A list of items to be completed or corrected is attached to this document, or transmitted as agreed upon by the parties, and identified as follows:

[Identify the list of Work to be completed or correct]

"The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificated of Payment or the date of final payment, whichever occurs first. The Contractor will complete or correct the Work on the list of items attached within [XXX] [business/calendar] days from the above date of Substantial Completion."

**Cost estimate of Work to be completed or corrected:** \$ \_\_\_\_\_

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:

*(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)*

**The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate off Substantial Completion:**

\_\_\_\_\_  
Contractor (Firm Name)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name and Title

\_\_\_\_\_  
Date

\_\_\_\_\_  
Owner (Firm Name)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name and Title

\_\_\_\_\_  
Date





## CLOSEOUT CHECKLIST

**Additions and Renovations to Mary C. Howse Elementary School**  
**641 Boot Road**  
**West Chester, PA 19380**  
**BHA Job No. 22-114**

**CONTRACT FOR:** General Construction or other Prime Contractor

**FROM CONTRACTOR:** Contractor Name  
Contractor Company Name

**TO ARCHITECT:** Contract Administrator  
Blackney Hayes Architects

Contractor shall submit a copy of this Checklist with their required punchlist and attachments to the Architect, indicating that the Work has been completed in accordance with the Contract Documents.

The undersigned certifies that all items of Work noted herein and all other required scope of Work have been completed in accordance with the Contract Documents, and is further certifying that the project is ready for punchlist by the Architect. The undersigned acknowledges providing to the Architect all required close-out documents, including, but not limited to the following:

- Certificates of Release from authorities having jurisdiction (health department approval, building department approval, Certificate of Occupancy, etc.);
- Closeout Submittals:
  - Project record documents;
  - Operation and maintenance manuals;
  - Property survey;
  - Warranties;
  - Workmanship bonds;
  - Maintenance service agreements;
  - Testing, adjusting and balancing records;
- Complete start up and testing of all systems and equipment;
- Complete Owner demonstration and training of all systems and equipment; turn over training manuals and video to Owner; provide Owner emergency contact information as part of Closeout Submittals;
- Perform preventative maintenance on permanent equipment used by the Contractor prior to Substantial Completion;
- Maintenance material submittals, tools, spare parts, etc. delivered to Owner;
- Final changeover of permanent locks and deliver keys to Owner;
- Advise Owner of changeover in utility services;
- Advise Owner of pending insurance changeover requirements;
- Sustainable design submittals are submitted and completed;
- Remove temporary facilities from the Project site, along with mock-ups, construction tools, storage units, etc.;
- Complete final cleaning.

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### ASSOCIATES

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Tyler Cooney, AIA, LEED AP BD+C  
Patrick Gallagher, RA, CSI, CDT  
John Townsend, NCIDQ

Items not completed shall be summarized by the Contractor in letter form and attached to this form. The Contractor shall provide a dollar value for each individual item not completed.

The undersigned hereby certifies that they shall pay the Owner for any and all expenses incurred by the Architect due to the Contractor's misrepresentation of completion of punch list items.

\_\_\_\_\_  
Authorized Representative of the Contractor (Print/Type)

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

The Contractor shall notarize this punchlist as noted below:

\_\_\_\_\_  
Contractor's Corporate Seal

\_\_\_\_\_  
Notary Seal

\_\_\_\_\_  
Prepared by (Print/Type):

\_\_\_\_\_  
Date



## SECTION 017900 – DEMONSTRATION AND TRAINING

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for demonstration and training of building systems and equipment.

#### 1.02 DEMONSTRATION AND TRAINING

- A. Demonstrate operation and maintenance of equipment and systems to the Owner's personnel two weeks prior to the end of each construction phase. Allow for two (2) training sessions for all of the equipment and systems installed.
- B. Demonstrate start-up, operation, control, adjustment, trouble shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at designated location.
- C. For equipment and systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide qualified person who is knowledgeable about the equipment and system to perform the demonstration and instruction to the Owner's personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with the Owner's personnel in detail to explain all aspects of operation and maintenance. A copy of each maintenance manual will be left with the Owner after training and demonstration is complete.
- F. Provide a sign in sheet and provide a copy to the Owner after demonstration is complete.

### PART 2 PRODUCTS

NOT USED

### PART 3 EXECUTION

NOT USED

END OF SECTION 017900

## SECTION 024116 - STRUCTURE DEMOLITION

### 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. Demolition and removal of buildings and site improvements.
2. Removing below-grade construction.
3. Disconnecting, capping or sealing, and removing site utilities.
4. Salvaging items for reuse by Owner.

- B. Related Requirements:

1. Section 011000 "Summary" for use of the premises and phasing requirements.
2. Section 013200 "Construction Progress Documentation" for preconstruction photographs taken before building demolition.
3. Section 024117 "Selective Demolition" for partial demolition of buildings, structures, and site improvements.
4. Section 024119 "Sitework Selective Demolition" for site clearing and removal of above- and below-grade site improvements not part of building demolition.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store. Include fasteners or brackets needed for reattachment elsewhere.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

#### 1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
  1. Inspect and discuss condition of construction to be demolished.

2. Review structural load limitations of existing structures.
3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review and finalize protection requirements.
5. Review procedures for noise control and dust control.
6. Review procedures for protection of adjacent buildings.
7. Review items to be salvaged and returned to Owner.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
  1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.
- B. Schedule of Building Demolition Activities: Indicate the following:
  1. Detailed sequence of demolition work, with starting and ending dates for each activity.
  2. Temporary interruption of utility services.
  3. Shutoff and capping or re-routing of utility services.
- C. Predemolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before the Work begins.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

#### 1.8 FIELD CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
  1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
  2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
    - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.



1. Before building demolition, Owner will remove the following items:

- a. Classroom furniture.
- b. Education records and files.
- c. Books.
- d. Educational materials.

D. Hazardous Materials: Present in buildings and structures to be demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

- 1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- 2. Owner will provide material safety data sheets for materials that are known to be present in buildings and structures to be demolished because of building operations or processes performed there.

E. On-site storage or sale of removed items or materials is not permitted.

1.9 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied buildings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

2.2 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Section 312000 "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

- C. Inventory and record the condition of items to be removed and salvaged.
  - 1. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations. Comply with Section 013233 "Photographic Documentation.

### 3.2 PREPARATION

- A. 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 a secure area until delivery to Owner.
  - 4. Transport items to storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.

### 3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Utilities to be Disconnected: Locate, identify, disconnect, and seal or cap off utilities serving buildings and structures to be demolished.
  - 1. Arrange to shut off utilities with utility companies.
  - 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
  - 3. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

### 3.4 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of demolition.
- C. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations.
  - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
  - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
    - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.

- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 015000 "Temporary Facilities and Controls."
1. Protect adjacent buildings and facilities from damage due to demolition activities.
  2. Protect existing site improvements, appurtenances, and landscaping to remain.
  3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
  4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
  6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
  7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- E. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

### 3.5 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
  2. Maintain fire watch during and for at least 24 hours after flame-cutting operations.
  3. Maintain adequate ventilation when using cutting torches.
  4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
  2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Explosives: Use of explosives is not permitted.

### 3.6 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Salvage: Items to be removed and salvaged are indicated on Drawings.
- D. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
  - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely.
- E. Existing Utilities: Demolish and remove existing utilities and below-grade utility structures.

### 3.7 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Section 312000 "Earth Moving."
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

### 3.8 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

### 3.9 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Do not burn demolished materials.

3.10 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.
  - 1. Clean roadways of debris caused by debris transport.

END OF SECTION 024116

## SECTION 024117 - SELECTIVE DEMOLITION

### 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. Demolition and removal of selected portions of building or structure.
  - 2. Demolition and removal of selected site elements.
  - 3. Salvage of existing items to be reused or recycled.

- B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
  - 2. Section 017300 "Execution" for cutting and patching procedures.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

#### 1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
  1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  2. Interruption of utility services. Indicate how long utility services will be interrupted.
  3. Coordination for shutoff, capping, and continuation of utility services.
  4. Use of elevator and stairs.
  5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 013233 "Photographic Documentation." Submit before Work begins.
- D. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

#### 1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  1. Before selective demolition, Owner will remove the following items as per each phase of the Work:
    - a. Classroom furniture.



- b. Education records and files.
  - c. Books.
  - d. Educational materials.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
  - 1. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
  - 2. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

#### 1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
  - 1. None identified by Owner.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

#### 1.10 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

- B. Standards: Comply with ASSE A10.6 and NFPA 241.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- B. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
  - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- D. Survey of Existing Conditions: Record existing conditions by use of measured drawings and preconstruction photographs.
  - 1. Comply with requirements specified in Section 013233 "Photographic Documentation."
  - 2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

#### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Arrange to shut off utilities with utility companies.
  - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.

- c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

### 3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  5. Maintain fire watch during and for at least <Insert number> hours after flame-cutting operations.
  6. Maintain adequate ventilation when using cutting torches.
  7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  10. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a 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.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

### 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCT's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for new roofing requirements.
  - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
  - 2. Remove existing roofing system down to substrate.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.

### 3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024117

## SECTION 024119 – SITEWORK SELECTIVE DEMOLITION

### 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. Demolition and removal of selected site elements as indicated on plans.
  - 2. Removal of existing utilities and utility structures as indicated on plans.

- B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
  - 2. Section 017300 "Execution" for cutting and patching procedures.
  - 3. Section 013516 "Alteration Project Procedures" for general protection and work procedures for alteration projects.
  - 4. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

#### 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

#### 1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at project site in project job trailer.
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review structural load limitations of existing structure.

3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
  1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure on-site operations are uninterrupted.
  2. Interruption of utility services. Indicate how long utility services will be interrupted.
  3. Coordination for shutoff, capping, and continuation of utility services.
- C. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

#### 1.8 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by WCASD as far as practical.
- B. Notify Design Professional of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
  2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- D. Storage or sale of removed items or materials on-site is not permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.



1. Maintain fire-protection facilities in service during selective demolition operations.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
  1. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
  2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  1. Contractor shall coordinate with utility companies to arrange to shut off necessary utilities associated with the scope of work.
  2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems.

### 3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent properties and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area.
  - 2. Provide temporary weather protection to prevent water leakage.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.
- D. Existing Utilities to Remain: Maintain utility services to remain and protect from damage during demolition operations.
  - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by the WCASD and authorities having jurisdiction.
  - 2. Protect and support existing utilities to remain as required for sequenced demolition and or site work.
  - 3. Provide temporary services during interruptions to existing utilities, as acceptable to the WCASD and authorities having jurisdiction.
    - a. Provide at least five (5) days notice to occupants of affected buildings if shutdown of service is required during changeover.

### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  - 2. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  - 3. Maintain fire watch during and for at least two (2) hours after flame-cutting operations.
  - 4. Maintain adequate ventilation when using cutting torches.
  - 5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - 6. Dispose of demolished items and materials promptly.

- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from the WCASD and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
  - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

### 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction and recycle or dispose of them according to Section 017419 "Construction Waste Management and Disposal."
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. Coordinate first subparagraph below with use of elevators, stairs, or building entries permitted by building manager.
  - 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

## SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Form-facing material for cast-in-place concrete.
  - 2. Shoring, bracing, and anchoring.

- B. Related Requirements:

- 1. Section 032000 "Concrete Reinforcing."
  - 2. Section 033000 "Cast-in-Place Concrete."
  - 3. Section 321313 "Concrete Paving" for formwork related to concrete pavement and walks.

#### 1.3 DEFINITIONS

- A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.
- B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following:

- 1. Waterstops.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
  - 1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
  - 2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

### 2.2 FORM-FACING MATERIALS

- A. As-Cast Surface Form-Facing Material:
  - 1. Provide continuous, true, and smooth concrete surfaces.
  - 2. Furnish in largest practicable sizes to minimize number of joints.
  - 3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:
    - a. Plywood, metal, or other approved panel materials.
- B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.
  - 1. Provide lumber dressed on at least two edges and one side for tight fit.

### 2.3 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 (19 by 25 mm).

### 2.4 RELATED MATERIALS

- A. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

- D. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
- E. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION OF FORMWORK

- A. Comply with ACI 301 (ACI 301M).
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M) and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.
- C. Limit concrete surface irregularities as follows:
  - 1. Surface Finish-1.0: ACI 117 Class D, 1 inch (25 mm).
  - 2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch (6 mm).
  - 3. Surface Finish-3.0: ACI 117 Class A, 1/8 inch (3.0 mm).
- D. Construct forms tight enough to prevent loss of concrete mortar.
  - 1. Minimize joints.
  - 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
  - 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
  - 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
  - 1. Provide and secure units to support screed strips
  - 2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.



1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches (305 mm).
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
  1. Determine sizes and locations from trades providing such items.
  2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:
  1. Construct joints true to line with faces perpendicular to surface plane of concrete.
  2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  3. Place joints perpendicular to main reinforcement.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
  1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
  2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
- N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.2 INSTALLATION OF 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.
  1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3. 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.
4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
5. Clean embedded items immediately prior to concrete placement.

### 3.3 INSTALLATION OF WATERSTOPS

- A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
  1. Install in longest lengths practicable.
  2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
  3. Protect exposed waterstops during progress of the Work.

### 3.4 REMOVING AND REUSING FORMS

- A. 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 (10 deg C) 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.
- B. Clean and repair surfaces of forms to be reused in the Work.
  1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
  2. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
  1. Align and secure joints to avoid offsets.
  2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.5 FIELD QUALITY CONTROL

- A. Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
  1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
  2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 031000

## SECTION 032000 - CONCRETE REINFORCING

### 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. Steel reinforcement bars.
  - 2. Welded-wire reinforcement.
- B. Related Requirements:
  - 1. Section 033000 "Cast-in-Place Concrete."
  - 2. Section 321313 "Concrete Paving."

#### 1.3 ACTION SUBMITTALS

- A. Shop Drawings: Comply with ACI SP-066:
  - 1. Include placing drawings that detail fabrication, bending, and placement.
  - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
  - 1. Store reinforcement to avoid contact with earth.

### PART 2 - PRODUCTS

#### 2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed.

- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

## 2.2 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
  - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
    - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- C. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.
  - 1. Finish: Plain.

## 2.3 FABRICATING REINFORCEMENT

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

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protection of In-Place Conditions:
  - 1. Do not cut or puncture vapor retarder.
  - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

### 3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
  - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.

2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch (25 mm), not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318 (ACI 318M).
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
  1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or 24 inches (610 mm), whichever is greater.
  2. Stagger splices in accordance with ACI 318 (ACI 318M).
- G. Install welded-wire reinforcement in longest practicable lengths.
  1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
    - a. For reinforcement less than W4.0 or D4.0, continuous support spacing shall not exceed 12 inches (305 mm).
  2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches (50 mm) for plain wire and 8 inches (200 mm) for deformed wire.
  3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
  4. Lace overlaps with wire.

### 3.3 JOINTS

- A. 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.
  2. Continue reinforcement across construction joints unless otherwise indicated.
  3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

### 3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117 (ACI 117M).

### 3.5 FIELD QUALITY CONTROL

- A. Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel-reinforcement placement.

END OF SECTION 032000



## SECTION 033000 - CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
  - 1. Section 031000 "Concrete Forming and Accessories".
  - 2. Section 032000 "Concrete Reinforcing".
  - 3. Section 312000 "Earth Moving".
  - 4. Section 321313 "Concrete Paving".

#### 1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following.
  - 1. Portland cement.
  - 2. Aggregates.
  - 3. Admixtures.
  - 4. Curing materials.
  - 5. Joint fillers.
  - 6. Repair materials.
- B. Design Mixtures: For each concrete mixture, include the following:
  - 1. Mixture identification.
  - 2. Minimum 28-day compressive strength.
  - 3. Maximum w/cm.
  - 4. Slump limit.
  - 5. Air content.

6. Nominal maximum aggregate size.

## 1.5 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products that complies with ASTM C94/C94M requirements for production facilities and equipment.
  1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
  2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

## 1.7 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 306.1 and as follows.
  1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  2. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).
  3. Do not use frozen materials or materials containing ice or snow.
  4. Do not place concrete in contact with surfaces less than 35 deg F (1.7 deg C), other than reinforcing steel.
  5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M), and as follows:
  1. Maintain concrete temperature at time of discharge to not exceed 95 deg F (35 deg C).
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

## PART 2 - PRODUCTS

### 2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 (ACI 301M) unless modified by requirements in the Contract Documents.

### 2.2 CONCRETE MATERIALS

- A. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I.
- B. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
  1. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) nominal.
  2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C260/C260M.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do 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 C494/C494M, Type A.
  2. Retarding Admixture: ASTM C494/C494M, Type B.
  3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
  4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
  5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
  6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- E. Water: ASTM C94/C94M, potable.

## 2.3 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 C171, polyethylene film burlap-polyethylene sheet.
- D. Water: Potable or complying with ASTM C1602/C1602M.

## 2.4 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.
- B. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

## 2.5 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
  2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand, as recommended by underlayment manufacturer.
  4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
  2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
  4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested in accordance with ASTM C109/C109M.

## 2.6 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, in accordance with ACI 301 (ACI 301M).
1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

## 2.7 CONCRETE MIXTURES

- A. Normal-weight concrete used for footings and piers.
1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
  2. Maximum w/cm: 0.50.
  3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
  4. Air Content:
    - a. 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1 1/2-inch (38-mm) nominal maximum aggregate size.
  5. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- B. Normal-weight concrete used for interior slabs-on-ground.

1. Minimum Compressive Strength: 3500 psi (24.1 MPa) at 28 days.
2. Maximum w/cm: 0.45.
3. Minimum Cementitious Materials Content: 470 lb/cu. yd. (279 kg/cu. m).
4. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).
5. Air Content:

- a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.

## 2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification of Conditions:
  1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
  2. Do not proceed until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
  1. Daily access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
  4. Security and protection for test samples and for testing and inspection equipment at Project site.

### 3.3 INSTALLATION OF 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.
  1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3. 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.

### 3.4 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
  1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
  2. Place joints perpendicular to main reinforcement.
    - a. Continue reinforcement across construction joints unless otherwise indicated.
    - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
  3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
  4. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
  5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
  1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.

### 3.5 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement and embedded items, are complete and that required inspections are completed.
  1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
  2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.

- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
  - 1. If a section cannot be placed continuously, provide construction joints as indicated.
  - 2. Deposit concrete to avoid segregation.
  - 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).
    - a. Do not use vibrators to transport concrete inside forms.
    - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.
    - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    - d. 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.
- E. 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. Do not place concrete floors and slabs in a checkerboard sequence.
  - 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 3. Maintain reinforcement in position on chairs during concrete placement.
  - 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 5. Level concrete, cut high areas, and fill low areas.
  - 6. Slope surfaces uniformly to drains where required.
  - 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
  - 8. Do not further disturb slab surfaces before starting finishing operations.

### 3.6 FINISHING FORMED SURFACES

- A. As-Cast Surface Finishes:
  - 1. ACI 301 (ACI 301M) Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
    - a. Patch voids larger than 1-1/2 inches (38 mm) wide or 1/2 inch (13 mm) deep.
    - b. Remove projections larger than 1 inch (25 mm).
    - c. Tie holes do not require patching.
    - d. Surface Tolerance: ACI 117 (ACI 117M) Class D.
    - e. Apply to concrete surfaces not exposed to public view.
- B. Related Unformed Surfaces:



1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.7 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish:
  1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
  2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4 inch (6 mm) in one direction.
- C. Float Finish:
  1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
  2. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 (ACI A117M) tolerances for conventional concrete.
- D. Trowel Finish:
  1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
  2. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance.
  3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  4. Do not add water to concrete surface.
  5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
  6. Finish surfaces to the following tolerances, in accordance with ASTM E1155 (ASTM E1155M), for a randomly trafficked floor surface:
    - a. Slabs on Ground:
      - 1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3 mm) and also no more than 1/16 inch (1.6 mm) in 2 feet (610 mm).
- 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 thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.
  1. Coordinate required final finish with Architect before application.
  2. 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 locations indicated on Drawings.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
  - 2. Coordinate required final finish with Architect before application.

### 3.8 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
  - 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
  - 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
  - 3. 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:
  - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
  - 2. Construct concrete bases 4 inches (100 mm) high unless otherwise indicated on Drawings, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
  - 3. Minimum Compressive Strength: 5000 psi (34.5 MPa) at 28 days.
  - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
  - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
  - 6. Prior to pouring concrete, place and secure anchorage devices.
    - a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    - b. Cast anchor-bolt insert into bases.
    - c. Install anchor bolts to elevations required for proper attachment to supported equipment.

### 3.9 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
  - 1. Comply with ACI 301 (ACI 301M) and ACI 306.1 for cold weather protection during curing.
  - 2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.
  - 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h (1 kg/sq. m x h), calculated in accordance with ACI 305.1,) before and during finishing operations.
- B. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
  - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
    - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
      - a) Lap edges and ends of absorptive cover not less than 12-inches (300-mm).
      - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
    - 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.
      - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
      - b) Cure for not less than seven days.
    - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
      - a) Water.
      - b) Continuous water-fog spray.
  - b. Floors to Receive Curing Compound:
    - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
    - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
    - 3) Maintain continuity of coating, and repair damage during curing period.
    - 4) 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 does not interfere with bonding of floor covering used on Project.
  - c. Floors to Receive Curing and Sealing Compound:
    - 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
    - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
    - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.10 TOLERANCES

- A. Conform to ACI 117 (ACI 117M).

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Architect.
2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 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.
  - a. Limit cut depth to 3/4 inch (19 mm).
  - b. Make edges of cuts perpendicular to concrete surface.
  - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
  - d. Fill and compact with patching mortar before bonding agent has dried.
  - e. 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 matches surrounding color.
  - a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
  - b. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
  - a. Correct low and high areas.
  - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including 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.
3. After concrete has cured at least 14 days, correct high areas by grinding.

4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
  - a. Finish repaired areas to blend into adjacent concrete.
5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
  - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  - b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
  - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations.
  - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. 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.
  - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around.
  - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
  - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
  - d. Place, compact, and finish to blend with adjacent finished concrete.
  - e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar.
  - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
  - b. Dampen cleaned concrete surfaces and apply bonding agent.
  - c. Place patching mortar before bonding agent has dried.
  - d. Compact patching mortar and finish to match adjacent concrete.
  - e. 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.

### 3.12 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
  2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
  3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
    - a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
      - 1) Project name.
      - 2) Name of testing agency.
      - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
      - 4) Name of concrete manufacturer.
      - 5) Date and time of inspection, sampling, and field testing.
      - 6) Date and time of concrete placement.
      - 7) Location in Work of concrete represented by samples.
      - 8) Date and time sample was obtained.
      - 9) Truck and batch ticket numbers.
      - 10) Design compressive strength at 28 days.
      - 11) Concrete mixture designation, proportions, and materials.
      - 12) Field test results.
      - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
      - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- C. Inspections:
1. Verification of use of required design mixture.
  2. Concrete placement, including conveying and depositing.
  3. Curing procedures and maintenance of curing temperature.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
    - a. When frequency of testing provides 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 C143/C143M:

- a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - b. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
  - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M:
  - a. One test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C31/C31M:
  - a. Cast and laboratory cure two sets of two 6-inch (150 mm) by 12-inch (300 mm) or 4-inch (100 mm) by 8-inch (200 mm) cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C39/C39M.
  - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
  - b. 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. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa) if specified compressive strength is 5000 psi (34.5 MPa), or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi (34.5 MPa).
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests:
  - a. 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.
  - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
    - 1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 (ACI 301M), section 1.6.6.3.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.



12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.13 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.

END OF SECTION 033000

## SECTION 033013 – VAPOR RETARDERS

### 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. Vapor retarders to be placed under the concrete slab on grade.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

- 1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete Subcontractor.
  - 2. Review the following:
    - a. Special inspection and testing and inspecting agency procedures for field quality control.
    - b. Construction joints, control joints, isolation joints, and joint-filler strips.
    - c. Semirigid joint fillers.
    - d. Vapor-retarder installation.
    - e. Anchor rod and anchorage device installation tolerances.
    - f. Cold and hot weather concreting procedures.
    - g. Concrete finishes and finishing.
    - h. Curing procedures.
    - i. Forms and form-removal limitations.
    - j. Shoring and reshoring procedures.
    - k. Methods for achieving specified floor and slab flatness and levelness.
    - l. Floor and slab flatness and levelness measurements.
    - m. Concrete repair procedures.
    - n. Concrete protection.
    - o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
    - p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Vapor retarders.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Vapor retarders.

B. Minutes of preinstallation conference.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Maintain permeance of less than 0.03 pers as tested in accordance with ASTM E1745.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Stego, Stego Wrap Vapor Barrier Class A.
  - b. WR Meadows, Class A Perminator HP.

- c. IDS Products, Viper II Vapor Barrier Class A.
  - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification of Conditions:
  - 1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
  - 2. Do not proceed until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
  - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
  - 2. Face laps away from exposed direction of concrete pour.
  - 3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
  - 4. Lap joints 6 inches and seal with manufacturer's recommended tape.
  - 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
  - 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
  - 7. Protect vapor retarder during placement of reinforcement and concrete.
    - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

END OF SECTION 033013

## SECTION 035416 - HYDRAULIC CEMENT UNDERLAYMENT

### 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. Polymer-modified, self-leveling, hydraulic cement underlayment for application below interior floor coverings.
  - 2. Provide underlayment as a means to repair and level the concrete subflooring in order to prep subfloor to meet specified flooring manufacturers' requirements prior to installation.

- B. Related Requirements:

- 1. Section 012200 "Unit Prices".
  - 2. Section 090561.13 "Moisture Vapor Emission Control" for treating concrete subflooring due to high-moisture emission rate.
  - 3. Division 09 finished flooring specification sections for scheduled floor finishes and subfloor preparation requirements.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each product.

- 1. Prior to submitting product data, Contractor shall review project specific conditions with each installer and manufacturer for each scheduled floor finish. Manufacturer for each scheduled floor finish to provide documentation and approval for the products provided in the submittals.

- B. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
  - 1. Place hydraulic cement underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F.

PART 2 - PRODUCTS

2.1 HYDRAULIC CEMENT UNDERLAYMENTS

- A. Hydraulic Cement Underlayment: Polymer-modified, self-leveling, hydraulic cement product that can be applied in minimum uniform thickness of 1/4 inch and that can be feathered at edges to match adjacent floor elevations.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. W.R. Meadows, Floor Top STG (basis of design).
    - b. Ardex V1000.
    - c. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - 2. Cement Binder: ASTM C150/C150M, Portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C219.
  - 3. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C109.
  - 4. Flexural Strength: Not less than 1000 psi at 28 days when tested according to ASTM C348.
- B. Water: Potable and at a temperature of not more than 70 deg F.
- C. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
- D. Bonding Agent, over Terrazzo: provide W.R. Meadows REZI-Weld LV.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of the Work. Verify with the manufacturer the condition of the floor substrates and what preparation Work needs to be completed as per the manufacturer's installation instructions.
- B. Proceed with application only after unsatisfactory conditions have been corrected and the manufacturer for schedule floor finishes have approved the condition of the substrates.
  - 1. Installation of system indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Prepare and clean substrate according to manufacturer's written instructions.
  - 1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
  - 2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
  - 1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 85 percent relative humidity level measurement, or as recommended by hydraulic cement underlayment manufacturer.
- C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

### 3.3 INSTALLATION

- A. Mix and install underlayment components according to manufacturer's written instructions.
  - 1. Close areas to traffic during underlayment installation and for time period after installation recommended in writing by manufacturer.
  - 2. Coordinate installation of components to provide optimum adhesion to substrate and between coats.
  - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.



- C. Install underlayment to produce uniform, level surface.
  - 1. Install a final layer without aggregate to product surface.
  - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during installation and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

#### 3.4 INSTALLATION TOLERANCES

- A. Finish and measure surface, so gap at any point between gypsum cement underlayment surface and an unleveled, freestanding, 10-foot-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch and 1/16 inch in 2 feet.

#### 3.5 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 035416

## SECTION 040120.63 - BRICK MASONRY REPAIR

### 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. Repairing existing brick masonry as a result of demolition or construction activities.
  - 2. Removing abandoned anchors.
  - 3. Painting steel uncovered during the work.

- B. Related Requirements:

- 1. Section 079200 "Joint Sealants" for joint sealant products for masonry repointing and repair.

#### 1.3 DEFINITIONS

- A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
- B. Rebuilding (Setting) Mortar: Mortar used to set and anchor masonry in a structure, distinct from pointing mortar installed after masonry is set in place.
- C. Saturation Coefficient: Ratio of the weight of water absorbed during immersion in cold water to weight absorbed during immersion in boiling water; used as an indication of resistance of bricks to freezing and thawing.

#### 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

- 1. Review methods and procedures related to brick masonry repair including, but not limited to, the following:
    - a. Verify brick masonry repair specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
    - b. Materials, material application, sequencing, tolerances, and required clearances.
    - c. Quality-control program.
    - d. Coordination with building occupants.

## 1.5 SEQUENCING AND SCHEDULING

- A. Order sand and gray Portland cement for colored mortar immediately after approval of mockups. Take delivery of and store at Project site enough quantity to complete Project.
- B. Work Sequence: Perform brick masonry repair work in the following sequence, which includes work specified in this and other Sections:
  - 1. Remove plant growth.
  - 2. Inspect masonry for open mortar joints and point them before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
  - 3. Remove paint.
  - 4. Clean masonry.
  - 5. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.
  - 6. Repair masonry, including replacing existing masonry with new masonry materials.
  - 7. Rake out mortar from joints to be repointed.
  - 8. Point mortar and sealant joints.
  - 9. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
  - 10. Where water repellents are to be used on or near masonry work, delay application of these chemicals until after pointing and cleaning.
- C. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in bricks according to "Brick Masonry Patching" Article.

## 1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
  - 2. Include recommendations for product application and use.
  - 3. Include test data substantiating that products comply with requirements.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and locations of replacement bricks on the structure, showing relation of existing and new or relocated units.
  - 2. Show provisions for expansion joints or other sealant joints.
  - 3. Show provisions for flashing, lighting fixtures, conduits, and weep holes as required.
  - 4. Show locations of scaffolding and points of scaffolding in contact with masonry. Include details of each point of contact or anchorage.
- C. Samples for Initial Selection: For the following:
  - 1. Colored Mortar: Submit sets of mortar that will be left exposed in the form of sample mortar strips, 6 inches long by 1/4 inch wide, set in aluminum or plastic channels.

- a. Have each set contain a close color range of at least six (6) samples of different mixes of colored sands and cements that produce a mortar matching existing, cleaned mortar when cured and dry.
    - b. Submit with precise measurements on ingredients, proportions, gradations, and source of colored sands from which each Sample was made.
  2. Sand Types Used for Mortar: Minimum 8 oz. of each in plastic screw-top jars.
  3. Patching Compound: Submit sets of patching compound Samples in the form of plugs (patches in drilled holes) in sample units of masonry representative of the range of masonry colors on the building.
    - a. Have each set contain a close color range of at least six (6) samples of different mixes of patching compound that matches the variations in existing masonry when cured and dry.
  4. Include similar Samples of accessories involving color selection.
- D. Samples for Verification: For the following:
1. Each type of brick unit to be used for replacing existing units. Include sets of samples to show the full range of shape, color, and texture to be expected. For each brick type, provide straps or panels containing at least four bricks. Include multiple straps for brick with a wide range.
  2. Each type of patching compound in the form of briquettes, at least 3 inches long by 1-1/2 inches wide. Document each Sample with manufacturer and stock number or other information necessary to order additional material.
  3. Submit sets of briquettes samples on pieces of brick that will absorb moisture from the mortar and more accurately represent the finished product.
  4. Accessories: Each type of accessory and miscellaneous support.

#### 1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For brick masonry repair specialist.

#### 1.8 QUALITY ASSURANCE

- A. Brick Masonry Repair Specialist Qualifications: Engage an experienced brick masonry repair firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing masonry is insufficient experience for masonry repair work.
1. Field Supervision: Brick masonry repair specialist firm shall maintain experienced full-time supervisors on Project site during times that brick masonry repair work is in progress.
  2. Brick Masonry Repair Worker Qualifications: When bricks are being patched, assign at least one worker per crew who is trained and certified by manufacturer of patching compound to apply its products.

- B. Mockups: Prepare mockups of brick masonry repair to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation.
1. Masonry Repair: Prepare sample areas for each type of masonry repair work performed. If not otherwise indicated, size each mockup not smaller than two adjacent whole units or approximately 48 inches in least dimension. Construct sample areas in locations in existing walls where directed by Architect unless otherwise indicated. Demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:
    - a. Replacement: Four brick units replaced.
    - b. Patching: Three small holes as directed for each type of brick indicated to be patched.
  2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  3. Mock-up work shall be performed by the same people who will be executing the Work.
  4. Mock-up shall remain for the duration of the project as the standard of aesthetic and workmanship. The Mock-up shall remain easily identified from other repointing work for the duration of the project.
  5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver bricks to Project site strapped together in suitable packs or pallets or in heavy-duty cartons and protected against impact and chipping.
- B. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.
- E. Store sand where grading and other required characteristics can be maintained and contamination avoided.
- F. Handle bricks to prevent overstressing, chipping, defacement, and other damage.

#### 1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit brick masonry repair work to be performed according to product manufacturers' written instructions and specified requirements. Reference BIA Technical Note 1 – Hot and Cold Weather Construction.

- B. Temperature Limits: Repair brick masonry only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.
- C. Cold-Weather Requirements: Comply with the following procedures for masonry repair unless otherwise indicated:
  - 1. When air temperature is below 40 deg F, heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F.
  - 2. When mean daily air temperature is below 40 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for seven days after repair.
- D. Hot-Weather Requirements: Protect masonry repairs when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks, mist masonry regularly or hang damped burlap and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.
- E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Source Limitations: Obtain each type of material for repairing brick masonry (brick, cement, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

### 2.2 MASONRY MATERIALS

- A. Face Brick As required to complete brick masonry repair work.
  - 1. Brick Matching Existing: Units with colors, color variation within units, surface texture, size, and shape that match existing brickwork and with physical properties as listed below:
    - a. Physical Properties: According to ASTM C67 and as follows:
      - 1) Compressive Strength: 3000 psi.
      - 2) Initial Rate of Absorption: 30 g/30 sq. in. per minute.
    - b. For existing brickwork that exhibits a range of colors or color variation within units, provide brick that proportionally matches that range and variation rather than brick that matches an individual color within that range.
  - 2. Special Shapes:

- a. Provide molded, 100 percent solid shapes for applications where core holes or "frogs" could be exposed to view or weather when in final position and where shapes produced by sawing would result in sawed surfaces being exposed to view.
  - b. Provide specially ground units, shaped to match patterns, for arches and where indicated.
  - c. Mechanical chopping or breaking brick, or bonding pieces of brick together by adhesive, are unacceptable procedures for fabricating special shapes.
3. Tolerances as Fabricated: According to tolerance requirements in ASTM C216, Type FBS.

## 2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction; white or gray, or both where required for color matching of mortar.
1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Masonry Cement: ASTM C91/C91M.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Hanson Brick and Tile; Lehigh Hanson.
    - b. Lafarge North America Inc.
    - c. QUIKRETE.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- D. Mortar Cement: ASTM C1329/C1329M.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Lafarge North America Inc.
- E. Mortar Sand: ASTM C144.
1. Exposed Mortar: Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
  2. Colored Mortar: Natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
- F. Mortar Pigments: ASTM C979/C979M, compounded for use in mortar mixes, and having a record of satisfactory performance in masonry mortars.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Davis Colors.
  - b. LANXESS Corporation.
  - c. Solomon Colors, Inc.
  - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

G. Water: Potable.

## 2.4 MANUFACTURED REPAIR MATERIALS

- A. Brick Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching brick masonry.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Cathedral Stone Products, Inc.
    - b. Conproco Corporation.
    - c. Edison Coatings, Inc.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  2. Use formulation that is vapor and water permeable (equal to or more than the brick), exhibits low shrinkage, has lower modulus of elasticity than bricks being repaired, and develops high bond strength to all types of masonry.
  3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.
  4. Formulate patching compound in colors and textures to match each brick being patched. Provide sufficient number of colors to enable matching of the color, texture, and variation of each unit.

## 2.5 ACCESSORY MATERIALS

- A. Setting Buttons and Shims: Resilient plastic, non-staining to masonry, sized to suit joint thicknesses and bed depths of bricks, less the required depth of pointing materials unless removed before pointing.
- B. Sealant Materials:
  1. Sealant manufacturer's standard elastomeric sealant(s) of base polymer and characteristics indicated below and according to applicable requirements in Section 079200 "Joint Sealants."
    - a. Type: Silicone, non-staining, S, NS, 50, NT.



2. Colors: Provide colors of exposed sealants to match colors of mortar adjoining installed sealant unless otherwise indicated.

C. Joint-Sealant Backing:

1. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), oversized 30 to 50 percent larger than joint width, with appropriate density to control sealant depth and otherwise contribute to producing optimum sealant performance.
2. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended in writing by sealant manufacturer for preventing sealant from adhering to rigid, inflexible, joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

D. Masking Tape: Non-staining, nonabsorbent material; compatible with mortar, joint primers, sealants, and surfaces adjacent to joints; and that easily comes off entirely, including adhesive.

E. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer according to SSPC-Paint 20 or SSPC-Paint 29 zinc-rich coating.

1. Surface Preparation: Use coating requiring no better than SSPC-SP 3, "Power Tool Cleaning" surface preparation according to manufacturer's literature or certified statement.
2. VOC Limit: Use coating with a VOC content of 400 g/L or less.

F. Other Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Minimal possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could leave residue on surfaces.

## 2.6 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

B. Colored Mortar: Produce mortar of color required by using specified ingredients. Do not alter specified proportions without Architect's approval.

1. Mortar Pigments: Where mortar pigments are indicated, do not add pigment exceeding 10 percent by weight of the cementitious or binder materials, except for carbon black which is limited to 2 percent, unless otherwise demonstrated by a satisfactory history of performance.

C. Do not use admixtures in mortar unless otherwise indicated.

D. Mixes: Mix mortar materials in the following proportions:

1. Rebuilding (Setting) Mortar by Volume: ASTM C270, Proportion Specification, 1 part Portland cement, 1 part lime, and 6 parts sand.
2. Rebuilding (Setting) Mortar by Type: ASTM C270, Proportion Specification, Type N unless otherwise indicated; with cementitious material limited to Portland cement and lime.
3. Rebuilding (Setting) Mortar by Property: ASTM C270, Property Specification, Type N unless otherwise indicated; with cementitious material limited to Portland cement and lime.
4. Pigmented, Colored Mortar: Add mortar pigments to produce exposed, setting (rebuilding) mortar of colors required.

### PART 3 - EXECUTION

#### 3.1 REPAIR SPECIALIST

- A. Brick Masonry Repair Specialist Firms: Firms to have a minimum of five (5) years experience with the type and scale of masonry repair similar to this Project.

#### 3.2 PROTECTION

- A. Prevent mortar from staining face of surrounding masonry and other surfaces.
1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
  2. Keep wall area wet below rebuilding and repair work to discourage mortar from adhering.
  3. Immediately remove mortar splatters in contact with exposed masonry and other surfaces.
- B. Remove gutters, downspouts and associated hardware adjacent to masonry and store during masonry repair. Reinstall when repairs are complete.
1. Provide temporary rain drainage during work to direct water away from building.
- C. Provide dust and silica control for all saw cutting and other similar activities.
1. Wet down the work to minimize the amount of air borne dust.
  2. Provide local exhaust ventilation to capture air borne dust.
  3. Provide temporary tenting and dust-proof partitions.
  4. Utilize vacuum attachments to power tools to capture and minimize air borne silica.

#### 3.3 MASONRY REPAIR, GENERAL

- A. Appearance Standard: Repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect.

### 3.4 ABANDONED ANCHOR REMOVAL

- A. Remove abandoned anchors, brackets, wood nailers, and other extraneous items no longer in use unless indicated to remain.
  - 1. Remove items carefully to avoid spalling or cracking masonry.
  - 2. Notify Architect before proceeding if an item cannot be removed without damaging surrounding masonry. Do the following where directed:
    - a. Cut or grind off item approximately 3/4 inch beneath surface and core drill a recess of same depth in surrounding masonry as close around item as practical.
    - b. Immediately paint exposed end of item with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended dry film thickness per coat. Keep paint off sides of recess.
  - 3. Patch hole where each item was removed unless directed to remove and replace bricks.

### 3.5 BRICK REMOVAL AND REPLACEMENT

- A. At locations indicated, remove bricks that are damaged, spalled, or deteriorated or are to be reused. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.
  - 1. When removing single bricks, remove material from center of brick and work toward outside edges.
- B. Support and protect remaining masonry that surrounds removal area.
- C. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition. Coordinate with new flashing, reinforcement, and lintels, which are specified in other Sections.
- D. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.
- E. Remove in an undamaged condition as many whole bricks as possible.
  - 1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
  - 2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
  - 3. Store brick for reuse. Store off ground, on skids, and protected from weather.
  - 4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.
- F. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for brick replacement.
- G. Replace removed damaged brick with other removed brick in good condition, where possible, or with new brick matching existing brick. Do not use broken units unless they can be cut to usable size.

- H. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
  - 1. Maintain joint width for replacement units to match existing joints.
  - 2. Use setting buttons or shims to set units accurately spaced with uniform joints.
- I. Lay replacement brick with rebuilding (setting) mortar and with completely filled bed, head, and collar joints. Butter ends with enough mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.
  - 1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
  - 2. When mortar is hard enough to support units, remove shims and other devices interfering with pointing of joints.
- J. Curing: Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.
  - 1. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

### 3.6 PAINTING STEEL UNCOVERED DURING THE WORK

- A. Notify Architect if steel is exposed during masonry removal. Where Architect determines that steel is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:
  - 1. Surface Preparation: Remove paint, rust, and other contaminants according to SSPC-SP 3, "Power Tool Cleaning", as applicable to comply with paint manufacturer's recommended preparation.
  - 2. Antirust Coating: Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry film thickness per coat).
- B. If on inspection and rust removal, the thickness of a steel member is found to be reduced from rust by more than 1/16 inch, notify Architect before proceeding.

### 3.7 BRICK MASONRY PATCHING

- A. Patch the following bricks unless another type of repair or replacement is indicated:
  - 1. Bricks indicated to be patched.
  - 2. Bricks with holes.
  - 3. Bricks with chipped edges or corners. Patch chipped edges or corners measuring more than 3/4 inch in least dimension.
  - 4. Bricks with small areas of deep deterioration. Patch deep deteriorations measuring more than 3/4 inch in least dimension and more than 1/4 inch deep.

B. Patching Bricks:

1. Remove loose material from masonry surface. Carefully remove additional material so patch does not have feathered edges but has square or slightly undercut edges on area to be patched and is at least 1/4 inch thick, but not less than recommended in writing by patching compound manufacturer.
2. Mask adjacent mortar joint or rake out for repointing if patch extends to edge of brick.
3. Mix patching compound in individual batches to match each unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.
4. Rinse surface to be patched and leave damp, but without standing water.
5. Brush-coat surfaces with slurry coat of patching compound according to manufacturer's written instructions.
6. Place patching compound in layers as recommended in writing by patching compound manufacturer, but not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.
7. Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of brick. Shape and finish surface before or after curing, as determined by testing, to best match existing brick.
8. Keep each layer damp for 72 hours or until patching compound has set.
9. Remove and replace patches with hairline cracks or that show separation from brick at edges, and those that do not match adjoining brick in color or texture.

3.8 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property.
- B. Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION 040120.63

## SECTION 042000 - UNIT MASONRY

### 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. Concrete masonry units.
2. Decorative concrete masonry units.
3. Concrete and masonry lintels.
4. Clay face brick.
5. Mortar and grout.
6. Steel reinforcing bars.
7. Masonry-joint reinforcement.
8. Ties and anchors.
9. Embedded flashing.
10. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:

1. Steel lintels in unit masonry.
2. Steel shelf angles for supporting unit masonry.
3. Cavity wall insulation.

C. Related Requirements:

1. Section 051200 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
2. Section 072100 "Thermal Insulation" for cavity wall insulation.
3. Section 076200 "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

#### 1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
  - 2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
  - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Selection:
  - 1. Decorative CMUs.
  - 2. Clay face brick, in the form of straps of five or more bricks.
  - 3. Colored mortar.
  - 4. Weep holes/cavity vents.

1.6 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
  - 1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Material Certificates: For each type and size of the following:
  - 1. Masonry units.
    - a. Include data on material properties.
    - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
    - c. For exposed brick, include test report for efflorescence according to ASTM C67.
    - d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
  - 2. Cementitious materials. Include name of manufacturer, brand name, and type.
  - 3. Mortar admixtures.
  - 4. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  - 5. Grout mixes. Include description of type and proportions of ingredients.
  - 6. Reinforcing bars.
  - 7. Joint reinforcement.

8. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

## 1.7 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for typical exterior wall in sizes approximately 72 inches long by 72 inches high by full thickness, including face and backup wythes and accessories.
  - a. Include a sealant-filled joint at least 16 inches long in exterior wall mockup.
  - b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
  - c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
  - d. Include all materials and accessories detailed in Exterior Wall Type MV1 and MV2.
2. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
3. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
4. Protect accepted mockups from the elements with weather-resistant membrane.
5. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
  - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
  - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.



6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

#### 1.9 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
  2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  2. Protect sills, ledges, and projections from mortar droppings.
  3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
  - 1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

### 2.3 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
  - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

## 2.4 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C90.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi.
  - 2. Density Classification: Normal weight unless otherwise indicated.
  - 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
  - 4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
- C. Decorative CMUs: ASTM C90.
  - 1. Ground Faced Block GFB-1:
    - a. York Building Products, Split Face Premium Series.
    - b. Size (Width): 8 inches by 8 inches by 16 inches, nominal, unless otherwise indicated on Drawings.
    - c. Shapes: Chamfered, solid for top courses; standard for other courses.
    - d. Color: Chamois.
    - e. Conforms to ASTM C90 standard.
    - f. Units contain integral water repellent.

## 2.5 CONCRETE AND MASONRY LINTELS

- A. General: Provide one of the following:
- B. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated.
- C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

## 2.6 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
  - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
3. Provide lipped brick where indicated on Drawings.

B. Clay Face Brick and Ground Face Brick: Facing brick complying with ASTM C216.

1. Provide Face Brick to match existing, or as indicated.
2. Grade: MW or SW.
3. Type: FBS.
4. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.
5. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C67.
6. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."

C. Brick Types:

1. Brick Type BR-1: Watsontown Brick by Church Brick, Iron Spot Series Landover I/S KT Flashed.
2. Brick Type BR-2: General Shale Brick by Church Brick, Manhattan Series Riverdale KT Type 8 Modular.
3. Brick Type BR-3: General Shale Brick by Church Brick, Manhattan Series Riverdale KT Type 8 Jumbo.

## 2.7 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Essroc.
  - b. LaFarge.
  - c. Leigh Hanson.
  - d. Lehigh White Cement.
  - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

- D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
- E. Colored Cement Products: Packaged blend made from Portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
  - 1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
  - 2. Pigments shall not exceed 10 percent of Portland cement by weight.
- F. Aggregate for Mortar: ASTM C144.
  - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
  - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
  - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- G. Aggregate for Grout: ASTM C404.
- H. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Euclid Chemical Company (The); an RPM company.
    - b. GCP Applied Technologies Inc.
- I. Water: Potable.

## 2.8 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Hohmann & Barnard, Inc. RB Rebar Positioner.

- b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
  - 1. Interior Walls: Hot-dip galvanized carbon steel.
  - 2. Exterior Walls: Hot-dip galvanized carbon steel.
  - 3. Wire Size for Side Rods: 0.187-inch diameter.
  - 4. Wire Size for Cross Rods: 0.148-inch diameter.
  - 5. Wire Size for Veneer Ties: 0.187-inch diameter.
  - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
  - 7. Provide in lengths of not less than 10 feet , with prefabricated corner and tee units.
- D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder type with single pair of side rods. Formed from 0.148-inch steel, wire, hot dip galvanized (ASTM A153).
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Hohmann & Barnard, Inc. 220 Ladder-Mesh.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.9 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
- C. Partition Top Anchors: 12 gauge steel channels with (2) 7/16-inch-diameter holes for anchoring to the structure above.
  - 1. 2 inch downward legs each side of channel.
  - 2. Length: 8 inches.
  - 3. Width: Match width of masonry wall.
  - 4. Finish: Hot-dip galvanized (ASTM A153, Class B).
  - 5. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Hohmann & Barnard, Inc. PTA 422 Partition Top Anchor.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

D. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 200-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
2. Pull-out Value with 1-1/4 inch embed: 850 pounds, minimum.
3. Steel-reinforced, flame-resistant plastic coated wings creating thermal break.
4. Up to 1/2 inch adjustability.
5. Size length of anchors based upon exterior cavity wall depth and manufacturer's recommendations.
6. 1-1/2 inch diameter type 304 stainless steel washer.
7. Anchor includes washer seal at weather barrier.
8. 9 gauge hook Finish: Hot-dip galvanized.
9. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Hohmann & Barnard, Inc. Thermal Concrete 2-seal Wing Nut Anchor.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

2.10 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. York Manufacturing, Inc.; York 304 SA SS (basis of design).
  - b. GE Silicones, Inc.; GE Elemax SS Flashing.
  - c. Vapro Shield, Inc.; VaproThru-Wall Flashing SA.
  - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
2. Characteristics:
  - a. Type: stainless steel core with one uncoated (bare) stainless steel face (outward facing) with a butyl block copolymer adhesive (inward facing).
  - b. Stainless steel: type 304, ASTM A240. Domestically sourced per DFARS 252.225-7008 and/or DFARS 252.225-7009.
  - c. Adhesive: block copolymer
  - d. No primer required.
  - e. UV resistant.
  - f. 20-year warranty.
  - g. Fire resistant: ASTM E84 Class A material.
  - h. Mold resistant: passes ASTM D3273.
  - i. Passes AAMA 711-20.
  - j. Passes air barrier material test: ASTM E2178-13.
3. Accessories:

- a. Polyether Sealant: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work, as part of the flexible flashing manufacturer's recommendations, include the following:
  - 1) York Manufacturing, Inc.; UniverSeal US-100.
  - 2) STS Coatings; GreatSeal LT-100.
  - 3) Prosoco, Inc.; R-Guard Joint Seam Sealer.
  - 4) Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- b. Splice Tape: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work, as part of the flexible flashing manufacturer's recommendations, include the following:
  - 1) York Manufacturing, Inc.; York 304 SA.
  - 2) GE Silicones, Inc.; GE Elemax SS Flashing.
  - 3) VaproShield, Inc.; Vapro Thru-Wall Flashing SA.
  - 4) Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- c. Corner and End Dams: Form the stainless steel flashing in the field or use 26 gauge stainless steel pre-manufactured corners.
- d. Termination bar: Stainless steel termination bar with sealant catch lip. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work, as part of the flexible flashing manufacturer's recommendations.

B. Drip Plate:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Hohmann & Barnard Drip Plate.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
2. Stainless steel 304, 26 gauge.

2.11 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.



1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Hohmann & Barnard, Inc. RS Series Rubber Control Joint for CMU.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).
- D. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage. Treated with flame-retardant and UV inhibitors. Panels in dovetail profile, 8 inches high.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Advanced Building Products Mortar Break DT.
    - b. Hohmann & Barnard, Inc. Mortar Trap.
    - c. Mortar Net Solutions MortarNet.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- E. Weep/Cavity Vent Products: Polyester Mesh Material, 90% Open: Sized as required for masonry unit sizes. UV stabilizers for lighter colored vents. Use only for weeps. Color as selected by Architect from manufacturer's full range of colors.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. CavClear Weep Vents.
    - b. Hohmann & Barnard, Inc. Mortar Trap Weep Vents.
    - c. Mortar Net Solutions Weep Vents.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- F. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Hohmann & Barnard, Inc. Mortar Web.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

2. Configuration: Provide one of the following:

- a. Strips, not less than 2 inches thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.

G. Neoprene Sponge: Closed-cell neoprene sponges compliant with ASTM D-1056-91, without tear strip.

1. Color black or dark gray.
2. Thickness: 3/8 inch.
3. Width: width of masonry unit at location of installation.
4. Tensile Strength (ASTM D3575): 65 psi.
5. Elongation (ASTM 3575): 350.
6. Compressive Set, max. (ASTM 3575/1056): 12-15%.
7. Water Absorption by Weight, max. (ASTM Method): 5%.
8. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Hohmann & Barnard, Inc NS Neoprene Sponge.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

2.12 MASONRY CLEANERS

A. Water: Potable.

B. All-purpose Cleaner and Degreaser: Manufacturer's standard cleaner with biodegradable ingredients (no phosphates, hazardous solvents, or environmentally harmful surfactants) for use on stone, tile masonry, stucco and metal panels.

1. Technical Data:

- a. pH: 10.90.
- b. Flash Point: > 212 degrees F as per ASTM D3278.
- c. Freeze Point: 32 degrees F.
- d. VOC Content: Less than 0.1%.

2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

- a. PROSOCO, Inc., Enviro Klean, Klean 'N Release Cleaner.
- b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

C. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, glazed masonry, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

1. Technical Data:
  - a. Flash Point: 444 degrees F as per ASTM D 3278.
  - b. Freeze Point: 32 degrees F.
  - c. VOC Content: 30% maximum.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. PROSOCO, Inc., Sure Klean Strippable Masking.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.13 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  1. Do not use calcium chloride in mortar or grout.
  2. Use Portland cement-lime mortar unless otherwise indicated.
  3. For exterior masonry, use Portland cement-lime mortar.
  4. For reinforced masonry, use Portland cement-lime mortar.
  5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  1. For masonry below grade or in contact with earth, use Type M.
  2. For reinforced masonry, use Type S.
  3. For mortar parge coats, use Type S or Type N.
  4. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
  5. For interior nonload-bearing partitions, Type O may be used instead of Type S.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
  1. Pigments shall not exceed 10 percent of Portland cement by weight.
  2. Mix to match existing mortar.
  3. Application: Use pigmented mortar for exposed mortar joints with the following units:
    - a. Clay face and ground faced brick.

- E. Grout for Unit Masonry: Comply with ASTM C476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
  - 2. Proportion grout in accordance with ASTM C476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
  - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
  - 2. Verify that foundations are within tolerances specified.
  - 3. Verify that reinforcing dowels are properly placed.
  - 4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build singlewythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C67. Allow units to absorb water so they are damp but not wet at time of laying.

### 3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern matching existing conditions; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry with mineral wool insulation unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  - 1. Install compressible filler in joint between top of partition and underside of structure above.
  - 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches on center unless otherwise indicated.
  - 3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
  - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078443 "Joint Firestopping."

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  3. Bed webs in mortar in grouted masonry, including starting course on footings.
  4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
  5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive ceramic tile or other direct-applied finishes (other than paint) unless otherwise indicated.
- E. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, and air barriers, unless otherwise indicated.

### 3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together as follows:
1. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches on center both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

### 3.7 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to masonry backup with masonry-veneer anchors to comply with the following requirements:
1. Fasten anchors-to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  2. Embed tie sections in masonry joints.

3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  4. Space anchors as indicated, but not more than 16 inches on center vertically and 25 inches on center horizontally, with not less than one anchor for each 3.5 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.
- B. Provide not less than 1-1/2 inches of airspace between back of masonry veneer and face of insulation.
1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

### 3.8 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
1. Space reinforcement not more than 16 inches on center.
  2. Space reinforcement not more than 8 inches on center in foundation walls and parapet walls.
  3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### 3.9 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
  2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
  3. Space anchors as indicated, but not more than 24 inches on center vertically and 36 inches on center horizontally.



3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
  - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
  - 2. Install preformed control-joint gaskets designed to fit standard sash block.
- C. Form expansion joints in brick as follows:
  - 1. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."
- D. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch.
  - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and 1-1/2 inches into the inner wythe. Form 1/4-inch hook in edge of flashing embedded in inner wythe.
  3. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of substrate at least 8 inches; with upper edge tucked under weather barrier, lapping at least 4 inches.
  4. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
  5. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  6. Install metal drip edges with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
  7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
1. Use specified weep/cavity vent products to form weep holes.
  2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
  3. Space weep holes 24 inches on center unless otherwise indicated.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

### 3.13 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

### 3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
  1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

### 3.15 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.
7. Clean masonry with masonry cleaner applied according to manufacturer's written instructions.

3.16 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

## SECTION 047200 - CAST STONE MASONRY

### 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. Trim units.
2. Mortar materials.
3. Accessories.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
  - 1. Include building elevations showing layout of units and locations of joints and anchors.
- C. Samples for Initial Selection: For colored mortar.
- D. Samples for Verification:
  - 1. For each color and texture of cast stone required, 4 inches square in size.
  - 2. For each trim shape required, 4 inches in length.
  - 3. For colored mortar, make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
- E. Full-Size Samples: For each color, texture, engraving, and shape of cast stone unit required.
  - 1. Make available for Architect's review at Project site or at manufacturing plant, if acceptable to Architect.
  - 2. Make Samples from materials to be used for units used on Project immediately before beginning production of units for Project.
  - 3. Approved Samples may be installed in the Work.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.

1. Include copies of material test reports, indicating compliance of cast stone with ASTM C1364.
- B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C1364.
  1. Provide test reports based on testing within previous six months.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by CSI or APA.
- B. Installer Qualifications: A qualified installer who employs experienced masons with at least ten (10) years of documented experience.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with the Work to avoid delaying the Work and to minimize the need for on-site storage.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
  1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units if required, using dollies with wood supports.
  2. Store cast stone units on wood skids or pallets with non-staining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

#### 1.7 PROJECT CONDITIONS

- A. Protection of Cast Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed cast stone masonry when construction is not in progress.
  1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining cast stone masonry face.
  1. Protect base of walls from rain-splashed mud and mortar splatter using coverings spread on the ground and over the wall surface.

2. Protect sills, ledges, and projections from mortar droppings.
  3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in TMS 602.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements in TMS 602.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Cast Stone: Obtain cast stone units from single source from single manufacturer.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

### 2.2 CAST STONE MATERIALS

- A. General: Comply with ASTM C1364.
- B. Portland Cement: ASTM C150/C150M, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C114. Provide natural color or white cement as required to produce cast stone color indicated.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C33/C33M; gradation and colors as needed to produce required cast stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C33/C33M, gradation and colors as needed to produce required cast stone textures and colors.
- E. Color Pigment: ASTM C979/C979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.
  1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.

2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
3. Air-Entraining Admixture: ASTM C260/C260M. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
4. Water-Reducing Admixture: ASTM C494/C494M, Type A.
5. Water-Reducing, Retarding Admixture: ASTM C494/C494M, Type D.
6. Water-Reducing, Accelerating Admixture: ASTM C494/C494M, Type E.

G. Reinforcement:

1. Deformed steel bars complying with ASTM A615/A615M, Grade 40. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast stone material.
  - a. Epoxy Coating: ASTM A775/A775M.
2. Plain-Steel, Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.
3. Galvanized-Steel, Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.
4. Fiber Reinforcement: ASTM C1116/C1116M.

H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666, Type 304.

## 2.3 CAST STONE UNITS

- A. Cast Stone Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
1. Church Brick Cast Stone.
  2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Cast Stone Units: Comply with ASTM C1364.
1. Units shall be manufactured using the manufacturer's selected wet-cast or machine-made method.
  2. Units to be 16" tall by 48" long by 4" deep (nominal), unless otherwise indicated on Drawings.
- C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
  2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
  3. Provide drips on projecting elements unless otherwise indicated.
- D. Fabrication Tolerances:



1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

E. Cure Units as Follows:

1. Cure units in enclosed, moist curing room at 95 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
2. Keep units damp and continue curing to comply with one of the following:
  - a. No fewer than five days at mean daily temperature of 70 deg F or above.
  - b. No fewer than seven days at mean daily temperature of 50 deg F or above.

F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

G. Colors and Textures: To match existing unless as indicated on Drawings.

## 2.4 MORTAR MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Essroc.
  - b. LaFarge.
  - c. Leigh Hanson.
  - d. Lehigh White Cement.
  - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Davis Colors.
  - b. Euclid Chemical Company (The); an RPM company.
  - c. Lanxess Corporation.
  - d. Solomon Colors, Inc.
  - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- E. Aggregate for Mortar: ASTM C144.
  1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
  2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
  3. White-Mortar Aggregates: Natural white sand or crushed white stone.
  4. Colored Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- F. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Euclid Chemical Company (The); an RPM company.
    - b. GCP Applied Technologies Inc.
    - c. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- G. Water: Potable.

## 2.5 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666.
- B. Dowels: 1/2-inch-diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666.
- C. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by

cast stone manufacturer and expressly approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - a. Diedrich Technologies, Inc.; a Hohmann & Barnard company.
  - b. EaCo Chem, Inc.
  - c. PROSOCO, Inc.
  - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.6 MORTAR MIXES

- A. Do not use admixtures including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  1. Do not use calcium chloride in mortar or grout.
  2. Use portland cement-lime mortar unless otherwise indicated.
- B. Comply with ASTM C270, Proportion Specification.
  1. For setting mortar, use Type N.
  2. For pointing mortar, use Type N.
- C. Preblended dry mortar mix complying with ASTM C1714/C1714M and capable of producing mortar strength as indicated in ASTM C270.
  1. For setting mortar, use Type N.
  2. For pointing mortar, use Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
  1. Pigments shall not exceed 10 percent of portland cement by weight.
  2. Mix to match Architect's sample.
  3. Application: Use pigmented mortar for exposed mortar joints.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
  1. Mix to match Architect's sample.
  2. Application: Use colored-aggregate mortar for exposed mortar joints.

## 2.7 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing: Refer to Section 042000 "Unit Masonry."

2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Refer to Section 042000 "Unit Masonry."

2.9 MASONRY CLEANERS

- A. Refer to Section 042000 "Unit Masonry."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

- A. Set cast stone as indicated in TMS 604.
- B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
  - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
  - 2. Coordinate installation of cast stone with installation of flashing specified in other Sections.
- C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- D. Set units in full bed of mortar with full head joints unless otherwise indicated.
  - 1. Set units with joints 1/4 to 3/8 inch wide unless otherwise indicated.
  - 2. Build anchors and ties into mortar joints as units are set.
  - 3. Fill dowel holes and anchor slots with mortar.
  - 4. Build concealed flashing into mortar joints as units are set.
  - 5. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
  - 6. Keep joints at shelf angles open to receive sealant.
- E. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
- F. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

- G. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
  - 1. Joint Profile: To be selected by Architect on the mock-up.
- H. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.
  - 1. Keep joints free of mortar and other rigid materials.
  - 2. Build in compressible foam-plastic joint fillers where indicated.
  - 3. Form joint of width indicated, but not less than 3/8 inch.
  - 4. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
  - 5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

### 3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/4 inch in 10 ft., or 1/2 inch maximum.
- B. Variation from Level: Do not exceed 1/4 inch in 10 ft., or 1/2 inch maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

### 3.4 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
  - 1. Remove mortar fins and smears before tooling joints.
  - 2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.

3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 047200

## SECTION 051200 - STRUCTURAL STEEL FRAMING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Shrinkage-resistant grout.

B. Related Requirements:

1. Section 042000 "Unit Masonry."
2. Section 052100 "Steel Joist Framing."
3. Section 053100 "Steel Decking."

#### 1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

#### 1.3 COORDINATION

- A. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

#### 1.4 ACTION SUBMITTALS

- A. 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.

#### 1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

## 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 F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
  - 1. ANSI/AISC 303.
  - 2. ANSI/AISC 360.
  - 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
  - 1. Option 2: Fabricator's experienced steel detailer shall select or complete connections in accordance with ANSI/AISC 303.
    - a. Select and complete connections using schematic details indicated and ANSI/AISC 360.
    - b. Use Allowable Stress Design; data are given at service-load level.
- C. Moment Connections: Type FR, fully restrained.

### 2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
- B. Channels, Angles, M-Shapes, S-Shapes: ASTM A36/A36M
- C. Plate and Bar: ASTM A36/A36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C structural tubing.
- E. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.



- F. Welding Electrodes: Comply with AWS requirements.

## 2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH (ASTM A563M, Class 10S), heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

## 2.4 RODS

- A. Headed Anchor Rods:[ASTM F1554, Grade 36 straight.
1. Nuts: ASTM A563 (ASTM A563M) heavy-hex carbon steel.
  2. Plate Washers: ASTM A36/A36M carbon steel.
  3. Washers: ASTM F436 (ASTM F436M), Type 1, hardened carbon steel.
  4. Finish: Plain.

## 2.5 PRIMER

- A. Steel Primer:
1. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

## 2.6 SHRINKAGE-RESISTANT GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

## 2.7 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
1. Camber structural-steel members where indicated.
  2. Fabricate beams with rolling camber up.
  3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing 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/D1.1M.
- 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. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel 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, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
  - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

## 2.8 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

## 2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.
  - 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
  - 2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls.

## 2.10 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
  - 2. Surfaces to be field welded.
  - 3. Surfaces of high-strength bolted, slip-critical connections.
  - 4. Galvanized surfaces.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
  - 1. SSPC-SP 2.
  - 2. SSPC-SP 3.
- C. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- 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 on Drawings.

### 3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Baseplates Bearing Plates 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 shrinkage-resistant 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 grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- 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 are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
  - 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.

- 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 in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
  - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

### 3.5 REPAIR

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting:
  - 1. 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.
    - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

### 3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
  - 1. Verify structural-steel materials and inspect steel frame joint details.
  - 2. Verify weld materials and inspect welds.
  - 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
  - 1. Bolted Connections: Inspect bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
  - 2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
    - a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
      - 1) Liquid Penetrant Inspection: ASTM E165/E165M.

- 2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
- 3) Ultrasonic Inspection: ASTM E164.
- 4) Radiographic Inspection: ASTM E94/E94M.

END OF SECTION 051200

## SECTION 053100 - STEEL DECKING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Roof deck.
- B. Related Requirements:
  - 1. Section 051200 "Structural Steel Framing".
  - 2. Section 052100 "Steel Joist Framing".

#### 1.2 ACTION SUBMITTALS

- A. Product Data:
  - 1. Roof deck.
- B. Shop Drawings:
  - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Certificates:
  - 1. Product Certificates: For each type of steel deck.
- B. Field Quality-Control Submittals:
  - 1. Field quality-control reports.

#### 1.4 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Welding Qualifications: Qualify procedures and personnel in accordance with SDI QA/QC and the following welding codes:
    - a. AWS D1.1/D1.1M.
    - b. AWS D1.3/D1.3M.
- B. FM Approvals' RoofNav Listing: Provide steel roof deck evaluated by FM Approvals and listed in its "RoofNav" for Class 1 fire rating and Class 1-60 windstorm ratings. Identify materials with FM Approvals Certification markings.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Store products in accordance with SDI MOC3. 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 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.
- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

### 2.2 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:
  - 1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33 (230), G60 (Z180) zinc coating.
  - 2. Deck Profile: Type wide rib.
  - 3. Profile Depth: 1-1/2 inches (38 mm).
  - 4. Design Uncoated-Steel Thickness: 0.0358 inch (0.91 mm).
  - 5. Span Condition: Triple span or more.
  - 6. Side Laps: Overlapped.

### 2.3 ACCESSORIES

- A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.
- D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- E. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.

- F. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.
- G. Galvanizing Repair Paint: ASTM A780/A780M.

### 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 of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; 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 deck 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 deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, 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.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install in accordance with deck manufacturer's written instructions.

#### 3.3 INSTALLATION OF ROOF DECK

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches (38 mm) long, and as follows:
  - 1. Weld Diameter: 5/8 inch (16 mm), nominal.
  - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches (300 mm) apart in Zone 1 and 6 inches



(150 mm) apart in Zones 2 and 3, based on roof-area definitions in FM Global Loss Prevention Data Sheet 1-28.

- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches (1 m), and as follows:
  - 1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
  - 1. End Joints: Lapped 2 inches (50 mm) minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches (300 mm) apart with at least one fastener at each corner.
  - 1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels in accordance with deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
  - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

### 3.4 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
  - 1. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck in accordance with quality-assurance inspection requirements of SDI QA/QC.
    - a. Field welds will be subject to inspection.
  - 2. Steel decking will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 053100

## SECTION 054000 - COLD-FORMED METAL FRAMING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Floor joist framing.
4. Roof rafter framing.

B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.
2. Section 053100 "Steel Decking."
3. Section 092216 "Non-Structural Metal Framing."

#### 1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Cold-formed steel framing materials.
2. Load-bearing wall framing.
3. Exterior non-load-bearing wall framing.
4. Single deflection track.
5. Floor joist framing.
6. Roof-rafter framing.
7. Post-installed anchors.
8. Power-actuated anchors.

#### 1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI S202.

### PART 2 - PRODUCTS

#### 2.1 COLD-FORMED STEEL FRAMING MATERIALS

- A. Framing Members, General: Comply with AISI S240 for conditions indicated.

- B. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
  - 1. Grade: ST33H (ST230H) and ST50H (ST340H).
  - 2. Coating: G60 (Z180).

## 2.2 LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
  - 2. Flange Width: 1-5/8 inches (41 mm).
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: Matching steel studs.
  - 2. Flange Width: 1-1/4 inches (32 mm).
- C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
  - 2. Flange Width: 1-5/8 inches (41 mm).

## 2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
  - 2. Flange Width: 1-5/8 inches (41 mm).
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: Matching steel studs.
  - 2. Flange Width: 1-1/4 inches (32 mm).
- C. 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 loads and transfer them to the primary structure, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0677 inch (1.72 mm).
  - 2. Flange Width: 1 inch (25 mm) plus the design gap for one-story structures.

## 2.4 FLOOR JOIST FRAMING

- A. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, unpunched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
  - 2. Flange Width: 1-5/8 inches (41 mm), minimum.
- B. Steel Joist Track: Manufacturer's standard U-shaped steel joist track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: Matching steel joists.
  - 2. Flange Width: 1-1/4 inches (32 mm) and 1-1/2 inches (38 mm), minimum.

## 2.5 ROOF-RAFTER FRAMING

- A. Steel Rafters: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
  - 2. Flange Width: 1-5/8 inches (41 mm), minimum.

## 2.6 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation 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. Joist hangers and end closures.

## 2.7 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 as appropriate for the substrate.
  - 1. Uses: Securing cold-formed steel framing to structure.
  - 2. Type: Torque-controlled expansion anchor.

3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
  - C. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
  - D. Mechanical Fasteners: ASTM C1513, 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 A780/A780M.
  - B. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Install non-shrink grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

### 3.3 INSTALLATION, GENERAL

- A. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- B. 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 by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
  - a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
  - b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.
- C. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- D. Install temporary bracing and supports to secure framing and support loads equal 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.
- E. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

#### 3.4 INSTALLATION OF LOAD-BEARING WALL FRAMING

- A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:
  1. Anchor Spacing: As shown on Drawings.
- B. Squarely seat studs against top and bottom tracks, with gap not exceeding 1/8 inch (3 mm) between the end of wall-framing member and the web of track.
  1. Fasten both flanges of studs to top and bottom tracks.
  2. Space studs as follows:
    - a. Stud Spacing: 16 inches (406 mm).
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
- D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.
- E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.
- F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.
- G. Install headers over wall openings wider than stud spacing. Locate headers above openings. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame. Fasten jamb members together to uniformly distribute loads.
  2. Install tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.
- H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.
1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.
- I. Install horizontal bridging in stud system, spaced vertically 48 inches (1220 mm). Fasten at each stud intersection.
1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.
- J. Install steel sheet diagonal bracing straps to both stud flanges; terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
- K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.5 INSTALLATION OF EXTERIOR NONLOADBEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
1. Stud Spacing: 16 inches (406 mm).
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
1. Install single deep-leg deflection tracks and anchor to building structure.
  2. Connect vertical deflection clips to bypassing studs and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 18 inches (450 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
1. Install solid blocking at 96-inch (2440-mm) centers.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

### 3.6 INSTALLATION OF JOIST FRAMING

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
  2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.
- C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:
1. Joist Spacing: 16 inches (406 mm).
- D. Frame openings with built-up joist headers, consisting of joist and joist track or another combination of connected joists if indicated.
- E. Install bridging at intervals indicated. Fasten bridging at each joist intersection as follows:
1. Joist-Track Solid Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
- F. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.
- G. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

### 3.7 INSTALLATION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:



1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error are not to exceed minimum fastening requirements of sheathing or other finishing materials.

### 3.8 REPAIR

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

### 3.9 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. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.10 PROTECTION

- A. 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 055000 - METAL FABRICATIONS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Steel framing and supports for operable partitions.
  - 2. Steel framing and supports for overhead doors.
  - 3. Steel framing and supports for countertops.
  - 4. Steel framing and supports for mechanical and electrical equipment.
  - 5. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 6. Slotted channel framing.
  - 7. Metal ladders.
  - 8. Metal bollards.
  - 9. Metal downspout boots.

- B. Products furnished, but not installed, under this Section include the following:

- 1. Loose steel lintels.
  - 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
  - 3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

- C. Related Requirements:

- 1. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
  - 2. Section 051200 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, divider beams, door frames, and other steel items attached to the structural-steel framing.

#### 1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Slotted channel framing.
  - 2. Metal downspout boots.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
  - 1. Steel framing and supports for operable partitions.
  - 2. Steel framing and supports for overhead doors.
  - 3. Steel framing and supports for countertops.
  - 4. Steel tube reinforcement for low partitions.
  - 5. Steel framing and supports for mechanical and electrical equipment.
  - 6. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  - 7. Metal ladders.
  - 8. Metal bollards.
  - 9. Loose steel lintels.
- C. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- B. Research Reports: For post-installed anchors.

#### 1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

### 2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
  - 1. Size of Channels: 1-5/8 by 1-5/8 inches.
  - 2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B, with G90 coating; 0.108-inch nominal thickness.
- F. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

### 2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 1.
- D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
  1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
  2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.
- G. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B633, Class Fe/Zn 5, as needed for fastening to inserts.

## 2.4 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
  1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- B. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- F. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- G. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

## 2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

## 2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
  - 1. Fabricate units from slotted channel framing where indicated.
  - 2. Furnish inserts for units installed after concrete is placed.

- C. Fabricate supports for operable partitions from continuous steel beams of sizes recommended by partition manufacturer with attached bearing plates, anchors, and braces as recommended by partition manufacturer. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
- D. Galvanize miscellaneous framing and supports where indicated.

## 2.7 COUNTERTOP SUPPORTS

- A. Concealed Mount Counter Support Bracket:
  - 1. Size: As required for depth of countertop.
  - 2. Material: Extruded aluminum sections complying with ASTM B221, 6063-T5 alloy and tempered.
  - 3. Finish: Factory powder coat finish.
  - 4. Weight Capacity: 300 pounds, minimum.
  - 5. Manufacturer: RAKKS EH Counter Support Bracket with Rounded Ends, or approved equal.

## 2.8 METAL LADDERS

- A. General:
  - 1. Comply with ANSI A14.3.
- B. Steel Ladders:
  - 1. Space siderails 18 inches apart unless otherwise indicated.
  - 2. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.
  - 3. Rungs: 3/4-inch-diameter, steel bars.
  - 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
  - 5. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
  - 6. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
  - 7. Galvanize ladders, including brackets.

## 2.9 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.
- B. Prime steel bollards with zinc-rich primer.

## 2.10 METAL DOWNSPOUT BOOTS

- A. J.R. Hoe, or approved equal.

- B. Provide downspout boots made from cast iron with inlets of size and shape to suit downspouts. Provide units with flanges and holes for countersunk anchor bolts.
  - 1. Outlet: Horizontal, to discharge into pipe.
- C. ASTM A-48 Class 30 Gray Iron.
- D. Provide integral cleanout access.
- E. Rubber adapter for connection to underground drain pipe.
- F. Downspout inlet to be 36 inches above finished grade.
- G. Prime cast-iron downspout boots with zinc-rich primer.
- H. Shop prime and field paint cast-iron downspout boots.

#### 2.11 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize bearing and leveling plates.
- C. Prime plates with zinc-rich primer.

#### 2.12 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.
- C. Galvanize and prime loose steel lintels located in exterior walls.

#### 2.13 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.



## 2.14 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
  - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
  - 1. Shop prime with universal shop primer unless indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
  - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
  - 5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

### 3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions and overhead doors securely to, and rigidly brace from, building structure.
- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installation of Bearing and Leveling Plates" Article.
1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

### 3.3 INSTALLATION OF METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
- B. Anchor bollards in concrete in formed or core-drilled holes not less than 42 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with shrinkage-resistant grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

- C. Fill bollards solidly with concrete, mounding top surface to shed water.

- 1. Do not fill removable bollards with concrete.

### 3.4 INSTALLATION OF BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.5 REPAIRS

- A. Touchup Painting:
  - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
    - a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
  - 2. Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

## SECTION 055119 - METAL GRATING STAIRS

### 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. Industrial Class stairs with steel-grating treads.

#### 1.3 COORDINATION

- A. Coordinate installation of anchorages for metal stairs.
  - 1. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry.
  - 2. Deliver such items to Project site in time for installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For metal grating stairs and the following:
  - 1. Gratings.
  - 2. Grout.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, details, and attachment to other work.
  - 2. Indicate sizes of metal sections, thickness of metals, profiles, holes, and field joints.
  - 3. Include plan at each level.
- C. Delegated-Design Submittal: For stairs, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the State in which Project is located.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification.
  - 1. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers.
  - 2. Protect steel members and packaged materials from corrosion and deterioration.
  - 3. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.
    - a. Repair or replace damaged materials or structures as directed.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design stairs, including attachment to building construction.
- B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Uniform Load: 100 lbf/sq. ft..
  - 2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
  - 3. Uniform and concentrated loads need not be assumed to act concurrently.
  - 4. Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.
  - 5. Limit deflection of treads, platforms, and framing members to  $L/360$ .

### 2.2 METALS

- A. Metal Surfaces: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.
- D. Steel Bars for Grating Treads: ASTM A36/A36M or steel strip, ASTM A1011/A1011M or ASTM A1018/A1018M.
- E. Steel Wire Rod for Grating Crossbars: ASTM A510/A510M.
- F. Provide galvanized finish.
- G. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

- H. Cast-Abrasive Nosings: Cast iron, with an integral abrasive, as-cast finish consisting of aluminum oxide, silicon carbide, or a combination of both.

## 2.3 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls.
  - 1. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
  - 1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts for stairs indicated to be galvanized.
- D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

## 2.4 MISCELLANEOUS MATERIALS

- A. Welding Electrodes: Comply with AWS requirements.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout; noncorrosive and nonstaining; mixed with water to consistency suitable for application and a 30-minute working time.

## 2.5 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, railings, guards, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
  - 1. Join components by welding unless otherwise indicated.
  - 2. Use connections that maintain structural value of joined pieces.
- B. Assemble stairs in shop to greatest extent possible.

1. Disassemble units only as necessary for shipping and handling limitations.
  2. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately.
1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
  2. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish # 3 - Partially dressed weld with spatter removed.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
1. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated.
  2. Locate joints where least conspicuous.
  3. Fabricate joints that are exposed to weather in a manner to exclude water.
  4. Provide weep holes where water may accumulate internally.

## 2.6 FABRICATION OF STEEL-FRAMED STAIRS

- A. NAAMM Stair Standard: Comply with NAAMM AMP 510, "Metal Stairs Manual," for Industrial Class, unless more stringent requirements are indicated.
- B. Stair Framing:
1. Fabricate stringers of steel channels.
    - a. Stringer Size: As required to comply with "Performance Requirements" Article.
    - b. Provide closures for exposed ends of channel stringers.
    - c. Finish: Galvanized.
  2. Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers.
- C. Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."

1. Fabricate treads and platforms from welded steel grating with openings in gratings no more than 5/16 inch in least dimension.
  - a. Surface: Serrated.
  - b. Finish: Galvanized.
2. Fabricate grating treads with cast-abrasive nosing and with steel angle or steel plate carrier at each end for stringer connections.
  - a. Secure treads to stringers with bolts.

D. Risers: Open.

## 2.7 FINISHES

- A. Finish metal stairs after assembly.
- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
  1. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify elevations of floors, bearing surfaces and locations of bearing plates, and other embedments for compliance with requirements.
  1. For wall-mounted railings, verify locations of concealed reinforcement within gypsum board and plaster assemblies.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF METAL STAIRS

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction.
  1. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.



- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.
  - 1. Grouted Baseplates: Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces.
    - a. Clean bottom surface of baseplates.
    - b. Set steel-stair baseplates on wedges, shims, or leveling nuts.
    - c. After stairs have been positioned and aligned, tighten anchor bolts.
    - d. Do not remove wedges or shims, but if protruding, cut off flush with edge of bearing plate before packing with grout.
    - e. Promptly pack grout solidly between bearing surfaces and plates to ensure that no voids remain.
      - 1) Neatly finish exposed surfaces; protect grout and allow to cure.
      - 2) Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints.
  - 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
  - 2. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
  - 3. Comply with requirements for welding in "Fabrication, General" Article.

### 3.3 REPAIR

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055119

## SECTION 055213 - PIPE AND TUBE RAILINGS

### 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. Steel railings.
  - 2. Aluminum railings.
  - 3. Stainless steel railings.

#### 1.3 COORDINATION

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data:
  - 1. Manufacturer's product lines of mechanically connected railings.
  - 2. Fasteners.
  - 3. Post-installed anchors.
  - 4. Handrail brackets.
  - 5. Bituminous paint.
  - 6. Nonshrink, nonmetallic grout.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For delegated-design professional engineer.

- B. Mill Certificates: Signed by manufacturers of stainless steel products, certifying that products furnished comply with requirements.
- C. Research Reports: For post-installed anchors, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

#### 1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
- B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.
    - c. Uniform and concentrated loads need not be assumed to act concurrently.
  - 2. Infill of Guards:
    - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
    - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

#### 2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
  - 1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

## 2.3 STEEL RAILINGS

- A. Tubing: ASTM A500/A500M (cold formed).
- B. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
  - 1. Provide galvanized finish.
- C. Plates, Shapes, and Bars: ASTM A36/A36M.
- D. Cast Iron Fittings: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

## 2.4 ALUMINUM RAILINGS

- A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
- B. Extruded Bars and Tubing: ASTM B221, Alloy 6063-T5/T52.
- C. Extruded Structural Pipe and Round Tubing: ASTM B429/B429M, Alloy 6063-T6.
  - 1. Provide Standard Weight (Schedule 40) pipe unless otherwise indicated.
- D. Plate and Sheet: ASTM B209, Alloy 6061-T6.
- E. Die and Hand Forgings: ASTM B247, Alloy 6061-T6.
- F. Castings: ASTM B26/B26M, Alloy A356.0-T6.

## 2.5 STAINLESS STEEL RAILINGS

- A. Tubing: ASTM A554, Grade MT 304.
- B. Pipe: ASTM A312/A312M, Grade TP 304.
- C. Castings: ASTM A743/A743M, Grade CF 8 or CF 20.
- D. Plate and Sheet: ASTM A240/A240M or ASTM A666, Type 304.

## 2.6 FASTENERS

- A. Fastener Materials:
  - 1. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
  - 2. Aluminum Railing Components: Type 304 stainless steel fasteners.
  - 3. Stainless Steel Railing Components: Type 304 stainless steel fasteners.
  - 4. Finish exposed fasteners to match appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
  - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
- D. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.
  - 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 [**Group 2**] stainless steel bolts, ASTM F593, and nuts, ASTM F594.

## 2.7 MISCELLANEOUS MATERIALS

- A. Handrail Brackets: Cast iron, cast aluminum, or cast stainless steel (matching railing type), center of handrail 3-1/8 inches from wall.
- B. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
  - 1. For aluminum and stainless steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- C. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion, complying with ASTM D1187/D1187M.
- F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## 2.8 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.
  - 1. Clearly mark units for reassembly and coordinated installation.
  - 2. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately.
  - 1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
  - 2. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water.
  - 1. Provide weep holes where water may accumulate.
  - 2. Locate weep holes in inconspicuous locations.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint.
- I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- J. Form changes in direction as follows:
  - 1. By bending or by inserting prefabricated elbow fittings.
- K. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

- L. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
- M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
  - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.
  - 1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
  - 2. Coordinate anchorage devices with supporting structure.
- P. For railing posts set in concrete, provide stainless steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.
- Q. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

## 2.9 STEEL AND IRON FINISHES

- A. Galvanized Railings:
  - 1. Hot-dip galvanize steel railings, including hardware, after fabrication.
  - 2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
  - 3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
  - 4. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner and as follows.
  - 1. Comply with SSPC-SP 16.

## 2.10 ALUMINUM FINISHES

- A. 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 unacceptable. Variations in appearance of other components are

acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

- B. Mill Finish: AA-M12, nonspecular as fabricated.

## 2.11 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Stainless Steel Pipe and Tubing Finishes:
  - 1. 180-Grit Polished Finish: Uniform, directionally textured finish.
- C. Stainless Steel Sheet and Plate Finishes:
  - 1. Directional Satin Finish: ASTM A480/A480, No. 4.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

### 3.2 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for installing railings.
  - 1. Fit exposed connections together to form tight, hairline joints.
  - 2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
  - 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
  - 4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
  - 6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
  - 1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.



- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

### 3.3 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve, extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; and locate joint within 6 inches of post.

### 3.4 ANCHORING POSTS

- A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.

### 3.5 ATTACHING RAILINGS

- A. Anchor railing ends to concrete and masonry with flanges connected to railing ends and anchored to wall construction with anchors and bolts.
- B. Attach handrails to walls with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
  - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
  - 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets and railing end flanges to building construction as follows:
  - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
  - 2. For hollow masonry anchorage, use toggle bolts.
  - 3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
  - 4. For steel-framed partitions, fasten brackets directly to steel framing or concealed steel reinforcements, using self-tapping screws of size and type required to support structural loads.

3.6 CLEANING

- A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

## SECTION 061000 - ROUGH CARPENTRY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Wood blocking, cants, and nailers.
  - 2. Plywood backing panels.

#### 1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Exposed Framing: Framing not concealed by other construction.
- C. OSB: Oriented strand board.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
  - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preserved-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.

## 1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

# PART 2 - PRODUCTS

## 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  1. Factory mark each piece of lumber with grade stamp of grading agency.
  2. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

## 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
  1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, weather barriers, and dampproofing.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  1. Treatment shall not promote corrosion of metal fasteners.
  2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
  3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664 and design value adjustment factors shall be calculated according to ASTM D6841.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
  1. Concealed blocking.
  2. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  1. Blocking.
  2. Nailers.
  3. Rooftop equipment bases and support curbs.

4. Cants.
5. Furring.
6. Grounds.
7. Utility shelving.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:

1. Hem-fir (north); NLGA.
2. Mixed southern pine or southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Northern species; NLGA.

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

## 2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

## 2.6 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Metal Framing: ASTM C954, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1.

- G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- H. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- I. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC193 as appropriate for the substrate.
  - 1. Material (interior): Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
  - 2. Material (exterior): Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2.

## 2.7 MISCELLANEOUS MATERIALS

- A. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chlorpyrifos as its active ingredient.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Install shear wall panels to comply with manufacturer's written instructions.
- F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- G. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- H. Do not splice structural members between supports unless otherwise indicated.
- I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches on center.
- J. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- K. Comply with AWPAC M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  1. Use inorganic boron for items that are continuously protected from liquid water.
  2. Use copper naphthenate for items not continuously protected from liquid water.
- L. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- M. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
  2. ICC-ES evaluation report for fastener.
- N. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

### 3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

### 3.3 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000



## SECTION 061600 - SHEATHING

### 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. Wall sheathing.
- 2. Roof sheathing.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry" for plywood backing panels.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

- 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
- 2. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:

- 1. Wood-preservative-treated plywood.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## PART 2 - PRODUCTS

### 2.1 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- C. Factory mark panels to indicate compliance with applicable standard.

### 2.2 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, weather barriers and waterproofing.

### 2.3 WALL AND ROOF SHEATHING

- A. Plywood Sheathing: , Exterior, Structural I sheathing.
  - 1. Span Rating: Not less than 32/16.
  - 2. Nominal Thickness: Not less than 11/32 inch.

### 2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

- C. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
  - 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

#### 3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Wall and Roof Sheathing:
    - a. Screw to cold-formed metal framing.
    - b. Space panels 1/8 inch apart at edges and ends.

END OF SECTION 061600

## SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.
2. Section 101423.16 "Room-Identification Panel Signage" for accessibility signage to be installed on cabinets where indicated on Drawings.
3. Section 123623.13 "Plastic-Laminate-Clad Countertops."
4. Section 123661.16 "Solid Surfacing Countertops."

#### 1.2 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Show large-scale details.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
5. Apply AWI Quality Certification Program label to Shop Drawings.

- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.
- D. Samples for Initial Selection: For each type of exposed finish.
- E. Samples for Verification: For the following:
  - 1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
    - a. Provide one sample applied to core material with specified edge material applied to one edge.
  - 2. Thermally Fused Laminate (TFL) Panels: 8 by 10 inches, for each color, pattern, and surface finish.
    - a. Provide edge banding on one edge.
  - 3. Corner Pieces:
    - a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
    - b. Miter joints for standing trim.
  - 4. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Certificates: For each type of product.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

#### 1.7 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
  - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Licensed participant in AWI's Quality Certification Program.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups of typical architectural cabinets as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

#### 1.9 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

### PART 2 - PRODUCTS

#### 2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
  1. Provide labels and certificates from AWI certification program indicating that woodwork and installation complies with requirements of grades specified.
- B. Architectural Woodwork Standards Grade: Custom.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.

- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Refer to the Finish Schedule on Drawings for basis of design manufacturer.
- F. Laminate Cladding for Exposed Surfaces:
  - 1. Horizontal Surfaces: Grade HGS.
  - 2. Postformed Surfaces: Grade HGP.
  - 3. Vertical Surfaces: Grade VGS.
  - 4. Edges: Grade HGS.
  - 5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.
- G. Materials for Semi-exposed Surfaces:
  - 1. Surfaces Other Than Drawer Bodies: Thermally fused laminate panels.
    - a. Edges of Thermally Fused Laminate Panel Shelves: PVC or polyester edge banding.
    - b. For semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
  - 2. Drawer Sides and Backs: Thermally fused laminate panels with PVC or polyester edge banding.
  - 3. Drawer Bottoms: Thermally fused laminate panels.
- H. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- J. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
  - 1. Join subfronts, backs, and sides with glued dovetail joints.
- K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As selected by Architect from laminate manufacturer's full range in the following categories:
    - a. Solid colors, gloss finish.
    - b. Solid colors with core same color as surface, gloss finish.
    - c. Wood grains, matte finish.
    - d. Patterns, gloss finish.

## 2.2 WOOD MATERIALS

- A. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
  - 1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 150.

## 2.3 CABINET HARDWARE AND ACCESSORIES

- A. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 170 degrees of opening, self-closing.
- B. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter, chrome finished.
- C. Catches: Push-in magnetic catches, ANSI/BHMA A156.9, B03141.
- D. Adjustable Shelf Standards and Supports: ANSI/BHMA A156.9, B04071; with shelf rests, B04081.
- E. Drawer Slides: ANSI/BHMA A156.9.
  - 1. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mount.
    - a. Type: Full extension.
    - b. Material: Stainless steel slides.
    - c. Motion Feature: Soft close dampener.
  - 2. Pencil drawers not more than 3 inches high and not more than 24 inches wide, provide 50 lb. load capacity.
  - 3. General-purpose drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide 75 lb. load capacity.
  - 4. File drawers more than 6 inches high or more than 24 inches wide, provide 100 lb. load capacity.
  - 5. Lateral file drawers more than 6 inches high and more than 24 inches but not more than 30 inches wide, provide 150 lb. load capacity.
  - 6. Lateral file drawers more than 6 inches high and more than 30 inches wide, provide 200 lb. load capacity.
  - 7. Computer keyboard tray, provide 75 lb. load capacity.
  - 8. Hanging File Drawer Sets: 22 inch standard hanging file supports for drawers.
    - a. Steel Rails: 1/8 inch thick by 1/2 inch high.
- F. Door Locks: ANSI/BHMA A156.11, E07121, cylindrical (cam) type, 5-pin tumbler, steel with chrome finish.
  - 1. Provide one lock per classroom as shown on elevations, and on all cabinets in health suite.
- G. Drawer Locks: ANSI/BHMA A156.11, E07041, cylindrical (cam) type, 5-pin tumbler, steel with chrome finish.



- H. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- I. Mirror Glass for Teachers Wardrobes: ASTM C1036, Type 1. 12 inches wide by 60 inches tall with metal frame.
  - 1. Thickness: 3.0 mm.
- J. Plastic Trays: Gratnell 3 inch Trays. Chemically inert polypropylene. Antimicrobial material. Colors as selected by Architect from manufacturer's full range of colors. Provide up to five colors in each room.
- K. Grommets for Cable Passage: Molded-plastic grommets and matching plastic caps with slot for wire passage.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Doug Mockett & Company, Inc.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - 2. Outside Diameter: 2 inches.
  - 3. Color: As selected by Architect from manufacturer's full range of available colors.
- L. Stop Chains: Zinc or nickel finished chain with attachment hooks. Provide for doors adjacent to walls, deep cabinets, countertops or appliances.
- M. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
- N. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

## 2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesive for Bonding Plastic Laminate: Contact cement.
  - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

## 2.5 FABRICATION

- A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.

- B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
  - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
  - 2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- D. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual."
  - 1. For glass in frames, secure glass with removable stops.
  - 2. For exposed glass edges, polish and grind smooth.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

#### 3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
  - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
  - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide

- unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches on center width.

### 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semi-exposed surfaces.

END OF SECTION 064116

## SECTION 064600 - WOOD TRIM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Interior standing and running trim.
  - 2. Wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.
  - 3. Shop priming of wood trim.
  - 4. Shop finishing of wood trim.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry" for wood furring, blocking, and shims required for installing wood trim and concealed within other construction before wood trim installation.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

- 1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

- C. Samples for Initial Selection:

- 1. Shop-applied opaque finishes.
  - 2. PVC edge material.
  - 3. Thermoset decorative panels.

- D. Samples for Verification:

- 1. Lumber and panel products with shop-applied opaque finish, 5 inches wide by 12 inches long for lumber, for each finish system and color, with one-half of exposed surface finished.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.
- C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver wood trim until operations that could damage wood trim have been completed in installation areas. If wood trim must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

- A. Environmental Limitations for Interior Work: Do not deliver or install interior wood trim until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that wood trim can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 WOOD TRIM, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of wood trim indicated for construction, finishes, installation, and other requirements.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

- A. Grade: Custom.
- B. Wood Species: Any closed-grain hardwood.

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of wood trim and quality grade specified unless otherwise indicated.
  - 1. Wood Moisture Content for Interior Materials: 5 to 10 percent.

2.4 MISCELLANEOUS MATERIALS

- A. Interior Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.

2.5 FABRICATION

- A. Fabricate wood trim to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
  - 1. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.
- B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members except for members with ends exposed in finished work.
- C. Assemble casings in shop except where shipping limitations require field assembly.

2.6 SHOP PRIMING

- A. Interior Wood Trim for Opaque Finish: Shop prime with one coat of wood primer specified in Section 099123 "Interior Painting."
- B. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing wood trim, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of wood trim. Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.

## 2.7 SHOP FINISHING

- A. General: Finish wood trim at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
- B. General: Refer to Section 099123 "Interior Painting" for field finishing opaque-finished wood trim.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Before installation, condition wood trim to average prevailing humidity conditions in installation areas.
- B. Before installing architectural wood trim, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

### 3.2 INSTALLATION

- A. Grade: Install wood trim to comply with same grade as item to be installed.
- B. Assemble wood trim and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install wood trim level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut wood trim to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor wood trim to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.
  1. For shop-finished items, use filler matching finish of items being installed.
- F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches long except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
  1. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.

- G. Refer to Section 099123 "Interior Painting" for final finishing of installed wood trim.

### 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective wood trim, where possible, to eliminate functional and visual defects; where not possible to repair, replace wood trim. Adjust joinery for uniform appearance.
- B. Clean wood trim on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064600



## SECTION 071113 - BITUMINOUS DAMPPROOFING

### 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. Cold-applied, emulsified-asphalt dampproofing at foundation.
- B. Related Requirements:
  - 1. Section 033013 "Vapor Retarders" for vapor retarder system under slab on grade.
  - 2. Section 072100 "Thermal Insulation" for foundation and underslab insulation.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Convene two (2) weeks prior to commencing Work of this Section. Meeting attendees to include dampproofing manufacturer's technical representative, Architect, Contractor, dampproofing installer, and any other subcontractors, materialmen, etc. affected by the Work of this Section.
  - 2. Review dampproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.
  - 3. Participants will include other subcontractors, materialmen, etc., whose Work is related to the installation of the dampproofing.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

#### 1.5 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

- B. Ventilation: Provide adequate ventilation during application of dampproofing in enclosed spaces. Maintain ventilation until dampproofing has cured.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide auxiliary materials recommended in writing by manufacturer of primary materials.

### 2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Henry, HE101 Non-fibred Foundation Coating.
  - 2. Karnak, 100 Non-Fibred Dampproofing.
  - 3. Sika, MasterSeal 610 Dampproofing.
  - 4. W.R. Meadows, Sealmastic Non-fibred Dampproofing.
  - 5. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Brush and Spray Coats: ASTM D1227, Type III, Class 1.

### 2.3 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Emulsified-Asphalt Primer: ASTM D1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.
- C. Patching Compound: Epoxy or latex-modified repair mortar of type recommended in writing by dampproofing manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for surface smoothness, maximum surface moisture content, and other conditions affecting performance of the Work.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.
- B. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- C. Clean substrates of projections and substances detrimental to dampproofing work; fill voids, seal joints, and remove bond breakers if any.
- D. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections.

### 3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.
  - 1. Apply dampproofing to provide continuous plane of protection.
  - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
  - 1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
  - 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.
- C. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap dampproofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
  - 1. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe.
  - 2. Lap dampproofing at least 1/4 inch onto shelf angles supporting veneer.
- D. Where dampproofing interior face of above-grade, exterior concrete walls, continue dampproofing through intersecting walls by keeping vertical mortar joints at intersection temporarily open or by dampproofing wall before constructing intersecting walls.

3.4 PROTECTION

- A. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where panels are subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- B. Correct dampproofing that does not comply with requirements; repair substrates, and reapply dampproofing.

END OF SECTION 071113

## SECTION 072100 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Extruded polystyrene foam-plastic board insulation.
  - 2. Mineral-wool board.

- B. Related Requirements:

- 1. Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for insulation specified as part of roofing construction.
  - 2. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, and tested physical and performance properties of insulation.
  - 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

## 1.6 WARRANTY

### A. Extruded Polystyrene Board (XPS):

1. Manufacturer's Warranty: Submit manufacturer's standard warranty document that the insulation will maintain ninety (90) percent of its R-value for the lifetime of the building and covers all ASTM C578 properties.

### B. Mineral Wool Board:

1. Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official for a warranty period of thirty (30) years commencing on Date of Substantial Completion. Manufacturer warrants that product will maintain the originally declared R-value as published on the date of installation of the product.

## PART 2 - PRODUCTS

### 2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

- #### A. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Dow Chemical Company, Styrofoam.
  - b. Kingspan Insulation Limited, Greenguard.
  - c. Owens Corning, Foamular.
  - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

## 2.2 MINERAL-WOOL BOARD

- A. Mineral-Wool Board, Types IA and IB, Unfaced: ASTM C 612, Types IA and IB; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Nominal density of 4 lb./cu. ft.. R-value per inch equals 4.0 minimum.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Rockwool, Comfortboard 110 (Basis of Design).
    - b. Knauf Earthwool.
    - c. Owens Corning, Thermafiber.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.3 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. AGM Industries, Inc.
    - b. Gemco.
  - 2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - 3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.
- B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. AGM Industries, Inc.
    - b. Gemco.
- C. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space as indicated on Drawings between face of insulation and substrate to which anchor is attached.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Gemco.
  - D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.
    1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      - a. AGM Industries, Inc.
      - b. Gemco.
- 2.4 ACCESSORIES
- A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

#### 3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.



### 3.3 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
- C. Install insulation as shown on the Drawings.

### 3.4 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
  - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application.
  - 2. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.
  - 3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
  - 4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- C. Adhesive Installation: Install with adhesive or press into tacky waterproofing according to manufacturer's written instructions.

### 3.5 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches on center both ways on inside face and as recommended by manufacturer.
  - 1. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.
  - 2. Press units firmly against inside substrates.
  - 3. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

### 3.6 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

## SECTION 072116 – STRUCTURAL THERMAL BREAKS

### 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 Structural Thermal Breaks for the following types, to be located at the exterior brick veneer:
  - 1. Polyurethane structural thermal breaks.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Manufacturer's data sheets on each product to be used.
  - 2. Preparation instructions and recommendations.
  - 3. Storage and handling requirements and recommendations.
  - 4. Typical installation methods.
- B. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.
  - 1. Schedule: Submit a list of locations where structural thermal breaks are to be used, and the specific product and thickness to be used at each location.
- C. Samples for Verification: Two representative units of each type, size, pattern, and color.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturer's Installation Instructions:
- B. Manufacturer's Field Reports:

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

- B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
- D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
  - 1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
  - 2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
  - 3. Retain mock-up during construction as a standard for comparison with completed work.
  - 4. Do not alter or remove mock-up until work is completed or removal is authorized.
- E. Pre-installation Meetings.
  - 1. Conduct conference at Project Site.
  - 2. Attendees shall include Architect, Contractor and trades involved.
  - 3. Agenda shall include schedule, responsibilities, critical path items and approvals

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations Acceptance at site.

#### 1.7 PROJECT / SITE CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Design: Wall assembly or interface detail shall meet the ASHRAE 90.1 requirements for continuous insulation and shall not have structural connections (beams, support framing, sub girts, clips) which create thermal bridging. Effective U values of wall, roof and foundation assemblies shall meet or exceed the design requirements per code. Effective U value calculation or modeling shall be performed in accordance with ASHRAE guidelines.
- B. Structural Performance:

1. Provide structural thermal break material and connections capable of withstanding and/or transferring shear, moment, and wind design loads.
2. Allow for fabrication and construction tolerances, accommodate live load deflection, shrinkage, and creep of the building structure and other building movements as required by building code.
3. Maintain structural steel deflections per AISC 360.
4. Submit independent test results or engineered performance analysis for structural thermal break material in bearing and/or slip critical connections where shear and moment loads are applied.

## 2.2 MANUFACTURERS

### A. Structural Thermal Breaks installed at Steel to Steel Connections (SB-1):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Armatherm, Armatherm FRR.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
2. Performance Requirements:
  - a. Compressive Strength (ASTM D638): 40,000 psi.
  - b. Compressive Modulus (ASTM D695): 673,400 psi.
  - c. Shear Strength (ASTM D732): 16,000 psi.
  - d. Thermal Conductivity, U-Value (ASTM C518): 1.05.
  - e. Coefficient of Thermal Expansion (ASTM E831):  $2.2 \times 10^{-6}$  in/in/degree F.
  - f. Thermal Resistance, R-Value (ASTM C518): 0.95.
  - g. Surface Burning Characteristics (ASTM E84):
  - h. Flame Spread: 25, Class A.
  - i. Smoke Developed: 50, Class A.
  - j. Description: Reinforced thermoset resin thermal break.
  - k. Thickness: As indicated on Drawings.
  - l. Locations: As indicated on Drawings.
  - m. Accessories: Armatherm FRR bushings and washers as applicable to location.
  - n. Thickness: As indicated on Drawings.
  - o. Locations: As indicated on Drawings.

### B. Structural Thermal Breaks installed at Window Lintels (SB-2):

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Armatherm, Armatherm 500-280.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

2. Performance Requirements:

- a. Compressive Strength (ASTM D638): 2,200 psi.
- b. Compressive Modulus (ASTM D695): 49,300 psi.
- c. Shear Strength (ASTM D732): 310 psi.
- d. Thermal Conductivity, U-Value (ASTM C518): 0.53.
- e. Thermal Resistance, R-Value (ASTM C518): 1.9 per inch.
- f. Surface Burning Characteristics (ASTM E84):
- g. Flame Spread: 25, Class A.
- h. Smoke Developed: 50, Class A.
- i. Description: Reinforced thermoset resin thermal break.
- j. Thickness: As indicated on Drawings.
- k. Locations: As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction. Include accessory products including bushings and washers.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.
- B. Manufacturer's Services: Arrange for the manufacturer's technical representative to inspect installation at commencement and upon completion.
  - 1. Notify Architect 48 hours in advance of date and time of inspection.

- C. Repair or remove and replace components of thermal breaks where inspections indicate that they do not comply with specified requirements.
  - 1. Additional inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

### 3.5 CLEANING AND PROTECTION

- A. Clean products in accordance with the manufacturer's recommendations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 072116

## SECTION 072500 - WEATHER BARRIERS

### 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. Vapor retarder materials and systems (air barrier and water resistive), including system accessories for an air tight exterior building envelope system.
  - 2. Weather barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Weather-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

- B. Related Requirements:

- 1. Section 042000 "Unit Masonry" for embedded flashing, ties and anchors in masonry walls.
  - 2. Section 076200 "Sheet Metal Flashing and Trim" for formed wall sheet metal fabrications.

#### 1.3 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Vapor Retarder: Air-tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
  - 1. Water Vapor Permeance: For purposes of conversion, 57.2 ng = 1 perm.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components to provide a barrier to air leakage through the building envelope including substructure, exterior enclosure, and roofing.



1. Substructure comprises foundations, footings, floors on grade, and other substructure elements.
2. Exterior enclosure comprises the essentially vertical separation between exterior and interior conditioned space, including exterior walls, exterior windows, exterior doors, other openings, exterior wall fixtures, and other exterior enclosure elements.
3. Roofing comprises all elements forming weather and thermal barriers at the sloped or essentially flat weather-proof enclosure over the entire "top-side" of building and over exposed floor superstructure, and other exposed floors; including roof coverings, closures for roof openings, roof fixtures, and other roof elements, not including the structural supporting elements of the roof.

B. Preinstallation Meeting:

1. Conduct a preinstallation meeting one week before starting work of this section at the Project Site.
2. Meeting Agenda:
  - a. Review and confirm job-specific product data, shop drawings, and job-specific quality plan.
  - b. Review contract document details and specifications.
  - c. Review and confirm product warranty, testing requirements, and protocols.
  - d. Review compatibility and adhesion between weather barrier and adjacent materials.
  - e. Review expectations of installation quality from the weather barrier installer and adjacent trades.
  - f. Review and verify installation sequencing, equipment to be used, logistics and compatibility of the weather barrier and adjacent trades.
  - g. Discuss weather and environmental concerns, exposure limits, and installation constraints.
  - h. Review and verify job site quality control procedures.
3. Required attendance by the following, but not limited to:
  - a. Architect.
  - b. General Contractor project manager.
  - c. General Contractor on-site superintendent.
  - d. Weather barrier foreperson.
  - e. Weather barrier manufacturer's representative.
  - f. Owner.
  - g. Testing agency foreperson.
  - h. Substrate, waterproofing, window, exterior cladding, roofing installers.
  - i. Other openings, equipment, and fixtures as part of this project.
  - j. Plumbing, electrical, mechanical, and other Prime Contractors making penetrations through the building envelop.

C. Coordinate protection and repair of weather barrier with subsequent trades.

## 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product and accessories. Include manufacturer's installation instructions, including surface preparation, environmental conditions, and testing requirements.
  - 1. Submit letter from primary weather barrier material manufacturer indicating approval of materials that are proposed to be used that are not currently listed in the accessories section of this specification for that manufacturer's material.
  - 2. Include statement from the primary weather barrier material manufacturer that the materials used in their weather barrier assembly which will be used to adhere to the underlying substrate are chemically compatible to the substrate material.
- B. Shop Drawings: Show details of weather barrier installation at site-specific terminations, openings, and penetrations. Show details of flexible flashing applications.
  - 1. Show locations and extent of air barrier materials, accessories, and assemblies specific to Project conditions.
    - a. Base of wall(s).
    - b. Parapet or top of wall(s).
    - c. Openings (head, jamb, sill) for each of the opening systems.
    - d. Penetrations, both before and after weather barrier installation.
    - e. Soffits and overhangs.
    - f. Building and wall movement joints, including horizontal floor movement joints.
    - g. Transitions to other building components.
    - h. Repair requirements due to damaged substrates, both before and after weather barrier installation.
  - 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
  - 3. Include details of interfaces with other materials that form part of air barrier.
  - 4. Manufacturer's standard details from non-project specific conditions are not acceptable.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For weather barrier and flexible flashing, from ICC-ES.
- B. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.
- C. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with air barrier.
- D. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

- E. Preinstallation Meeting Minutes: List of all attendees, summary of items discussed, and assignment of responsibilities.
- F. Digital photographs of each portion of the installation including atypical details.
- G. Accredited Laboratory Testing for Materials: Laboratory accredited by International Accreditation Service Inc. (IAS), American Association for Laboratory Accreditation (A2LA).
- H. ABAA Field Quality Control Reports: Submit third-party reports of testing and inspection required by ABAA QAP.

#### 1.7 QUALITY ASSURANCE

##### A. ABAA Installer Qualifications:

- 1. Installer shall be a manufacturer approved installer, with a minimum of five (5) years experience with the manufacturer's products and systems. Installer shall be certified under the Air Barrier Association of America's (ABAA) Quality Assurance Program (QAP).
- 2. Perform Work in accordance with Weather Barrier Manufacturer published literature and as specified in this Section.
- 3. Maintain one (1) copy of Weather Barrier Manufacturer's instructions on site.
- 4. Allow the Weather Barrier Manufacturer representative site access during installation.
- 5. Contact the Weather Barrier Manufacturer a minimum of two weeks prior to scheduling a meeting.

##### B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.

- 1. Build integrated mockups of exterior wall assembly, 150 sq. ft. minimum, incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
  - a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.
  - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
  - c. If Architect determines mockups do not comply with requirements, reconstruct mock-ups and apply air barrier until mockups are approved.
- 2. Testing:
  - a. Mock-Up Tests for Air and Water Infiltration: The third party testing agency shall test the mock-up for air and water infiltration in accordance with ASTM E1186 (air leakage location), ASTM E783 (air leakage quantification) at a pressure differential of 1.57 lb./ft<sup>2</sup> (75 Pa), and ASTM E1105 (water penetration). Use smoke tracer to locate sources of air leakage. If deficiencies are found, the air barrier Contractor shall reconstruct mock-up at their cost for retesting until

satisfactory results are obtained. Deficiencies include air leakage beyond values specified, uncontrolled water leakage, unsatisfactory workmanship.

- 1) Perform the air leakage test and water penetration test of mock-up prior to installation of cladding and trim but after installation of all fasteners for cladding and trim and after installation of other penetrating elements.
  - b. Mock-Up Tests for Membrane Adhesion: The third party testing agency shall test the mock-up for self-adhered sheet air barrier material and transition membrane adhesion in accordance with ASTM D4541 (modified), using a type II pull tester except that the membrane shall be cut through to separate the material attached to the disc from the surrounding material. Perform test after curing period recommended by the material manufacturer. Record mode of failure and area where the material failed in accordance with ASTM D4541. When the air barrier material manufacturer has established a minimum adhesion level for the product on the particular substrate, the inspection report shall indicate whether this requirement has been met. Where the material manufacturer has not declared a minimum adhesion value for their product/substrate combination, the value shall simply be recorded.
  - c. Air Barrier Assembly Testing: Verify air barrier assembly testing by the material Manufacturer by visiting the ABAA website to ensure an ASTM E2357 test has been completed and to obtain results. Visit the ABAA website for the reported air barrier assembly leakage rate and illustrations or CAD details which includes the methods in which the assembly test mock-ups shall be assembled.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on field mock-ups.
- B. Mock-up Testing: Air-barrier assemblies shall comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.
  1. Air-Leakage-Location Testing: Mockups will be tested for evidence of air leakage according to ASTM E1186, chamber pressurization or depressurization with smoke tracers.
  2. Air-Leakage-Volume Testing: Mockups will be tested for air-leakage rate according to ASTM E783.
  3. Adhesion Testing: Mockups will be tested for required air-barrier adhesion to substrate according to ASTM D4541.
  4. Notify Architect seven (7) days in advance of the dates and times when mockups will be tested.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials:

1. Deliver materials to the jobsite in undamaged and clearly marked containers and wrapping indicating the name of the Weather Barrier Manufacturer and product.

B. Storage of Materials:

1. Store materials as recommended by the Weather Barrier Manufacturer and conform to applicable safety regulatory agencies. Refer to all applicable data including, but not limited to, Safety Data Sheets, Product Data sheets, product labels, and specific instructions for personal protection.
2. Keep solvents away from open flame or excessive heat.
3. Store rolled materials on end.

C. Handling:

1. Product requirements may vary. Refer to Weather Barrier Manufacturer's published literature.

#### 1.10 FIELD CONDITIONS

A. Environmental Requirements:

1. Do not perform Work during rain or inclement weather.
2. Do not perform Work on frost covered substrates or surfaces that are wet to touch.
3. Product requirements may vary. Refer to Weather Barrier Manufacturer's published literature.

B. Protection:

1. It is the responsibility of the installing Subcontractor to protect all surfaces not included in scope of Work from damage.
2. Protect top and backside of substrate walls against bulk water during and after application of air barrier.

C. Complete preparation Work prior to installing the weather barrier assembly.

D. Ground electrical equipment during operations.

#### 1.11 WARRANTY

A. Manufacturer's Single Source Material Warranty: Manufacturer warrants the weather barrier and accessories to be free from manufacturing and material defects for a period of ten (10) years from date of Substantial Completion. Any materials and/or accessories proven defective during the warranty period will be repaired or replaced.

B. Installers Warranty: Installer warrants the weather barrier and accessories to be free from installation defects for a period of two (2) years from date of Substantial Completion. Any

materials and/or accessories proven defective during the warranty period will be repaired or replaced.

## PART 2 - PRODUCTS

### 2.1 WEATHER-BARRIER ASSEMBLIES

- A. Single Source Responsibility: Obtain weather barrier assembly, including but not limited to flashings, sealants, primers, mastics, and adhesives from a single Weather Barrier Manufacturer.
  - 1. Contractor may use either sheet-applied or liquid-applied systems to complete the work. Contractor may use both sheet-applied and liquid-applied systems to complete the work as well, provided that both applied systems are from the same manufacturer.
  - 2. Any accessory item listed herein or otherwise required by the manufacturer to complete the Work must be approved by the manufacturer as part of the warranted system listed.
- B. Performance Criteria:
  - 1. Water Vapor Permeance: 0.2 perm, maximum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
  - 2. Air Permeance (ASTM E2178): <0.0002 cfm/ft<sup>2</sup> (0.0011 L/s.m.2).
  - 3. Air leakage, Assembly (ASTM E2357): Pass.
  - 4. Nail Sealability (AAMA 711, ASTM D1970 modified): Pass.
  - 5. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to six months of weather exposure after application.
  - 6. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
  - 7. Tensile Strength: 175 psi when tested in accordance with ASTM D412.
  - 8. Fire Testing (NFPA 285): Compliant in various wall assemblies.
  - 9. Mildew Resistance, 0-no growth when tested in accordance with ASTM D5590.

### 2.2 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Vapor Retarder Sheet: ASTM D1970/D1970M.
  - 1. Type: Rubberized asphalt bonded to thermoplastic sheet, self-adhesive.
  - 2. Thickness: 40 mil, 0.040 inch, nominal.
  - 3. Seam and Perimeter Tape: As recommended by sheet manufacturer.
  - 4. Use low temperature version of product when ambient and surface installation temperatures are between 25 and 45 degrees F.
  - 5. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. W.R. Meadows, Inc; Air-Shield.
    - b. Henry Company; Blueskin SA.
    - c. Carlisle Coatings and Waterproofing, Inc; CCW-705 Air and Vapor Barrier Sheet.
    - d. Dorken Systems Inc.; DELTA-VENT SA.
    - e. 3M 3015VP.

- f. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Vapor Retarder Coating: Liquid applied, resilient, UV-resistant coating and associated joint treatment.
  1. Dry Film Thickness (DFT): 40 mils, 0.040 inch, minimum.
  2. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.
  3. Suitable for use on concrete, masonry, plywood and gypsum sheathing.
  4. Joint Preparation Treatment: Coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
  5. Additional Performance Criteria:
    - a. VOC Content: 100 g/L max.
    - b. Chemical Resistance: Resists salt solutions, mild acids, and alkalis.
    - c. Resistance to Mold, Mildew, and Fungal Growth (ASTM D5590): Pass.
    - d. Elongation (ASTM D412): 250%.
    - e. Tensile Strength (ASTM D412): 140 psi.
  6. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. W.R. Meadows, Inc; Air-Shield LSR.
    - b. Henry Company; Air-Bloc 17MR.
    - c. PROSOCO, Inc; R-GUARD VB.
    - d. Percora Corporation; XL-Perm Ultra VP.
    - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  7. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

## 2.3 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Adhesives: Synthetic rubber based quick setting adhesive with low VOC content.
- C. Primers: Synthetic rubber based quick setting adhesive with low VOC content.
- D. Thinners and Cleaners: As recommended by material manufacturer.
- E. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
  1. Liquid-applied flashing:

- a. Moisture-cure one component elastomeric liquid applied flashing using an STPE (Silyl-Terminated Polyether) polymer.
2. Self-Adhered Flashing:
  - a. Self-adhered water resistive air barrier membrane comprised of rubberized asphalt and integrally laminated to a thermoplastic film surface.
  - b. UV resistant self-adhered water resistive air barrier membrane comprised of rubberized asphalt and dual-layer high strength polyolefin with a surface layer metallic aluminum film.
- F. Pre-formed Transition Membrane: Semi-rigid silicone or polyester composition, tapered edges, ribbed back, tear resistant.
  1. Manufacturers, as approved by Weather Barrier Manufacturer:
    - a. Dow Chemical Company; DOWSIL Silicone Transition Strip and System.
    - b. Fortifiber Building Systems Group; Moistop Corner Shield.
    - c. Pecora Corporation; Pecora XL-Span.
    - d. Tremco Commercial Sealants & Waterproofing; ProGlaze ETA System 1.
    - e. Momentive Performance Materials, Inc/GE Construction Sealants; RF100 Reinforcing Fabric.
    - f. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- G. Sealants:
  1. Moisture cure, medium modulus polymer modified sealing compound, having the following typical properties:
  2. Complies with Fed. Spec. TT-S-00230C, Type II, Class A.
  3. Complies with ASTM C920, Type S, Grade NS, Class 35.
- H. Thru-Wall Flashing:
  1. Vapor impermeable, self-adhered water resistive weather barrier consisting of an SBS rubberized asphalt compound, integrally laminated to an engineered thermoplastic film.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.
  1. Verify surfaces are sound, clean and free of frost, oil, grease, dirt, excess mortar or other contaminants.
  2. Substrate must be continuous and secure.
  3. Sheathing fasteners must be installed into solid backing and set flush with sheathing.
  4. Masonry joints must be struck flush.



5. Concrete surfaces shall be smooth and without large voids, spalled areas or sharp protrusions.
6. Tie holes/voids in poured concrete to be flush and smooth shall be filled. Allow new concrete to cure a minimum of fourteen (14) days after forms are removed.
7. Top and backside of substrate walls must be protected against bulk water during and after application of air barrier.
8. Curing compounds must be resin based without oil, wax or pigments. Substrates must be free of form release agents.
9. Do not install air barrier over substrates that are wet to touch.

- B. Do not apply air barrier assembly components until substrate and environmental conditions are in accordance with Weather Barrier Manufacturer's published literature.

### 3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.
- C. Protect top and backside of substrate walls against bulk water during and after application of weather barrier.
- D. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- F. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- G. Bridge isolation joints expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

### 3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions and details and according to recommendations in ASTM D6135 to form a seal with adjacent construction and ensure continuity of air and water barrier.
  1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous air-barrier sheet produced for low-temperature application. Do not install low-temperature sheet if ambient or substrate temperature is higher than 60 deg F.

2. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
- B. Install continuous air-tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Apply primers, sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- D. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D6135.
- E. Self-Adhered Sheets:
  1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
  2. Lap sheets shingle-fashion and maintain uniform 2-1/2 inch minimum lap widths and end laps to shed water and seal laps air tight. Stagger end laps a minimum of 12 inches.
  3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
  4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
  5. At wide joints, provide extra flexible membrane allowing joint movement.
- F. Coatings:
  1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
  2. Use flashing to seal to adjacent construction and to bridge joints.
- G. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
- H. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.
  1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
  2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
- J. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

- K. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.
- L. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

### 3.4 FIELD QUALITY CONTROL

- A. ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, and inspections under ABAA's Quality Assurance Program.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements.
  - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
  - 2. Continuous structural support of air-barrier system has been provided.
  - 3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
  - 4. Site conditions for application temperature and dryness of substrates have been maintained.
  - 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
  - 6. Surfaces have been primed.
  - 7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
  - 8. Termination mastic has been applied on cut edges.
  - 9. Air barrier has been firmly adhered to substrate.
  - 10. Compatible materials have been used.
  - 11. Transitions at changes in direction and structural support at gaps have been provided.
  - 12. Connections between assemblies (air barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
  - 13. All penetrations have been sealed.
- D. Tests: As determined by testing agency from among the following tests:
  - 1. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, chamber pressurization or depressurization with smoke tracers.
  - 2. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E783.
  - 3. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D4541 for each 600 sq. ft. of installed air barrier or part thereof.
- E. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
  2. Remove and replace deficient air-barrier components for retesting as specified above.
- F. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- G. Prepare test and inspection reports.
- H. Take digital photographs of each portion of the installation prior to covering up.
- I. Air Barrier Association of America Installer Audits: Cooperate with ABAA's testing agency. Allow access to work areas and staging. Notify ABAA in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted. Arrange and pay for site inspections by ABAA to verify conformance with the material Manufacturer's instructions, the site Quality Assurance Program used by ABAA, and this section of the project specification.
1. Audits and subsequent testing shall be carried out at the following rate:
    - a. Up to 10,000 ft<sup>2</sup> of air barrier contract requires one (1) audit.
    - b. 10,001 – 35,000 ft<sup>2</sup> of air barrier contract requires two (2) audits.
    - c. 35,001 – 75,000 ft<sup>2</sup> of air barrier contract requires three (3) audits.
    - d. 75,001 - 125,000 ft<sup>2</sup> of air barrier contract requires four (4) audits.
    - e. 125,001 – 200,000 ft<sup>2</sup> of air barrier contract requires five (5) audits.
    - f. 200,001 ft<sup>2</sup> and over of air barrier contract requires six (6) audits.
  2. Forward written audit reports to the Architect within 10 working days of the inspection and test being performed.
  3. If the inspections reveal any defects, promptly remove and replace defective work at no additional cost to the Owner.

### 3.5 CLEANING

- A. As the Work proceeds, and upon completion, promptly clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing Work.
- B. Clean soiled surfaces, spatters, and damage to adjacent areas caused by Work of this Section.
- C. Check area to ensure cleanliness and remove debris, equipment, and excess material from the site.

### 3.6 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

END OF SECTION 072500

## SECTION 074113.16 - STANDING-SEAM METAL ROOF PANELS

### 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. Standing-seam metal roof panels.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
  - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
  - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
  - 1. Include similar Samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Metal Panels: 12 inches long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

- C. Sample Warranties: For special warranties.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including rupturing, cracking, or puncturing.
    - b. Deterioration of metals and other materials beyond normal weathering.
  - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 STANDING-SEAM METAL ROOF PANELS

- A. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required.
- B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.
  1. Pac-Clad, or approved equal.
  2. Aluminum Sheet: Coil-coated sheet, ASTM B209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
    - a. Thickness: 0.040 inch.
    - b. Surface: Smooth, flat finish.
    - c. Exterior Finish: Two-coat fluoropolymer.
    - d. Color: As selected by Architect from manufacturer's full range.
  3. Clips: One-piece fixed to accommodate thermal movement.
    - a. Material: 0.028-inch- nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
  4. Panel Coverage: 16 inches.
  5. Panel Height: 1.5 inches.

### 2.2 UNDERLAYMENT MATERIALS

- A. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

### 2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645; cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
  2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
  2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

## 2.4 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.



3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
  - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

## 2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Aluminum Panels and Accessories:
  1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
  1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
  2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

### 3.3 INSTALLATION OF UNDERLAYMENT

- A. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

### 3.4 INSTALLATION OF STANDING SEAM METAL ROOF PANELS

- A. Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Shim or otherwise plumb substrates receiving metal panels.
  - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
  - 3. Install screw fasteners in predrilled holes.
  - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 5. Install flashing and trim as metal panel work proceeds.
  - 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  - 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  - 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
  - 1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
  - 1. Install clips to supports with self-tapping fasteners.
  - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  - 3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
  - 1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
  - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

### 3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113.16

## SECTION 074213.23 - METAL COMPOSITE MATERIAL WALL PANELS

### 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 metal composite material wall panels (aluminum composite panels).

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal composite material panel Installer, metal composite material panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal composite material panels, including installers of doors, windows, and louvers.
  - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 3. Review methods and procedures related to metal composite material panel installation, including manufacturer's written instructions.
  - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
  - 5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal composite material panels.
  - 6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  - 7. Review temporary protection requirements for metal composite material panel assembly during and after installation.
  - 8. Review procedures for repair of panels damaged after installation.
  - 9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:

1. Include fabrication and installation layouts of metal composite material panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
  2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Selection: For each type of metal composite material panel indicated with factory-applied color finishes.
1. Include similar Samples of trim and accessories involving color selection.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal composite material panels to include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal composite material panels, and other manufactured items so as not to be damaged or deformed. Package metal composite material panels for protection during transportation and handling.
- B. Unload, store, and erect metal composite material panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal composite material panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal composite material panels to ensure dryness, with positive slope for drainage of water. Do not store metal composite material panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal composite material panels during installation.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal composite material panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

- A. Coordinate metal composite material panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal composite material panel systems that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including rupturing, cracking, or puncturing.
    - b. Deterioration of metals and other materials beyond normal weathering.
  - 2. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal composite material panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal composite material panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E330:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings.

- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- C. Surface Burning Characteristics: Flame spread index of 25 maximum; smoke developed index of 450 maximum; when tested in accordance with ASTM E84

## 2.2 METAL COMPOSITE MATERIAL WALL PANELS

- A. Metal Composite Material Wall Panel Systems: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment assembly components, and accessories required for weathertight system.
  - 1. Pac-Clad, PAC-3000 RC Composite Wall Panels, or approved equal.
- B. Aluminum-Faced Composite Wall Panels: Formed with 0.020-inch-thick, coil-coated aluminum sheet facings.
  - 1. Panel Thickness: 4 mm.
  - 2. Core: Standard.
  - 3. Exterior Finish: Two-coat fluoropolymer.
    - a. Color: Custom color, matching Insulated Metal Wall Panels and Formed Metal Wall Panels.
- C. Support Structure: Strongwell's StronGirt purtruded FRP cladding attachment support system.
  - 1. Thermal Conductivity: ASTM E1530, 2.64 BTU-in/ft<sup>2</sup>-Hr/F.
  - 2. Where installed in horizontal orientation, provide factory-drilled weep holes.
  - 3. Tested for use with NFPA 285 compliant phenolic rain screen wall assembly.
  - 4. Flammability Characteristics: ASTM E84, Class A (flame spread 10; smoke density 160).
  - 5. Tensile Strength: ASTM D638, over 77,000 psi.
  - 6. Screw Pullout Load: ASTM D1761, over 850 lbf.
- D. Attachment Assembly: Manufacturer's standard Rainscreen principle system.

## 2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet ASTM A653/A653M, G90 coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal composite material panel system.
- B. Flashing and Trim: Provide flashing and trim formed from same material as metal composite material panels as required to seal against weather and to provide finished appearance.



Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal composite material panels.

- C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal composite material panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- D. Panel Sealants: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal composite material panels and remain weathertight; and as recommended in writing by metal composite material panel manufacturer.

## 2.4 FABRICATION

- A. General: Fabricate and finish metal composite material panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  - 4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
  - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
  - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
    - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

## 2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations

in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Aluminum Panels and Accessories:

1. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal composite material panel supports, and other conditions affecting performance of the Work.
  1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal composite material wall panel manufacturer.
  2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal composite material wall panel manufacturer.
    - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and assemblies penetrating metal composite material panels to verify actual locations of penetrations relative to seam locations of metal composite material panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal composite material panel manufacturer's written recommendations.

#### 3.3 METAL COMPOSITE MATERIAL PANEL INSTALLATION

- A. General: Install metal composite material panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor metal composite material panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal composite material panels.
  2. Flash and seal metal composite material panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal composite material panels are installed.
  3. Install screw fasteners in predrilled holes.
  4. Locate and space fastenings in uniform vertical and horizontal alignment.
  5. Install flashing and trim as metal composite material panel work proceeds.
  6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  7. Align bottoms of metal composite material panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Aluminum Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal composite material panel manufacturer.
- D. Attachment Assembly, General: Install attachment assembly required to support metal composite material wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
- E. Installation: Attach metal composite material wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.
1. Rainscreen Systems: Do not apply sealants to joints unless otherwise indicated.
- F. Clip Installation: Attach panel clips to supports at locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-turned flanges of wall panels to panel clips with manufacturer's standard fasteners.
1. Seal horizontal and vertical joints between adjacent panels with sealant backing and sealant. Install sealant backing and sealant according to requirements specified in Section 079200 "Joint Sealants."
  2. Seal horizontal and vertical joints between adjacent metal composite material wall panels with manufacturer's standard gaskets.
- G. Track-Support Installation: Install support assembly at locations, spacings, and with fasteners recommended by manufacturer. Use manufacturer's standard horizontal tracks and vertical tracks that provide support and secondary drainage assembly, draining to the exterior at horizontal joints through drain tube. Attach metal composite material wall panels to tracks by interlocking panel edges with manufacturer's standard "T" clips.

1. Attach routed-and-turned flanges of wall panels to perimeter extrusions with manufacturer's standard fasteners.
  2. Install wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
  3. Do not apply sealants to joints unless otherwise indicated.
- H. Rainscreen-Principle Installation: Install using manufacturer's standard assembly with vertical channel that provides support and secondary drainage assembly, draining at base of wall. Notch vertical channel to receive support pins. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by manufacturer. Attach metal composite material wall panels by inserting horizontal support pins into notches in vertical channels and into flanges of panels. Leave horizontal and vertical joints with open reveal.
1. Install wall panels to allow individual panels to be installed and removed without disturbing adjacent panels.
  2. Do not apply sealants to joints unless otherwise indicated.
- I. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal composite material panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal composite material panel manufacturer; or, if not indicated, provide types recommended in writing by metal composite material panel manufacturer.
- J. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

### 3.4 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal composite material wall panel units within installed tolerance of 1/4 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal composite material wall panel installation, including accessories.
- B. Metal composite material wall panels will be considered defective if they do not pass test and inspections.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

### 3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal composite material panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal composite material panel installation, clean finished surfaces as recommended by metal composite material panel manufacturer. Maintain in a clean condition during construction.
- B. After metal composite material panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal composite material panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.23

## SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

### 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. Adhered ethylene-propylene-diene-terpolymer (EPDM) roofing system and accessories.
2. Substrate board.
3. Vapor retarder.
4. Roof insulation.
5. Cover board.

- B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 077100 "Roof Specialties" for manufactured copings and roof edge flashings.
3. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

#### 1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

#### 1.4 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.
  1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
  5. Review structural loading limitations of roof deck during and after roofing.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

B. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness if insulation.
2. Base flashings and membrane terminations.
3. Flashing details at penetrations.
4. Roof plan showing orientation of steel roof deck and orientation of roof membrane and fastening spacings and patterns for mechanically fastened roofing system.
5. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
6. Tie-in with weather barrier.

C. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, manufacturer, roofing inspector and infrared scanning testing agency.
  - 1. Include letter from Manufacturer written for this Project indicating approval of Installer.
- B. Manufacturer Certificates:
  - 1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
    - a. Submit evidence of complying with performance requirements.
  - 2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
- C. Product Test Reports: For components of roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.
- D. Warranties: Unexecuted sample copies of special warranties.
- E. Field quality-control reports.
  - 1. Reports of Roofing Inspector: Reports must include the following, but not limited to:
    - a. Date of the Inspection.
    - b. Contractor's Name.
    - c. Roofing Installer's Name.
    - d. Roofing Superintendent's Name.
    - e. Number of roofing workers present on site.
    - f. Weather conditions.
    - g. Substrate conditions.
    - h. Roof are and location of roofing installed that particular day.
    - i. Tests performed.
    - j. Defective work observed, and corrective actions taken to correct defective work.
    - k. Submit reports within forty eight (48) hours after inspection.
  - 2. Reports of Infrared Scanning: Report must include the following, but not limited to:
    - a. Date of the Inspection.
    - b. Contractor's Name.
    - c. Roofing Installer's Name.
    - d. Weather conditions.
    - e. Tests performed.
    - f. Findings of moisture and anomalies observed, including a scaled roof plan indicating locations.
    - g. Submit reports within forty eight (48) hours after inspection.



- F. Sample Warranties: For manufacturer's special warranties.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.
- B. Warranties: Executed copies of warranties.

#### 1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is listed in FM Approvals' RoofNav for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
  - 1. An authorized full-time technical employee of the manufacturer.
  - 2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.
  - 3. Technical Inspector Requirements and Qualifications.
    - a. Contractor shall engage the roofing manufacturer's full time technical inspector to supervise all aspects of the installation of the complete roofing system. The inspector shall be on the jobsite for full time everyday roofing work is being conducted. A full-time day is defined as from the time the crew arrives to the time the temporary tie-ins are completed. If the technical inspector is not provided by the roofing system manufacturer, an outside qualified inspector can be employed with a letter from the roof system manufacturer that they will comply with all decisions from the technical inspector and compliance with outside technical inspector will not affect roof system manufacturer's warranty. Technical Inspector shall have a minimum history of one year inspecting the specified roof system.
    - b. The manufacturer's technical inspector shall:
      - 1) Not be a salesperson or have any sales responsibilities.
      - 2) Must have a minimum of three (3) years' experience as a roofing Inspector of specified roofing system.
      - 3) Must be an employee of the manufacture for a minimum of three (3) years.
      - 4) Must have been formally trained by the roofing manufacturer with documentation to prove training. Yearly training updates must be supplies.
      - 5) Must have received the OSHA 10-Hour Safety Training.

- 6) Must have received RRO (Registered Roof Observer) Training and at least one member of the local inspection team must be a RRO in good standing with the Roofing Consulting Institute (RCI). This person will conduct quality control inspections and assure inspections are being properly documented per RRO standards.
  - c. If the technical inspector is not provided by the roofing system manufacturer, an outside qualified inspector can be employed along with a letter from the roof system manufacturer that they will comply with all decisions from the technical inspector and compliance with outside technical inspector will not affect roof system manufacturer's warranty. The technical inspector shall:
    - 1) Must not be a salesperson or have any sales responsibilities.
    - 2) Must have a minimum of ten (10) years' experience as a roofing foreman on a roofing crew that installed specified systems.
    - 3) Must have a minimum of three (3) years' experience inspecting the roof system specified.
    - 4) Must have been formally trained by the roofing manufacturer with documentation to prove training. Yearly training updates must be supplied.
    - 5) Must have completed the OSHA 10-Hour Safety Training Class.
    - 6) Must be a RRO (Registered Roof Observer) in good standing with the Roofing Consulting Institute (RCI).
- D. Infrared Scanning Provider Qualifications: A firm with a minimum five (5) year history of providing infrared scanning of similar size and scope of this Project. Provide a list of at least ten (10) similar projects performed.
- E. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written instructions for installation of products.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, substrate board, and other components of roofing system for peak gust wind speed exceeding 90 mph.
  - 2. Warranty Period: 20 years from Date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, and vapor retarders for the following warranty period:
  - 1. Warranty Period: Two years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and flashings shall remain watertight.
  - 1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
  - 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the Resistance to Foot Traffic Test in FM Approvals 4470.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897.
- D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

1. Fire/Windstorm Classification: Class 1A-90.
  2. Hail-Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 MH.
- E. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

## 2.2 ETHYLENE-PROPYLENE-DIENE-TERPOLYMER (EPDM) ROOFING

- A. EPDM Sheet: ASTM D4637/D4637M, Type I, nonreinforced, EPDM sheet with factory-applied seam tape.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Carlisle Sure-Seal/Sure-White EPDM Membrane (basis of design).
    - b. Firestone.
    - c. Johns Manville.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  2. Thickness: 90 mils, nominal.
  3. Exposed Face Color: White on black.
  4. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.
  5. Physical Properties:
    - a. Tensile Strength (ASTM D412): 1600 psi.
    - b. Elongation (ASTM D412): 540%.
    - c. Brittleness Temperature (ASTM D746): -49 deg. F.
    - d. Water Vapor Permeance (ASTM E96): 0.03 max. perm.

## 2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, according to application.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Bonding Adhesive: Manufacturer's standard, water based.
- E. Seaming Material: Factory-applied seam tape, width as recommended by manufacturer.

- F. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
- G. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- H. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- I. Expansion Joint Supports: Manufacturer's approved expansion joint supports at the width of joints indicated on Drawings. Install joint as per manufacturer's instructions. Material: Extruded EPDM sponge.
- J. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer.
- K. Walkway Pads:
  - 1. Manufactured by membrane roofing manufacturer.
  - 2. Color: Match field membrane.
  - 3. Pad Thickness 0.375 inches.
  - 4. Size: 30 by 30 inches.
  - 5. Slip resistant wear surface.
  - 6. UV resistant.
  - 7. Provide manufacturer's recommended primer for adhering pads.
- L. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
  - 1. Provide white flashing accessories for white EPDM membrane roofing.

## 2.4 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M, fiber-reinforced gypsum board.
  - 1. GP Dens-Deck Prime, distributed by Carlisle, or manufacturer's approved equal.
  - 2. Thickness: 1/2 inch.
  - 3. Surface Finish: Unprimed.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

## 2.5 VAPOR RETARDER

- A. Self-adhering, rubberized asphalt membrane laminated to spun-bonded polyester fabric; 40 mils (0.040 inch) thick, minimum.

1. Carlisle 725TR, or manufacturer's approved equal.

## 2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM roof membrane manufacturer, approved for use in FM Approvals' RoofNav-listed roof assemblies.
- B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
  1. Carlisle SecurShield Polyisocyanurate.
  2. Compressive Strength: 20 psi.
  3. Size: 48 by 96 inches.
  4. Thickness:
    - a. Base Layer: 2.6 inches.
- C. Tapered Insulation: Provide factory-tapered insulation boards.
  1. Material: Match roof insulation.
  2. Minimum Thickness: 1/4 inch.
  3. Slope:
    - a. Roof Field: 1/4 inch per foot minimum, unless otherwise indicated on Drawings.
    - b. Saddles and Crickets: 1/2 inch per foot minimum, unless otherwise indicated on Drawings.

## 2.7 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Cover Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum substrate, or ASTM C1278/C1278M, fiber-reinforced gypsum board.
  1. GP Dens-Deck Prime, distributed by Carlisle, or manufacturer's approved equal.
  2. Thickness: 5/8 inch.
  3. Surface Finish: Unprimed.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
  - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Perform fastener-pullout tests according to roof system manufacturer's written instructions.
  - 1. Submit test result within 24 hours of performing tests.
    - a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

### 3.3 INSTALLATION OF ROOFING, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified under Section 072500 "Weather Barriers."

### 3.4 INSTALLATION OF SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.
  - 1. At steel roof decks, install substrate board at right angle to flutes of deck.
    - a. Locate end joints over crests of steel roof deck.
  - 2. Tightly butt substrate boards together.
  - 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
  - 4. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.

### 3.5 INSTALLATION OF VAPOR RETARDER

- A. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.
- B. Vapor retarder to extend to weather barrier system and be counterflushed.

### 3.6 INSTALLATION OF INSULATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Metal Decking:
  - 1. Install base layer of insulation with end joints staggered not less than 12 inches in adjacent rows and with long joints continuous at right angle to flutes of decking.
    - a. Locate end joints over crests of decking.
    - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
    - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
    - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
      - 1) Trim insulation so that water flow is unrestricted.
    - e. Fill gaps exceeding 1/4 inch with insulation.
    - f. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
    - g. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.



- 1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
  - a. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
  - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
  - c. Make joints between adjacent insulation boards not more than 1/4 inch in width.
  - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
  - e. Trim insulation so that water flow is unrestricted.
  - f. Fill gaps exceeding 1/4 inch with insulation.
  - g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
  - h. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
    - 1) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

### 3.7 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.
  1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
  2. At internal roof drains, conform to slope of drain sump.
    - a. Trim cover board so that water flow is unrestricted.
  3. Cut and fit cover board tight to nailers, projections, and penetrations.
  4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
    - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

### 3.8 INSTALLATION OF ADHERED ROOF MEMBRANE

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

- B. Unroll membrane roof membrane and allow to relax before installing.
- C. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeters.
- G. Apply roof membrane with side laps shingled with slope of roof deck where possible.
- H. Factory-Applied Seam Tape Installation: Clean and prime surface to receive tape.
  - 1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
  - 2. Apply lap sealant and seal exposed edges of roofing terminations.
- I. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- J. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

### 3.9 INSTALLATION OF BASE FLASHING

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

### 3.10 FIELD QUALITY CONTROL

- A. Roofing Inspector: Contractor shall engage a qualified roofing inspector for full-time on site to perform roof tests and inspections and to prepare start up, interim, and final reports. Roofing Inspector's quality assurance inspections shall comply with criteria established in NRCA's

"Quality Control and Quality-assurance Guidelines for the Application of Membrane Roofing Systems."

1. Technical Inspector Duties:
  - a. Roof inspector shall provide the following on a daily basis:
    - 1) Via fax or email to the Owner, Roofing Contractor, and Roof System Manufacture.
    - 2) A daily report signed by both roofing foreman and the inspector.
    - 3) Provide approximate location of work being installed.
    - 4) Provide photographs, taken each day (including non-workdays due to weather), depicting conditions and progress of the work.
    - 5) Keep a list of visitors to the roof on a daily basis.
    - 6) Conduct safety meeting with the crew on site.
    - 7) Help coordinate work with other trades.
    - 8) Keep a record copy of specifications and drawings on site.
    - 9) Attends all progress meetings to help point out any area of concern.
    - 10) Keeps a record of hot asphalt temperature in the kettle and at point of application.
    - 11) Has the number of workdays and non-work days due to weather listed.
    - 12) On days when weather prevents roof work from taking place the inspector shall walk the roof and the inside of the building with the roofing foreman to ensure project is watertight.
      - a) Provide a daily report stating why contractor is not on site and if any issues were discovered during walk-thru.
  - B. An infrared thermographic scan and test of the roofing system shall be performed at the conclusion of the roofing work. The Contractor shall provide these scans as provided by the independent infrared scanning company. The scan and test shall comply with ASTM C1153 (current edition) – Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging.
    1. In the event of moisture detected under the roofing cap sheet through the infrared scanning, or if there are any anomalies detected from the infrared scanning, further testing is required via moisture meter probes for verification at no additional cost to the Owner.
    2. Locations of moisture detected and locations of anomalies detected shall be marked directly on the roof surface.
    3. Provide a report of the scanning and testing findings, included a scaled roof sketch indicating location of moisture and anomalies detected.
    4. The Contractor will be responsible for remediating the roofing work until the roof has been tested to be free of moisture.
    5. After repairs have been made, the Contractor shall have the roof infrared scanned again until there are no further findings of moisture or anomalies, at no additional cost to the Owner.
  - C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation at commencement and upon completion.
    1. Conduct final inspection and conference at Project site, as scheduled by Prime Contractor.

a. Attendance:

- 1) Roofing Inspector.
- 2) Roofing contractor / other subcontractors.
- 3) Representative of Owner.
- 4) Manufacturers Sales Representative.

b. Minimum agenda:

- 1) Walkover inspection.
- 2) Identification of problems, which may impede issuance of warranty.

D. Repair or remove and replace components of built-up roofing where test results or inspections indicate that they do not comply with specified requirements.

1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.11 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.12 ROOFING INSTALLER'S WARRANTY

A. WHEREAS \_\_\_\_\_ of \_\_\_\_\_, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: West Chester Area School District.
2. Address: 782 Springdale Drive, Exton, PA 19341.
3. Building Name/Type: Mary C. Howse Elementary School.
4. Building Address: 641 Boot Road, West Chester, PA 19380.
5. Area of Work: **<Insert information>**.
6. Acceptance Date: \_\_\_\_\_.
7. Warranty Period: **<Insert time>**.
8. Expiration Date: \_\_\_\_\_.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
    - a. lightning;
    - b. peak gust wind speed exceeding 90 mph;
    - c. fire;
    - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    - f. vapor condensation on bottom of roofing; and
    - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
  2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
  3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
  4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
  5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
  6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
  7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work

according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

1. Authorized Signature: \_\_\_\_\_.
2. Name: \_\_\_\_\_.
3. Title: \_\_\_\_\_.

END OF SECTION 075323

## SECTION 076200 - SHEET METAL FLASHING AND TRIM

### 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 sheet metal flashing and trim associated with the installation of low sloped roof assemblies.
- B. Related Requirements:
  - 1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for low slope roofing systems and materials.
  - 3. Section 077100 "Roof Specialties" for manufactured roof-edge drainage systems.
  - 4. Section 079200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

#### 1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following
  - 1. Underlayment materials.
  - 2. Elastomeric sealant.
  - 3. Butyl sealant.
  - 4. Epoxy seam sealer.
- B. Shop Drawings: For sheet metal flashing and trim.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.

3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
9. Include details of special conditions.
10. Include details of connections to adjoining work.
11. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

- C. Samples: For each exposed product and for each color and texture specified, 12 inches long by actual width.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Sample Warranty: For special warranty.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.
- B. Special warranty.

#### 1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Preinstallation Conference: Conduct conference at Project site.
  1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
  2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
  3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.



## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
  - 1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
  - 2. Protect stored sheet metal flashing and trim from contact with water.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

## 1.9 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 SHEET METALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
  - 1. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions for seacoast and severe environments.
  - 2. Color: As selected by Architect from manufacturer's full range.
  - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.
- C. Stainless Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
  - 1. Finish: ASTM A480/A480M, No. 4 (polished directional satin).
    - a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
    - b. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
      - 1) Run grain of directional finishes with long dimension of each piece.
      - 2) When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

## 2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
  - 1. Thermal Stability: ASTM D1970/D1970M; stable after testing at 240 deg F.
  - 2. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F.

## 2.4 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
    - a. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
  - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  - 3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.
- G. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.
  - 1. Material: Stainless steel, 0.0188 inch thick.
  - 2. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
  - 3. Accessories:
    - a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
    - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.

## 2.5 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
  - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
  - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
  - 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
  - 1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
  - 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
  - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- D. Sealant Joints: Where movable, non-expansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Seams:
  - 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer.
- G. Do not use graphite pencils to mark metal surfaces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering, High-Temperature Sheet Underlayment:
  - 1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.
  - 2. Prime substrate if recommended by underlayment manufacturer.
  - 3. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.
  - 4. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses.
  - 5. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller.
  - 6. Roll laps and edges with roller.
  - 7. Cover underlayment within 14 days.
- B. Install slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.
  - 1. Install in shingle fashion to shed water.
  - 2. Lapp joints not less than 4 inches.

### 3.3 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
  - 1. Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
  - 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.

4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
  5. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  6. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
  7. Do not field cut sheet metal flashing and trim by torch.
  8. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
  2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated.
    - a. Form joints to completely conceal sealant.
    - b. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
    - c. Adjust setting proportionately for installation at higher ambient temperatures.
      - 1) Do not install sealant-type joints at temperatures below 40 deg F.
  2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- 3.4 INSTALLATION OF ROOF FLASHINGS
- A. Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

3.5 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.

3.7 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.
- C. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 076200

## SECTION 077100 - ROOF SPECIALTIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Copings.
  - 2. Roof-edge specialties.
  - 3. Roof-edge drainage systems.
  - 4. Reglets and counterflashings.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.
  - 2. Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing" for materials and installation of sheet metal flashing and trim integral with roofing.
  - 3. Section 076100 "Sheet Metal Flashing and Trim."
  - 4. Section 079200 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings: For roof specialties.

- 1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.
  - 2. Include details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
  - 3. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
  - 4. Detail termination points and assemblies, including fixed points.
  - 5. Include details of special conditions.

- C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.



D. Samples for Verification:

1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
2. Include copings, roof-edge specialties, and roof-edge drainage systems made from 12-inch lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For copings and roof-edge flashings, for tests performed by a qualified testing agency.
- B. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing."
- C. Preinstallation Conference: Conduct conference at Project site.
  1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
  2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
  3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

## 1.8 FIELD CONDITIONS

- A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.
- B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

## 1.9 WARRANTY

- A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing."
- B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. FM Approvals' Listing: Manufacture and install copings and roof-edge specialties that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with FM Approvals' markings.
- C. SPRI Wind Design Standard: Manufacture and install copings and roof-edge specialties tested according to SPRI ES-1 and capable of resisting the following design pressures:
  - 1. Design Pressure: As indicated on Drawings.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 COPINGS

- A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Pac-Clad Continuous Cleat Coping System.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  2. Formed Aluminum Sheet Coping Caps: Aluminum sheet, 0.040 inch thick.
    - a. Surface: Smooth, flat finish.
    - b. Finish: Two-coat fluoropolymer.
    - c. Color: As selected by Architect from manufacturer's full range.
  3. Corners: Factory mitered and continuously welded.
  4. Coping-Cap Attachment Method:
    - a. Continuous outside and inside cleats.
    - b. Splice plate with factory installed neoprene strips.

## 2.3 ROOF-EDGE SPECIALTIES

- A. Canted Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed galvanized-steel sheet cant, 0.028 inch thick, minimum, with extended vertical leg terminating in a drip-edge cleat. Provide matching corner units.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Pac-Clad Pac-Loc Fascia 2000.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  2. Formed Aluminum Sheet Fascia Covers: Aluminum sheet, 0.040 inch thick.
    - a. Surface: Smooth, flat finish.
    - b. Finish: Two-coat fluoropolymer.
    - c. Color: As selected by Architect from manufacturer's full range.
  3. Corners: Factory mitered and continuously welded.

4. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.

## 2.4 ROOF-EDGE DRAINAGE SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  1. Pac-Clad.
  2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Gutters: Manufactured in uniform section lengths not exceeding 12 feet, with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
  1. Aluminum Sheet: 0.050 inch thick.
  2. Gutter Profile: Rectangular box.
  3. Corners: Factory mitered and continuously welded.
  4. Gutter Supports: Manufacturer's standard supports as selected by Architect with finish matching the gutters.
- C. Downspouts (Rain Water Conductors): Plain rectangular complete with machine-crimped elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
  1. Formed Aluminum: 0.125 inch thick.
- D. Parapet Scuppers: Manufactured with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof.
  1. Formed Aluminum: 0.032 inch thick.
- E. Splash Pans: Fabricate from the following exposed metal:
  1. Formed Aluminum: 0.040 inch thick.
- F. Aluminum Finish: Two-coat fluoropolymer.
  1. Color: As selected by Architect from manufacturer's full range.

## 2.5 REGLETS AND COUNTERFLASHINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  1. Carlisle Syntec System, SecurEdge 1 Piece Surface Mounted.
  2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

- B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:
  - 1. Formed Aluminum: 0.040 inch thick.
  - 2. Corners: Factory mitered and continuously welded.
  - 3. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
- C. Aluminum Finish: Two-coat fluoropolymer.
  - 1. Color: As selected by Architect from manufacturer's full range.

## 2.6 MATERIALS

- A. Aluminum Sheet: ASTM B209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
- B. Aluminum Extrusions: ASTM B221, alloy and temper recommended by manufacturer for type of use and finish indicated.
- C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.

## 2.7 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
  - 1. Thermal Stability: ASTM D1970/D1970M; stable after testing at 240 deg F.
  - 2. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F.

## 2.8 MISCELLANEOUS MATERIALS

- A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
  - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
  - 2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
- B. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- C. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

## 2.9 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Coil-Coated Aluminum Sheet Finishes:
  - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- E. Aluminum Extrusion Finishes:
  - 1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Two-Coat Fluoropolymer: AAMA 2604. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - b. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.

- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.
  - 1. Apply continuously under copings, roof-edge specialties, and reglets and counterflashings.
  - 2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.

### 3.3 INSTALLATION, GENERAL

- A. Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
  - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
  - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
  - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
  - 4. Torch cutting of roof specialties is not permitted.
  - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Coat concealed side of uncoated aluminum and stainless steel roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
  - 1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise indicated on Drawings.
  - 2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

- D. Fastener Sizes: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.
- F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

### 3.4 INSTALLATION OF COPINGS

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.
  - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.

### 3.5 INSTALLATION OF ROOF-EDGE SPECIALITIES

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

### 3.6 INSTALLATION OF ROOF-EDGE DRAINAGE-SYSTEM

- A. Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 24 inches apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.
  - 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion-joint caps.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c.
  - 1. Provide elbows at base of downspouts at grade to direct water away from building.
- D. Splash Pans: Install where downspouts discharge on low-slope roofs and grade.



3.7 INSTALLATION OF REGLETS AND COUNTERFLASHINGS

- A. Coordinate installation of reglets and counterflashings with installation of base flashings.
- B. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.

3.8 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

## SECTION 077200 - ROOF ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Roof hatches and safety accessories.
- B. Related Sections:
  - 1. Section 051200 "Structural Steel Framing".
  - 2. Section 053100 "Steel Decking".
  - 3. Section 055000 "Metal Fabrications" for metal vertical ladders.

#### 1.3 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
  - 2. Include test reports certified by a professional engineer licensed in the state of Pennsylvania.
  - 3. Include installation instructions from the manufacturer.
- B. Shop Drawings: For roof accessories.
  - 1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
  - 1. Size and location of roof accessories specified in this Section.
  - 2. Method of attaching roof accessories to roof or building structure.
  - 3. Required clearances.
- B. verifying that installers have been trained by the manufacturer and are competent.
- C. Sample Warranties: For manufacturer's special warranties.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. General:
  - 1. Manufacturer: A minimum of 5 years experience manufacturing similar products.
  - 2. Installer: A minimum of 2 years experience installing similar products.
- B. Roof Hatches:
  - 1. Manufacturer's Quality System: Registered to ISO 9001 Quality Standards including in-house engineering for product design activities.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original unopened packaging.
- B. Storage and Protection:
  - 1. Store materials in a protected area away from construction activities.
  - 2. Clean bolts that have become dirty before installing.
  - 3. Do not install damaged materials, removing them from site.

#### 1.9 WARRANTY

- A. Roof Hatches and Safety Accessories Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five (5) years from the date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Wind-Restraint Performance: As indicated on Drawings.
- C. Roof Hatches:
  - 1. The cover and the curb layers shall have a "Homogeneous Section" U-Value of not greater than 0.049 BTU/(ft<sup>2</sup>hrF), tested on a vent size of 3'-0" x 2'-6".

### 2.2 ROOF HATCHES

- A. Roof Hatches: Pre-manufactured, thermally broken metal roof-hatch units with lids and insulated curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, straight sides, and integrally formed deck-mounting flange at perimeter bottom.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. BILCO Company (The), Type SS-50TB.
    - b. ACUDOR Products, Inc.
    - c. O'Keeffe's Inc.
    - d. Precision Ladders, LLC.
    - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Type and Size: Single-leaf lid, 30 by 36 inches. Lid shall be hinged on the 36 inch side of the assembly.
- C. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.
- D. Construction:
  - 1. Cover: 11 gauge aluminum with 5 inch beaded flange with formed reinforcing members.
    - a. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation.
    - b. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
  - 2. Curb: Lined in 11 gauge aluminum.

- a. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation.
    - b. The curb shall be formed with a 5-1/2 inch flange with 7/16 inch holes provided for securing to the roof deck.
    - c. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, that features the manufacturer's standard flashing system, including stamped tabs, 6 inches on center, to be bent inward to hold roofing membrane securely in place.
  3. Cover and Curb Insulation: 3-inch-thick, polyisocyanurate board.
    - a. R-Value: 20.3 according to ASTM C1363.
  4. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
  5. Fabricate curbs to minimum height of 12 inches above roofing surface unless otherwise indicated.
  6. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is tapered to accommodate roof slope so that top surfaces of perimeter curb are level. Equip hatch with water diverter or cricket on side that obstructs water flow.
  7. Finishes: Factory finish shall be mill finish aluminum.
- E. Hardware:
1. Lifting Mechanism: Compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing.
    - a. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly.
    - b. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.
  2. Cover installed with spring latch with interior and exterior turn handles.
  3. Stainless steel pintle-type hinge system.
  4. Interior and exterior padlock hasps.
  5. Latch strike shall be a stamped component bolted to the curb assembly.
  6. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1 inch diameter red vinyl grip handle to permit easy release for closing.
  7. All hardware shall be zinc plated and chromate sealed.
  8. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- F. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder. Post to be fastened to the top two rungs of the roof access ladder with adjustable mounting channel.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

- a. Bilco LU-1.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
2. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
  3. Stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post.
  4. Extended Height: 42 inches above finished roof deck.
  5. Material: Steel square tube.
  6. Pull up loop installed at the top of the post.
  7. Finish: Manufacturer's standard baked enamel or powder coat.
- a. Color: As selected by Architect from manufacturer's full range.

## 2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Flashing with one EPDM gasket seal top and base.
  1. Seamless Spun Aluminum Flashing: ASTM B221; Type 6061-T6 alloy.
  2. Stainless Steel: Type 304.
- C. Polyisocyanurate Board Insulation: ASTM C1289, thickness and thermal resistivity as indicated.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
- E. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
  1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153/A153M or ASTM F2329.
  2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
- F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- G. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- H. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

## 2.4 FABRICATION

- A. Fabricate work true to dimension, square, plumb, level, and free from distortion or defects detrimental to appearance and performance.
- B. Grind off surplus welding material to ensure exposed surfaces are smooth so as not to abrade workers' ropes.
- C. Welding shall be in accordance with the AWS Structural Welding Code D1.1/D1.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
  - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
  - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
  - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
  - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Roof Hatches:
  - 1. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
  - 2. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
  - 3. Attach ladder-assist post according to manufacturer's written instructions.

### 3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.

- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

#### 3.4 ADJUSTING

- A. Verify that completed work has been installed correctly and products function properly. Make adjustments where needed to ensure satisfactory operation.

END OF SECTION 077200



## SECTION 078413 - PENETRATION FIRESTOPPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Penetration firestopping systems for the following applications:

- a. Penetrations in fire-resistance-rated walls.

- B. Related Requirements:

- 1. Section 078443 "Joint Firestopping" for joints in or between fire-resistance-rated construction.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

## 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

## 1.9 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
  - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
      - 1) UL in its "Fire Resistance Directory."

### 2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. 3M Fire Protection Products.
    - b. Hilti, Inc. (Basis of Design).
    - c. Tremco, Inc.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
    1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
  - C. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
    1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
  - D. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
  - E. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
    1. Permanent forming/damming/backing materials.
    2. Substrate primers.
    3. Collars.
    4. Steel sleeves.
- 2.3 FILL MATERIALS
- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
  - B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
  - C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
  - D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

## 2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.

2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
  3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

### 3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
  2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."

2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

### 3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified Special Inspector to perform tests and inspections according to ASTM E2174.
  1. Test and inspect as required by the IBC 2018, Subsection 1705.17, "Fire-Resistant Penetrations and Joints."
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.
- D. Manufacturer's Field Services: Contractor to ensure a manufacturer's direct representative is on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. Training will be done per manufacturer's written recommendations published in their literature and drawing details. During installation, contractor shall have manufacturer's representative provide periodic visual observations and written documentation of the results.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

### 3.7 PENETRATION FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under "Firestop Systems."

- C. Where FM Approval-approved systems are indicated, they refer to design numbers listed in FM Approval's "Approval Guide" under "Wall and Floor Penetration Fire Stops."
- D. Concrete and CMU Walls:
1. Penetration Firestopping Systems with No Penetrating Items:
    - a. UL-Classified Systems: C-AJ-0090, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
    - b. UL-Classified Systems: C-AJ-0009, 3M CP25WB Forming and Caulk System.
    - c. Or approved equal.
      - 1) Assembly Rating: Up to 2 hours.
  2. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing:
    - a. UL-Classified Systems: C-AJ-1226, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
    - b. UL-Classified Systems: CA-J-1001, 3M CP25WB Forming and Caulk System.
    - c. Or approved equal.
      - 1) Assembly Rating: Up to 2 hours.
      - 2) Nominal Joint Width: 1/4 inches.
      - 3) L-Rating at Ambient: Less than 1 cfm/ft.
      - 4) L-Rating at 400 Deg F: 4 cfm/ft.
  3. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing:
    - a. UL-Classified Systems: C-AJ-2167, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
    - b. UL-Classified Systems: CA-J-2299, 3M CP25WB Forming and Caulk System.
    - c. Or approved equal.
      - 1) Assembly Rating: Up to 2 hours.
      - 2) Nominal Joint Width: 1/2 inches.
  4. Penetration Firestopping Systems for Electrical Cables:
    - a. UL-Classified Systems: C-AJ-3216, Hilti CFS-PL Firestop Plug or CFS-SL-SK Firestop Sleeve Kit.
    - b. UL-Classified Systems: C-AJ-3021 3M MPS-2 Putty or C-AJ-3339 3M Fire Barrier PLG2 or PLG4 Plug.
    - c. Or approved equal.
      - 1) Assembly Rating: Up to 2 hours.
  5. Penetration Firestopping Systems for Cable Trays with Electric Cables:
    - a. UL-Classified Systems: C-AJ-4094, Hilti CFS-BL Firestop Block.
    - b. UL-Classified Systems: C-AJ-4056 3M MP+ Putty or Cable Wrap with 3M Fire Barrier Self-Locking Pillows.

- c. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
- 6. Penetration Firestopping Systems for Insulated Pipes:
  - a. UL-Classified Systems: C-AJ-5091, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. UL-Classified Systems: C-AJ-5001 3M CP25WB Forming and Caulk System
  - c. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 1/2 inches.
    - 3) L-Rating at Ambient: 4 cfm/ft.
    - 4) L-Rating at 400 Deg F: Less than 1 cfm/ft.
- 7. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants:
  - a. UL-Classified Systems: C-AJ-7111, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. UL-Classified Systems: C-AJ-7076 3M CP25WB Forming and Caulk System.
  - c. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 2 inches maximum.
  - d. Mineral Wool Forming Material (See Section 072100).
- 8. Penetration Firestopping Systems for Ductwork:
  - a. UL-Classified Systems: W-J-7022, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 1-1/2 inches maximum.
- 9. Penetration Firestopping Systems for Groupings of Penetrants:
  - a. UL-Classified Systems: C-AJ-8143, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. UL-Classified Systems: C-AJ-8231 3M CP25WB Forming and Caulk System
  - c. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
  - d. Mineral Wool Forming Material (See Section 072100).
- E. Gypsum Walls:
  - 1. Penetration Firestopping Systems with No Penetrating Items:



- a. UL-Classified Systems: W-L-0030, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
  - c. Mineral Wool Forming Material (See Section 072100).
2. Penetration Firestopping Systems for Metallic Pipes, Conduit, or Tubing:
  - a. UL-Classified Systems: W-L-1054, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 2 inches.
    - 3) L-Rating at Ambient: Less than 1 cfm/ft.
    - 4) L-Rating at 400 Deg F: Less than 1 cfm/ft.
3. Penetration Firestopping Systems for Nonmetallic Pipe, Conduit, or Tubing:
  - a. UL-Classified Systems: W-L-2474, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 5/8 inches.
    - 3) L-Rating at Ambient: Less than 1 cfm/ft.
    - 4) L-Rating at 400 Deg F: 4 cfm/ft.
4. Penetration Firestopping Systems for Electrical Cables:
  - a. UL-Classified Systems: W-L-3065, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 5/8 inches.
    - 3) L-Rating at Ambient: 15 cfm/ft.
    - 4) L-Rating at 400 Deg F: 8 cfm/ft.
  - c. Mineral Wool Forming Material (See Section 072100).
5. Penetration Firestopping Systems for Cable Trays with Electric Cables:
  - a. UL-Classified Systems: WL-4060, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 1/2 inches.

- c. Mineral Wool Forming Material (See Section 072100).
- 6. Penetration Firestopping Systems for Insulated Pipes:
  - a. UL-Classified Systems: W-L-5029, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 1/2 inches.
    - 3) L-Rating at Ambient: 4 cfm/ft.
    - 4) L-Rating at 400 Deg F: Less than 1 cfm/ft.
- 7. Penetration Firestopping Systems for Miscellaneous Mechanical Penetrants:
  - a. UL-Classified Systems: W-L-8141, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 1/2 inches.
    - 3) L-Rating at Ambient: Less than 1 cfm/ft.
    - 4) L-Rating at 400 Deg F: Less than 1 cfm/ft.
- 8. Penetration Firestopping Systems for Ductwork:
  - a. UL-Classified Systems: W-L-7155, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
    - 2) Nominal Joint Width: 2 inches.
    - 3) L-Rating at Ambient: Less than 1 cfm/ft.
    - 4) L-Rating at 400 Deg F: Less than 1 cfm/ft.
  - c. Mineral Wool Forming Material (See Section 072100).
- 9. Penetration Firestopping Systems for Groupings of Penetrants:
  - a. UL-Classified Systems: W-L-8079, Hilti FS-ONE-MAX Intumescent Firestop Sealant.
  - b. Or approved equal.
    - 1) Assembly Rating: Up to 2 hours.
  - c. Mineral Wool Forming Material (See Section 072100).

END OF SECTION 078413

## SECTION 078443 - JOINT FIRESTOPPING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Joints in or between fire-resistance-rated constructions.

- B. Related Requirements:

- 1. Section 078413 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and for wall identification.
  - 2. Section 092216 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Approvals according to FM Approvals 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

## 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

## 1.9 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
  - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
      - 1) UL in its "Fire Resistance Directory."
      - 2) Intertek Group in its "Directory of Listed Building Products."

### 2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Hilti, Inc. (Basis of Design).
    - b. 3M Fire Protection Products.
    - c. Rockwool International.
    - d. Thermafiber, Inc.
    - e. Tremco.
    - f. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- C. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.
  - 1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- D. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
- E. Accessories: Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning: Before installing joint firestopping systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
  - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
  - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.

3. Remove laitance and form-release agents from concrete.

- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

### 3.3 INSTALLATION

- A. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:
1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

### 3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified Special Inspector to perform tests and inspections according to ASTM E2393.

1. Test and inspect as required by the IBC 2018, Subsection 1705.17, "Fire-Resistant Penetrations and Joints."
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.
- D. Manufacturer's Field Services: Contractor to ensure a manufacturer's direct representative is on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. Training will be done per manufacturer's written recommendations published in their literature and drawing details. During installation, contractor shall have manufacturer's representative provide periodic visual observations and written documentation of the results.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

END OF SECTION 078443

## SECTION 079200 - JOINT SEALANTS

### 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. Non-staining silicone joint sealants.
  - 2. Urethane joint sealants.
  - 3. Mildew-resistant joint sealants.
  - 4. Butyl joint sealants.

- B. Preinstallation Conference: Conduct conference at Project site.

- C. Related Requirements:

- 1. Section 040120.63 "Brick Masonry Repair" for sealant requirements for masonry repointing and repair.
  - 2. Section 072500 "Weather Barriers" for sealants used as part of the Weather Barrier system.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.

- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

- D. Joint-Sealant Schedule: Include the following information:

- 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.



#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- C. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- D. Field-Adhesion-Test Reports: For each sealant application tested.
- E. Sample Warranties: For special warranties.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
  - 1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

#### 1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
  - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
  - 2. Conduct field tests for each kind of sealant and joint substrate.
  - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
  - 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
    - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
      - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

#### 1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
  2. When joint substrates are wet.
  3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

#### 1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period for Silicone Sealants: Twenty (20) years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
  1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  2. Disintegration of joint substrates from causes exceeding design specifications.
  3. Mechanical damage caused by individuals, tools, or other outside agents.
  4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

## PART 2 - PRODUCTS

### 2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content: Verify sealants and sealant primers comply with the following:
  - 1. Architectural sealants have a VOC content of 250 g/L or less.
  - 2. Sealants and sealant primers for nonporous substrates have a VOC content of 250 g/L or less.
  - 3. Sealants and sealant primers for porous substrates have a VOC content of 775 g/L or less.
  - 4. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Verify formaldehyde emissions do not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
- D. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Tremco Commercial Sealants & Waterproofing (basis of design).
  - 2. Pecora.
  - 3. Sika.
  - 4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

### 2.2 NON-STAINING SILICONE JOINT SEALANTS

- A. Non-staining Joint Sealants: No staining of substrates when tested according to ASTM C1248.
- B. Silicone, Non-staining, S, NS, 50, NT: Non-staining, single-component, non-sag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

### 2.3 URETHANE JOINT SEALANTS

- A. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 50, Uses T and NT.

## 2.4 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, non-sag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

## 2.5 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants: ASTM C1311.

## 2.6 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Non-staining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Tremco Commercial Sealants & Waterproofing.
    - b. Or approved equal.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.
  - 4. Provide flush joint profile at locations indicated on Drawings according to Figure 8B in ASTM C1193.
  - 5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C1193.
    - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

### 3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
  - 1. Extent of Testing: Test completed and cured sealant joints as follows:

- a. Perform five (5) tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
    - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
  2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
    - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
  3. Inspect tested joints and report on the following:
    - a. Whether sealants filled joint cavities and are free of voids.
    - b. Whether sealant dimensions and configurations comply with specified requirements.
    - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
  4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
  5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.
- 3.5 CLEANING
- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- 3.6 PROTECTION
- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage

or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### 3.7 JOINT-SEALANT SCHEDULE

#### A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces JS-1.

##### 1. Joint Locations:

- a. Isolation and contraction joints in cast-in-place concrete slabs.
- b. Other joints as indicated on Drawings.

##### 2. Joint Sealant: Urethane, M, P, 50, T, NT: Tremco Vulkem 445SSL.

#### B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces JS-2.

##### 1. Joint Locations:

- a. Construction joints in cast-in-place concrete.
- b. Control and expansion joints in unit masonry and cast stone masonry.
- c. Joints between different materials listed above.
- d. Perimeter joints between materials listed above and frames of doors and windows.
- e. Control and expansion joints in ceilings and other overhead surfaces.
- f. Other joints as indicated on Drawings.

##### 2. Joint Sealant: Silicone, non-staining, S, NS, 50, NT: Tremco Spectrem 1.

#### C. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces JS-3.

##### 1. Joint Locations:

- a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
- b. Other joints as indicated on Drawings.

##### 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT: Tremco Tremsil 200.

#### D. Joint-Sealant Application: Concealed mastics JS-4.

##### 1. Joint Locations:

- a. Aluminum thresholds.
- b. Sill plates.
- c. Other joints as indicated on Drawings.

##### 2. Joint Sealant: Butyl-rubber based: Tremco TremPro 651.

END OF SECTION 079200



## SECTION 079219 - ACOUSTICAL JOINT SEALANTS

### 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. Acoustical joint sealants.
  - 2. Acoustical joint tapes.
  - 3. Acoustical sealant at electrical and data boxes.
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for non-acoustical applications.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of acoustical joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Acoustical-Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by a qualified testing agency.
- B. Sample Warranties: For special warranties.

## 1.5 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

### 2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for partitions that have gypsum wall boards rigidly attached to framing at NON-FIRE RATED assemblies. Sealant to be non-sag, paintable, non-staining latex sealant complying with ASTM C834, ASTM C919.
  - 1. Hilti CP-506 Smoke and Acoustic Sealant, or approved equal.
  - 2. Performance Criteria:
    - a. Movement: +/- 12.5% as tested per ASTM C719 or ISO 11600.
    - b. Sealant has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
    - c. Sealant is mold and mildew resistant per ASTM G21 with a rating of zero (0), "no growth".
- B. Acoustical Sealant for partitions that have gypsum wall boards rigidly attached to framing at FIRE RATED assemblies. Sealant to be non-sag, paintable, non-staining latex sealant complying with ASTM C834, ASTM C919.
  - 1. 3M Fire Barrier Sealant FD 150+ Sealant, or approved equal.
  - 2. Performance Criteria:
    - a. Movement: +/- 12.5% as tested per ASTM C719 or ISO 11600.
    - b. Sealant has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
    - c. Sealant is mold and mildew resistant per ASTM G21 with a rating of less than 10% growth.

- C. Acoustical Sealant for partitions that have gypsum wall boards attached to framing such as resilient sound isolation clips, resilient channels, spring hangers, at NON-FIRE RATED and FIRE-RATED assemblies. Sealant to be non-sag, paintable, non-staining latex sealant complying with ASTM C834.
1. USG Sheetrock Acoustic Sealant, or approved equal.
  2. Performance Criteria:
    - a. Movement: +/- 25% as tested per ASTM C719.
    - b. Sealant has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
- D. Acoustical Sealant for partitions that have gypsum wall boards attached to framing such as resilient sound isolation clips, resilient channels, spring hangers, at FIRE-RATED assemblies. Sealant to be non-sag, paintable, non-staining latex sealant complying with ASTM C834.
1. SikaFlex 15LM Acoustic Sealant, or approved equal.
  2. Performance Criteria:
    - a. Movement: +100/-50% as tested per ASTM C719.
    - b. Sealant has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
- E. Acoustical Sealant for all locations where penetrations exceed 1/2 inch. Sealant to be non-sag, non-staining latex sealant complying with ASTM C834, ASTM C919.
1. Hilti Firestop Putty Stick CP 618 Sealant, or approved equal.
    - a. Provide manufacturer's recommended backer rod behind sealant.
  2. Performance Criteria:
    - a. Sealant has flame-spread and smoke-developed ratings of less than 25 as tested in accordance with ASTM E84.
    - b. Sealant is mold and mildew resistant per ASTM G21 with a rating of zero (0), "no growth".
    - c. VOC Content: Less than 10 g/L.
    - d. Acoustically tested according to ASTM E90.
  3. Penetrations may include, but are not limited to:
    - a. Steel framing.
    - b. Pipe.
    - c. Conduit.
    - d. Ductwork.
- F. Acoustical Sealant at electrical and data boxes at non-rated and rated wall assemblies.
1. Kinetics Noise Control IsoBacker Acoustical Outlet Backer Pad, or approved equal.
  2. Performance Criteria:

- a. Thickness: 1/8 inch minimum.
- b. Acoustical Firestop System installation must meet requirements of ASTM E-814, UL 1479 and ASTM E-119, UL 263 tested assemblies that provide a fire rating equal to that of construction being penetrated.
- c. Outlet box inserts are not an acceptable substitution.

## 2.3 ACOUSTICAL JOINT TAPES

- A. Acoustical Perimeter Isolation Closed-cell Polyethylene Foam Tape at the intersection of walls and ceilings, holding back the ceiling system from the perimeter walls to allow for the installation of the tape.
  1. Kinetics CPT Ceiling Perimeter Tape with peel off liner, or approved equal.
  2. Performance Criteria:
    - a. Tensile Strength: 44 psi.
    - b. Elongation: 150% to break.
    - c. Compression Strength: 7 psi at 25% deflection.

## 2.4 ACOUSTICAL SOUND BOXES

- A. Recessed Light Isolation Box installed over recessed light fixtures in ceilings. Factory manufactured MDF box with fully sealed with acoustical sealant, Type X gypsum board interior and hole for electrical wiring.
  1. IsoStore Quietbox, or approved equal.
  2. Performance Criteria:
    - a. UL Compliant.

## 2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- D. At electrical and data boxes on opposite sides of a walls, boxes are required to be installed at least 16 inches apart and one stud cavity apart.

### 3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.
- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
- D. Electrical and Data Boxes: Seal all five sides of the back boxes using moldable sound insulation putty pads. Follow manufacturer's installation instructions.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

## SECTION 079513.13 - INTERIOR EXPANSION JOINT COVER ASSEMBLIES

### 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 interior expansion joint cover assemblies.
- B. Related Requirements:
  - 1. Section 079513.16 "Exterior Expansion Joint Cover Assemblies".

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.
- B. Shop Drawings: For each expansion joint cover assembly.
  - 1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
  - 2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- C. Samples: For each expansion joint cover assembly and for each color and texture specified, full width by 6 inches long in size.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Installer Qualifications.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Approved by manufacturer and having experience installing joint systems that are similar in design complexity.
- B. Source Limitations: Obtain all architectural joint systems through one source from a single manufacturer.

1.6 DELIVERY AND STORAGE

- A. Manufacturer to provide protective film on all exposed cover plate components.
- B. Deliver joint systems to jobsite in new, clean, unopened cartons or crates of sufficient size and strength to protect materials during transit.
- C. Inspect materials upon arrival. Store components in original containers in a clean, dry location. Ensure temperature or moisture sensitive components are stored in a tempered location.
- D. Contractor to provide temporary protective covers on all installed finished surfaces. Protection is required to guard against both surface abrasions as well as overloading of horizontal deck components by construction traffic.

1.7 WARRANTY

- A. Provide manufacturer's warranty against material and manufacturing defects for a period of not less than five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Furnish units in longest practicable lengths to minimize field splicing.
- B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 FLOOR EXPANSION JOINT COVERS

- A. Elastomeric-Seal Floor Joint Cover: Assembly consisting of elastomeric seal anchored to frames fixed to sides of joint gap.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Construction Specialties, Inc., Model GFS Series.
    - b. Inpro, 104 Series Joint Covers.
    - c. Nystrom, LCFS Series.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - 2. Nominal Joint Width: As indicated on Drawings.
  - 3. Application: Floor to floor, floor to wall.
  - 4. Installation: Surface mounted.
  - 5. Load Capacity, Standard Duty, traffic surfaces:



- a. Uniform Load: 50 lb./sq. ft.
  - b. Concentrated Load: 300 lb.
  - c. Maximum Deflection: 0.0625 inch.
6. Exposed Metal:
  - a. Aluminum: Class II, clear anodic.
7. Seal: Preformed elastomeric membrane or extrusion, thermoplastic rubber. Gaskets to be dual durometer and have a flat profile that is free of ridges/reveals that collect dirt.
  - a. Color: As selected by Architect from manufacturer's full range.

## 2.3 WALL EXPANSION JOINT COVERS

- A. Elastomeric-Flat Seal Wall and Ceiling Joint Cover: Assembly consisting of elastomeric seal anchored to frames fixed to sides of joint gap.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Construction Specialties, Inc., Model FWF Series.
    - b. Inpro, 113 Series Joint Covers.
    - c. Nystrom, LCW Series.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  2. Application: Wall to wall flat and corner.
  3. Surface mounted, mounting flanges concealed behind gypsum board joint compound.
  4. Fire-Resistance Rating: Not less than that indicated on Drawings.
  5. Exposed Metal:
    - a. Aluminum: Class II, clear anodic.
  6. Seal: Preformed elastomeric membranes or extrusions.
    - a. Color: As selected by Architect from manufacturer's full range.

## 2.4 CEILING EXPANSION JOINT COVERS

- A. Elastomeric-Flat Seal Ceiling Joint Cover: Assembly consisting of elastomeric seal anchored to frames fixed to sides of joint gap.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Construction Specialties, Inc., Model FCF Series.
    - b. Inpro, 116 Series Joint Covers.
    - c. Nystrom, LCA Series.

- d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- 2. Application: Ceiling to ceiling, ceiling to wall.
- 3. Surface mounted.
- 4. Fire-Resistance Rating: Not less than that indicated on Drawings.
- 5. Exposed Metal:
  - a. Aluminum: Class II, clear anodic.
- 6. Seal: Preformed elastomeric membranes or extrusions.
  - a. Color: As selected by Architect from manufacturer's full range.

## 2.5 MATERIALS

- A. Aluminum: ASTM B221, Alloy 6063-T5 for extrusions; ASTM B209, Alloy 6061-T6 for sheet and plate.
  - 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
- B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.
- C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.
- D. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

## 2.6 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

## 2.7 ACCESSORIES

- A. Manufacturer's stainless-steel attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.
- B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

### 3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.
- B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
  - 1. Repair or grout block out as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
  - 2. Install frames in continuous contact with adjacent surfaces.
    - a. Shimming is not permitted.
  - 3. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
  - 4. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
  - 5. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.

6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.
- C. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
  1. Provide in continuous lengths for straight sections.
  2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
  3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
- E. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.
- F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.
  1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

#### 3.4 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion joint cover assemblies. Reinstall cover plates or seals prior to Substantial Completion.

END OF SECTION 079513.13

## SECTION 079513.16 - EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

### 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 exterior expansion joint covers.
- B. Related Requirements:
  - 1. Section 079513.13 "Interior Expansion Joint Cover Assemblies".

#### 1.3 DEFINITIONS

- A. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for expansion joint cover assemblies.
- B. Shop Drawings: For each expansion joint cover assembly.
  - 1. Include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams showing entire route of each expansion joint.
  - 2. Where expansion joint cover assemblies change planes, provide isometric or clearly detailed drawing depicting how components interconnect.
- C. Samples: For each exposed expansion joint cover assembly and for each color and texture specified, full width by 6 inches long in size.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each fire-resistance-rated expansion joint cover assembly, for tests performed by manufacturer and witnessed by a qualified testing agency.
- B. Installer Qualifications.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Approved by manufacturer and having experience installing joint systems that are similar in design complexity.
- B. Source Limitations: Obtain all architectural joint systems through one source from a single manufacturer.

1.7 DELIVERY AND STORAGE

- A. Manufacturer to provide protective film on all exposed cover plate components.
- B. Deliver joint systems to jobsite in new, clean, unopened cartons or crates of sufficient size and strength to protect materials during transit.
- C. Inspect materials upon arrival. Store components in original containers in a clean, dry location. Ensure temperature or moisture sensitive components are stored in a tempered location.
- D. Contractor to provide temporary protective covers on all installed finished surfaces. Protection is required to guard against both surface abrasions.

1.8 WARRANTY

- A. Provide manufacturer's warranty against material and manufacturing defects for a period of not less than five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Furnish units in longest practicable lengths to minimize field splicing.
- B. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E1966 by a qualified testing agency.
  - 1. Hose Stream Test: Wall-to-wall and wall-to-soffit assemblies shall be subjected to hose stream testing.

## 2.3 EXTERIOR EXPANSION JOINT COVERS

- A. Preformed Foam Joint Seals: Manufacturer's standard joint seal manufactured from silicone. Factory produce in pre-compressed sizes in roll or stick form to fit joint widths based on design criteria indicated, with factory- or field-applied adhesive for bonding to substrates.
  - 1. Nominal Joint Width: As indicated on Drawings.
  - 2. Joint Seal Color: As selected by Architect from manufacturer's full range.
  - 3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Construction Specialties, Inc., Model VF Series.
    - b. Inpro, 1200 Series Foam Seals.
    - c. Willseal, Colour Coreseal V.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.4 MATERIALS

- A. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to comply with performance criteria for required fire-resistance rating.
- B. Compression Seals: ASTM D2000; preformed rectangular elastomeric extrusions having internal baffle system and designed to function under compression.

## 2.5 ACCESSORIES

- A. Manufacturer's standard attachment devices. Include anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine surfaces where expansion joint cover assemblies will be installed for installation tolerances and other conditions affecting performance of the Work.
- B. Notify Architect where discrepancies occur that will affect proper expansion joint cover assembly installation and performance.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion joint cover assemblies.

### 3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.
- B. Preformed Foam Joint Seals: Install in compliance with manufacturer's written instructions. Install with minimum number of end joints.
  - 1. Install each length of seal immediately after removing protective wrapping.
  - 2. Firmly secure compressed joint seals to joint gap side to obtain full bond using exposed pressure-sensitive adhesive or field-applied adhesive as recommended by manufacturer.
  - 3. Do not pull or stretch material. Produce seal continuity at splices, ends, turns, and intersections of joints.
  - 4. For applications at low ambient temperatures, heat foam joint seal material in compliance with manufacturer's written instructions.
- C. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
- D. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.
- E. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.
  - 1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

### 3.4 CONNECTIONS

- A. Transition to Roof Expansion Joint Covers: Coordinate installation of exterior wall and soffit expansion joint covers with roof expansion joint covers as part of the roofing assembly.

### 3.5 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect the installation from damage by work of other Sections.



END OF SECTION 079513.16

## SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes:
  - 1. Interior standard steel doors and frames.
  - 2. Exterior standard steel doors and frames.
  - 3. Borrowed lites.
- B. Related Requirements:
  - 1. Section 081416 "Flush Wood Doors".
  - 2. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
  - 3. Section 088000 "Glazing" for glazing types.
  - 4. Section 099123 "Interior Painting".

#### 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

#### 1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
7. Details of anchorages, joints, field splices, and connections.
8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly and thermally rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.

1.7 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Ceco Door; ASSA ABLOY.
  - 2. Curries Company; ASSA ABLOY.
  - 3. Republic Doors and Frames.
  - 4. Steelcraft; an Allegion brand.
  - 5. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

### 2.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.
  - 1. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch.
    - d. Edge Construction: Model 1, Full Flush.
    - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
    - f. Core: Manufacturer's standard.
    - g. Fire-Rated Core: Manufacturer's standard vertical steel stiffener core for fire-rated doors.
    - h. Reinforced as required for door hardware.
    - i. At STC rated assemblies identified on the drawings, provide a door with a tested STC rating of 40 minimum.

- 2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch.
- b. Sidelite Frames: Fabricated from same thickness material as adjacent door frame.
- c. Construction: Full profile welded.
- d. Reinforced as required for door hardware.

3. Exposed Finish: Prime.

## 2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.

### 1. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches.
- c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
- d. Edge Construction: Model 1, Full Flush.
- e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
- f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
- g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
- h. Core: Manufacturer's standard.

### 2. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
- b. Construction: Full profile welded.
- c. Thermally broken frames:
  - 1) Thermally Rated Frame Assemblies: U-factor of not more than 0.38 deg Btu/F x h x sq. ft. when tested according to ASTM C518.

3. Exposed Finish: Factory primed, field painted.

## 2.5 BORROWED LITES

- A. Fabricate of uncoated steel sheet, minimum thickness of 0.053 inch.
- B. Construction: Full profile welded.
- C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide

alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

- D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
- E. Exposed Finish: Factory primed, field painted.

## 2.6 FRAME ANCHORS

### A. Jamb Anchors:

- 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
- 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
- 3. Post-installed Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

### B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

### C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

### D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

- 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

## 2.7 MATERIALS

### A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

### B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

### C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

### D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.

### E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Glazing: Comply with requirements in Section 088000 "Glazing."

## 2.8 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
  - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 2. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- B. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
  - 1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
  - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.
  - 1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
  - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

3. Where continuous hinges are scheduled at an opening, frames shall be custom prepped in the factory to accommodate thickness of hardware and space for the hardware to operate properly.
- E. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
  4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
  5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

## 2.9 LOUVERS

- A. Provide louvers for interior doors and frames, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades.
- B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

## 2.10 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- B. Field Finish: Refer to Sections 099113 and 099123 for finish paint systems and requirements.
1. Color and Gloss: As indicated on drawings, semi-gloss finish.



## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

### 3.2 INSTALLATION

- A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
    - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    - b. Install frames with removable stops located on secure side of opening.
  - 2. Fire-Rated Openings: Install frames according to NFPA 80.
  - 3. Floor Anchors: Secure with post-installed expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
  - 4. Solidly pack mineral-fiber insulation inside frames.
  - 5. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  - 6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

### 3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

## SECTION 081416 - FLUSH WOOD DOORS

### 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. Five-ply flush wood veneer-faced doors for transparent finish.
  - 2. Factory finishing flush wood doors.
  - 3. Factory fitting flush wood doors to frames and factory machining for hardware.

- B. Related Requirements:

- 1. Section 081113 "Hollow Metal Doors and Frames".
  - 2. Section 087100 "Door Hardware".
  - 3. Section 088000 "Glazing" for glass view panels in flush wood doors.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including the following:

- 1. Door core materials and construction.
  - 2. Door edge construction
  - 3. Door face type and characteristics.
  - 4. Door frame construction.
  - 5. Factory-machining criteria.
  - 6. Factory- finishing specifications.

- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

- 1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
  - 2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
  - 3. Details of frame for each frame type, including dimensions and profile.
  - 4. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
  - 5. Dimensions and locations of blocking for hardware attachment.
  - 6. Dimensions and locations of mortises and holes for hardware.
  - 7. Clearances and undercuts.

8. Requirements for veneer matching.
9. Doors to be factory finished and application requirements.
10. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples for Initial Selection: For factory-finished doors.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
3. Frames for light openings, 6 inches long, for each material, type, and finish required.

#### 1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

A. Special warranties.

B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

#### 1.6 QUALITY ASSURANCE

A. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

#### 1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

## 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Delamination of veneer.
    - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain flush wood doors from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C.

### 2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WT's "Architectural Woodwork Standards."
  - 1. Provide labels and certificates from AWI certification program indicating that doors comply with requirements of grades specified.
    - a. Contractor shall register the Work under this Section with the AWI Quality Certification Program at [www.awiqcp.org](http://www.awiqcp.org) or by calling 855-345-0991.
  - 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

2.4 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Doors:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Graham.
  - b. Marshfield Doors.
  - c. Mohawk Doors.
  - d. VT Industries Inc. (Eggers).
  - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
3. Faces: Single-ply wood veneer not less than 1/50 inch thick.
  - a. Species: Select white birch.
  - b. Cut: Plain sliced (flat sliced).
  - c. Match between Veneer Leaves: Book match.
  - d. Assembly of Veneer Leaves on Door Faces: Running match.
  - e. Pair and Set Match: Provide for doors hung in same opening.
4. Thickness: 1-3/4 inch.
5. Exposed Vertical and Top Edges: Same species as faces - Architectural Woodwork Standards edge Type A.
  - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
6. Core for Non-Fire-Rated Doors:
  - a. ANSI A208.1, Grade LD-1 particleboard.
    - 1) Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.
  - b. Glued wood stave.
  - c. WDMA I.S. 10 structural composite lumber.
    - 1) Screw Withdrawal, Door Face: 475 lbf.
    - 2) Screw Withdrawal, Vertical Door Edge: 475 lbf.
  - d. Either glued wood stave or WDMA I.S. 10 structural composite lumber.
7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.

- a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

## 2.5 LIGHT FRAMES

- A. Metal Frames for Light Openings in Fire-Rated Doors and Non-Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated on Drawings.

## 2.6 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
  1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
  1. Locate hardware to comply with DHI-WDHS-3.
  2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
  3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
  4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
  5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
  6. Where continuous hinges are scheduled at an opening, frames shall be custom prepped in the factory to accommodate thickness of hardware and space for the hardware to operate properly.
- C. Openings: Factory cut and trim openings through doors.
  1. Light Openings: Trim openings with moldings of material and profile indicated.
  2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."

## 2.7 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
  1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

2. Finish faces, all four edges, edges of cutouts, and mortises.
  3. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
1. Architectural Woodwork Standards Grade: Premium.
  2. Finish: Architectural Woodwork Standards System-11, Polyurethane, Catalyzed.
  3. Staining: As selected by Architect from manufacturer's full range.
  4. Effect: Open-grain finish.
  5. Sheen: Semigloss.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
1. Verify that existing door frames scheduled to receive doors and hardware are properly prepped to receive scheduled doors and hardware.
  2. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  3. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- C. Install fire-rated doors in accordance with NFPA 80 requirements.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

#### 3.3 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.



3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

## SECTION 083113 - ACCESS DOORS AND FRAMES

### 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. Access doors and frames.
  - 2. Fire-rated access doors and frames.
- B. Related Requirements:
  - 1. Section 099123 "Interior Painting".

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
1. Acudor (basis of design).
  2. MIFAB.
  3. Best Access Doors.
  4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:

1. Acudor Access Panels, UF-5000 Universal Access Door, or approved equal.
2. Description: Face of door flush with frame, with exposed flange and concealed continuous hinge.
3. Locations: Wall and ceiling, non-rated locations.
4. Door Size: 16 inches by 16 inches minimum; increase size as required for access.
5. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed, ready for field painting.
6. Frame Material: 18 gauge steel.
7. Latch and Lock: Cam latch, screwdriver operated.

## 2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Exposed Flanges:

1. Acudor Access Panels, FB-5060 Fire-rated Uninsulated Access Door, or approved equal.
2. Description: Door face flush with frame, uninsulated; with exposed flange, self-closing door, and concealed continuous hinge.
3. Locations: Wall and ceiling.
4. Door Size: 16 inches by 16 inches minimum; increase size as required for access.
5. Fire-Resistance Rating: Not less than 2 hours.
6. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed, ready for field painting.
7. Frame Material: 16 gauge steel.
8. Latch and Lock: Spring-loaded self-closing, self-latching door hardware; inside latch release; operated by knurled knob.
9. Removable door panel.

## 2.4 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
- C. Frame Anchors: Same material as door face.

- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

## 2.5 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
  - 1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
- D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.
- E. Latch and Lock Hardware:
  - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
  - 2. Keys: Furnish two keys per lock and key all locks alike.

## 2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
  - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

## SECTION 083323 - OVERHEAD COILING DOORS

### 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. Insulated service doors.
- B. Related Requirements:
  - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.
  - 2. Section 087100 "Door Hardware" for lock cylinders.
  - 3. Division 26 for electrical work to provide power to the door motor.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.
  - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
  - 1. Include plans, elevations, sections, and mounting details.
  - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
  - 4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
  - 5. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
  - 1. Include similar Samples of accessories involving color selection.

- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
1. Curtain slats.
  2. Curtain grilles.
  3. Bottom bar with sensor edge.
  4. Guides.
  5. Brackets.
  6. Hood.
  7. Locking device(s).
  8. Include similar Samples of accessories involving color selection.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Qualification Data: For Manufacturer.
- C. Certifications for Exterior Door Assembly:
1. Provide certification from an accredited testing laboratory of product compliance to an operational design wind load of 95 miles per hour.
  2. Provide certification from an accredited testing laboratory of product compliance that the assembly remains fully operational without any permanent deformation after being subjected to the specified operational design wind load.
- D. Sample Warranty from the Installer and Manufacturer, unexecuted, indicating terms and conditions of Warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors to include in maintenance manuals, describing the materials, devices, and procedures to be followed in operating and maintaining coiling doors in this Section. Include manufacturer's brochures and parts lists describing the actual materials used in the door assembly.
- B. Executed Warranty from the Installer and Manufacturer.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project. Installer shall have been in the business of and have experience in installing wide span opening protective door assemblies for a minimum of ten (10) years, and is an approved installer of the coiling door assembly.
- B. Manufacturer Qualifications: Manufacturer shall have been in the business of and have experience in manufacturing wide span opening protective door assemblies as well as providing dependable credible service for a minimum of ten (10) years.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials in manufacturer's original packaging, labeled to show name, brand and type. Store materials in a protected dry location off the ground in accordance with manufacturer's instructions.

1.8 WARRANTY

- A. Provide a two (2) year written warranty signed by the manufacturer and installer agreeing to repair or replace work which has failed as a result of defects in materials or workmanship. Upon notification within the warranty period, such defects shall be repaired at no cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
  - 1. Obtain operators and controls from overhead coiling door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
  - 1. Design Wind Load: As indicated on the Lateral Load Design Schedule shown on the Structural Drawings.
  - 2. Testing: According to ASTM E 330.
  - 3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
  - 4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward, as indicated on the Lateral Load Design Schedule shown on the Structural Drawings.

2.3 INSULATED SERVICE DOOR ASSEMBLY

- A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following
  - 1. McKeon Door Company, ClimateGuard Model IS3020D-M-PC (basis of design).
  - 2. Clopay, Commercial Steel Overhead Doors.
  - 3. Raynor, DuraCoil HP.
  - 4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.



- C. Operation Cycles: Door components and operators capable of operating for not less than 20,000 cycles. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- D. Air Infiltration: Maximum rate of 1.0 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283.
- E. Curtain R-Value: 9.0 deg F x h x sq. ft./Btu minimum.
- F. Door Curtain Material: Galvanized steel, front and back panels.
- G. Door Curtain Slats: Flat profile slats of 3-inch center-to-center height, 1-7/16 inch thick.
  - 1. Insulated-Slat Interior Facing: Metal.
  - 2. Slats shall have endlocks locking each end of all alternate slats to act as a wearing surface and maintain slat alignment.
  - 3. Front and back panel slats shall have positive interlock.
- H. Bottom Bar: Two angles, each not less than 2 by 2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.
- I. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- J. Hood: Match curtain material and finish.
  - 1. Shape: Square.
  - 2. Mounting: Face of wall.
- K. Locking Devices: Equip door with locking device assembly.
  - 1. Locking Device Assembly: inside and outside with cylinders.
- L. Electric Door Operator:
  - 1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.
  - 2. Operator Location: Front of hood.
  - 3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
  - 4. Motor Exposure: Interior.
  - 5. Emergency Manual Operation: Crank type.
  - 6. Obstruction-Detection Device: Automatic electric sensor edge on bottom bar.
    - a. Sensor Edge Bulb Color: As selected by Architect from manufacturer's full range.
  - 7. Control Station(s): Interior mounted, at location as verified by the Owner.
- M. Curtain Accessories: Equip door with poll hook.
- N. Door Finish:
  - 1. Baked-Enamel or Powder-Coated Finish: Custom color.
  - 2. Interior Curtain-Slat Facing: Custom color.

## 2.4 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.5 MATERIALS AND CONSTRUCTION

### A. Insulated Service Door:

1. Fabricate door of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
  - a. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, with G90 (Z275) zinc coating; nominal sheet thickness (coated) of 20 gauge; and as required.
  - b. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84 or UL 723. Enclose insulation completely within slat faces.
2. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading.
  - a. 4" x 4" steel support angle.
  - b. 3" x 4" inner guide angle.
  - c. 4" x 4" outer guide angle.
  - d. Provide neoprene weather seals extending the full height of both guides.
  - e. Slot bolt holes for guide adjustment.
  - f. Provide removable stops on guides to prevent overtravel of curtain.

## 2.6 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
  1. Galvanized Steel: 22 gauge thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653.
  2. Exterior Door: Provide neoprene air baffle to minimize air infiltration at the head.

## 2.7 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
  - 1. Lock Cylinders: Cylinders specified in Section 087100 "Door Hardware" and keyed to building keying system.
  - 2. Keys: Two for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

## 2.8 CURTAIN ACCESSORIES

- A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
  - 1. At door head, use 1/8-inch- thick, replaceable, continuous-sheet baffle secured to inside of hood or field- installed on the header.
  - 2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch-thick seals of flexible vinyl, rubber, or neoprene.
- B. Poll Hooks: Provide pole hooks and poles for doors more than 84 inches high.
- C. Steel Framing, Tracks and Angles: Provide steel tube jamb supports, tracks, and angles as required for the support and operation of the coiling door assemblies. Steel to be finished as indicated below.

## 2.9 COUNTERBALANCING MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.
- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of hot-rolled 3/16 inch steel plate provided to house ends of counterbalance barrel assembly.

## 2.10 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
  - 1. Comply with NFPA 70.
  - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door Operator Location(s): Operator location indicated for each door.
  - 1. Top-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on top of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Headroom is required for this type of mounting.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.
  - 1. Electrical Characteristics:
    - a. Phase: Single phase.
    - b. Volts: 24 V.
    - c. Amps: 10A.
  - 2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
  - 3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
  - 4. Motor Size: 1/2 HP minimum size, or as large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel to the open position.
  - 1. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard wireless sensor and controller.

- a. Self-Monitoring Type: Four-wire configured device designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
  - 1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
  - 2. Coordinate location of the Control Station with the Owner prior to installation.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 30 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

## 2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.
- C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install according to UL 325.

### 3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Perform installation and startup checks according to manufacturer's written instructions.
  - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

### 3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
  - 1. Adjust exterior doors and components to be weather-resistant.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

### 3.5 PROTECTION AND CLEANING

- A. Protect installed Work using adequate and suitable means during and after installation until accepted by Owner.
- B. Remove, repair or replace materials which have been damaged in any way.
- C. Clean surfaces of grime and dirt using acceptable and recommended means and methods.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

## SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

### 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. Aluminum-framed storefront systems.
  - 2. Aluminum-framed entrance door systems.

- B. Related Requirements:

- 1. Section 074213.19 "Insulated Metal Wall Panels" for panels inserted within storefront assemblies.
  - 2. Section 085113 "Aluminum-Windows" for coordinating finish among aluminum fenestration units.
  - 3. Section 088000 "Glazing" for glazing units.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

- 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
  - 3. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
  - 4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
  - 5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.



1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum storefront assemblies.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
  2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Expansion provisions.
    - d. Glazing.
    - e. Flashing and drainage.
  3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
  4. Include point-to-point wiring diagrams showing the following:
    - a. Power requirements for each electrically operated door hardware.
    - b. Location and types of switches, signal device, conduit sizes, and number and size of wires.
- C. Samples for Initial Selection: For units with factory-applied finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
1. Exposed Finishes: 2 by 6 inches.
  2. Exposed Hardware: Full-size units.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
1. Joinery, including concealed welds.
  2. Anchorage.
  3. Expansion provisions.
  4. Glazing.
  5. Flashing and drainage.
- F. Product Schedule: For aluminum storefronts. Use same designations indicated on Drawings.
- G. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum storefronts that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to aluminum storefront manufacturer for installation of units required for this Project. Company specializing in performing work of type specified and with at least ten (10) years of documented experience.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  - 1. Build mockup of typical wall area as shown on Drawings.
  - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

## 1.9 FIELD CONDITIONS

- A. Field Measurements: Verify actual measurements of existing openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.
- B. Do not install sealants when ambient temperature is less than 40 degrees F.
- C. Maintain this minimum temperature during and 24 hours after installation of sealants.

## 1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to meet performance requirements including water leakage, condensation, and air infiltration.
    - b. Structural failures including, but not limited to, excessive deflection.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Deterioration of metals and other materials beyond normal weathering.
    - e. Water penetration through fixed glazing and framing areas.
    - f. Faulty operation of movable sash and hardware.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
    - c. Cracking, peeling, or chipping.
  - 2. Warranty Period (Anodized): Ten (10) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

- B. Manufacturer of the aluminum storefront system is required to match the manufacturer of the aluminum entrances and aluminum window systems.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
  - 1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  - 2. Failure also includes the following:
    - a. Thermal stresses transferring to building structure.
    - b. Glass breakage.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Loosening or weakening of fasteners, attachments, and other components.
    - e. Failure of operating units.
- B. Structural Loads:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings.
- C. Deflection of Framing Members Supporting Glass: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AA Specifications for Aluminum Structures, at design wind load, as follows:
  - 1. Without Horizontals:  $L/175$  or  $3/4"$  (19.1mm) maximum.
  - 2. With Horizontals:  $L/175$  or  $L/240 + 1/4"$  (6.4mm) for spans greater than 13'-6" (4.1m) but less than 40'-0" (12.2m).
  - 3. Deflection Normal to Wall Plane: Limited to  $1/175$  of clear span for spans of up to 13 feet 6 inches and to  $1/240$  of clear span plus  $1/4$  inch for spans greater than 13 feet 6 inches.
  - 4. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than  $1/8$  inch.
    - a. Operable Units: Provide a minimum  $1/16$ -inch clearance between framing members and operable units.
- D. Structural: Test according to ASTM E330/E330M as follows:
  - 1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Water Penetration under Static Pressure: Test according to ASTM E331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 12 lbf/sq. ft.
- F. Water Penetration under Dynamic Pressure: Test according to AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft.
  2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- G. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
1. Thermal Transmittance (U-factor):
    - a. Fixed Glazing and Framing Areas: U-factor for the system of not more than 0.38 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  2. Air Leakage:
    - a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft. when tested according to ASTM E283.
    - b. Entrance Doors: Air leakage of not more than 0.50 cfm/sq. ft. (single door) and 1.0 cfm/sq.ft. (double doors) at a static-air-pressure differential of 1.57 lbf/sq. ft.
  3. Condensation Resistance Factor (CRF):
    - a. Fixed Glazing and Framing Areas: CRF for the system of not less than 72 as determined according to AAMA 1503.
- H. Noise Reduction: Test according to AAMA 1801:
1. Outdoor-Indoor Transmission Class: Minimum 25 when tested with 1 inch insulated glass unit.
  2. Sound Transmission Class: Minimum 31 when tested with 1 inch insulated glass unit.
- I. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
  - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
  - b. Low Exterior Ambient-Air Temperature: 0 deg F.
  - c. Interior Ambient-Air Temperature: 75 deg F.

## 2.3 STOREFRONT SYSTEMS

- A. Aluminum-Framed Storefronts Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  1. YKK AP, YES 60XT Center Set Storefront System (basis of design).
  2. Kawneer, TriFab 601 Storefront System.
  3. EFCO, 406X Storefront System.
  4. Oldcastle, 6000XT Storefront System.
  5. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
  1. Exterior Framing Construction: Thermally broken.
  2. Interior Vestibule Framing Construction: Thermally broken.
  3. Glazing System: Retained mechanically with gaskets on four sides.
  4. Glazing Plane: Centered.
  5. 6 inch deep frame.
  6. 2 inch sightline.
  7. Finish: Clear anodic finish.
  8. Fabrication Method: Field-fabricated stick system.
  9. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  10. Steel Reinforcement: As required by manufacturer.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Venting Windows:
  1. As specified in Section 085113 "Aluminum Windows."

## 2.4 ENTRANCE DOOR SYSTEMS

- A. Aluminum Entrances Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
1. YKK AP Series 50D Wide Stile Swing Doors (basis of design).
  2. Kawneer, 500 Heavy Wall Wide Stile Swing Doors.
  3. EFCO, D502 Wide Stile Swing Doors.
  4. Oldcastle, WS-500 Wide Stile Swing Doors.
  5. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
  2. Door Design: Wide stile; 5-inch nominal width.
  3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
    - a. Provide nonremovable glazing stops on outside of door.
  4. Finish: Match adjacent storefront framing finish.
  5. Structural: Door corner structural strength shall be tested per manufacturer's test procedure and certified by an independent testing laboratory to ensure corner integrity and weld compliance. Certified test procedures and results are available upon request. Uniform Load Test: 60 psf.
  6. Forced Entry Resistance: 300 lbs. satisfactory.

## 2.5 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door, to comply with requirements in this Section.
1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
  2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
  3. Opening-Force Requirements:
    - a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.
    - b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

## 2.6 GLAZING

- A. Glazing: Comply with Section 088000 "Glazing."
- B. Glazing Gaskets: Comply with Section 088000 "Glazing."
- C. Glazing Sealants: Comply with Section 088000 "Glazing."

## 2.7 MATERIALS

- A. Extruded Aluminum: ASTM B221, 6063-T5 and 6063-T6 Aluminum Alloys.
- B. Sheet Aluminum: ASTM B209, 3003-H14 Aluminum Alloy, 0.080" minimum thickness.
- C. Thermal Barrier: Provide continuous thermal barrier by means of 6/6 nylon polyamide glass fiber reinforced pressure extruded bars.
- D. Sill Flashing with End Dams: 0.050 Aluminum with 3 point attachment. 2 inch back leg.
- E. Steel Reinforcement:
  - 1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
  - 2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
  - 3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
- F. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

## 2.8 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, nonbleeding flashing compatible with adjacent materials.



- D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.
- E. Rigid PVC Filler for support of backer rod and perimeter sealant installation.

## 2.9 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Physical and thermal isolation of glazing from framing members.
  - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 5. Provisions for field replacement of glazing from exterior.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
  - 1. At interior and exterior doors, provide compression weather stripping at fixed stops.
- E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
  - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
  - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.11 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written instructions.
- B. Do not install damaged components.
- C. Fit joints to produce hairline joints free of burrs and distortion.
- D. Rigidly secure nonmovement joints.
- E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- F. Seal perimeter and other joints watertight unless otherwise indicated.
- G. Metal Protection:
  - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
  - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

- I. Install joint filler behind sealant as recommended by sealant manufacturer.
- J. Install components plumb and true in alignment with established lines and grades.

### 3.3 INSTALLATION OF OPERABLE UNITS

- A. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

### 3.4 INSTALLATION OF GLAZING

- A. Install glazing as specified in Section 088000 "Glazing."

### 3.5 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

- A. Install entrance doors to produce smooth operation and tight fit at contact points.
  - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
  - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

### 3.6 ERECTION TOLERANCES

- A. Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
  - 1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
  - 2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
  - 3. Alignment:
    - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
    - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
    - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
  - 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

### 3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on mockups.

1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
    - a. Perform a minimum of two tests in areas as directed by Architect.
  2. Air Leakage: ASTM E783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
    - a. Perform a minimum of two tests in areas as directed by Architect.
  3. Water Penetration: ASTM E1105 at a minimum uniform static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.
- C. Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
- 3.8 ADJUSTING, CLEANING, AND PROTECTION
- A. Adjust operating units and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing storefronts and entrances. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect aluminum surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 084113

## SECTION 085113 - ALUMINUM WINDOWS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes aluminum windows for exterior locations.
- B. Related Requirements:
  - 1. Section 084113 "Aluminum-Framed Entrances and Storefronts" for coordinating finish among aluminum fenestration units.
  - 2. Section 088000 "Glazing" for glazing units.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 2. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
  - 3. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchoring, flashing, weeping, sealing perimeters, and protecting finishes.
  - 4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
  - 5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.
- B. Shop Drawings: For aluminum windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples for Initial Selection: For units with factory-applied finishes.
- D. Samples for Verification: For aluminum windows and components required, showing full range of color variations for finishes, and prepared on Samples of size indicated below:
  1. Exposed Finishes: 2 by 6 inches.
  2. Exposed Hardware: Full-size units.
- E. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For manufacturer's warranties.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum windows to include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.
- B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project. Company specializing in performing work of type specified and with at least ten (10) years of documented experience.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
  1. Build mockup of typical wall area as shown on Drawings.
  2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Comply with requirements of AAMA CW-10.
- B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.9 FIELD CONDITIONS

- A. Field Measurements: Verify actual measurements of existing openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.
- B. Do not install sealants when ambient temperature is less than 40 degrees F.
- C. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure to meet performance requirements including water leakage, condensation, and air infiltration.
    - b. Structural failures including, but not limited to, excessive deflection.
    - c. Noise or vibration created by wind and thermal and structural movements.
    - d. Deterioration of metals and other materials beyond normal weathering.
    - e. Water penetration through fixed glazing and framing areas.
    - f. Faulty operation of movable sash and hardware.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.
- B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
    - c. Cracking, peeling, or chipping.
  - 2. Warranty Period (Anodized): Ten (10) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain aluminum windows from single source from single manufacturer.
- B. Manufacturer of the aluminum window system is required to match the manufacturer of the aluminum-framed storefront system.

### 2.2 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
  - 1. Window Certification: AAMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
  - 1. Minimum Performance Class: AW.
  - 2. Minimum Performance Grade: 65.
- C. Extruded aluminum frame and sash with integral structural thermal break, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices. Windows to be installed as part of the aluminum-framed storefront system. Windows shall be flush with storefront frame. Operable units will be hung units and exterior window insect screens will be provided.
  - 1. Frame Depth: 4 inch.
  - 2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
  - 3. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
  - 4. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
  - 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.
- D. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.50 (Single Hung), 0.53 (Double Hung) BTU/HR/FT<sup>2</sup>/deg F or less.
- E. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of a minimum of 51 (Single Hung), 53 (Double Hung).
- F. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface



temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.
- G. Air Infiltration: When tested in accordance with ASTM E 283-04 at differential static pressure of 6.24 PSF (299 Pa), completed window systems shall have maximum allowable infiltration of 0.30 CFM/FT<sup>2</sup> (0.07 m<sup>3</sup>/h·m<sup>2</sup>).
- H. Water Infiltration: No uncontrolled water other than condensation on indoor face of any component when tested in accordance with ASTM E 331-00(2009) at a minimum test pressure differential of 12 PSF (575 Pa) operable units.
- I. Sound Transmission Class (STC): Rated for not less than 30 for (Single Hung), 31 (Double Hung) STC, and 23 (Single Hung) and 24 (Double Hung) OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E413.
- J. Outside-Inside Transmission Class (OITC): Rated for not less than 26 (operable units) OITC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E1332.
- K. Static Load: There shall be no damage to fasteners, hardware, accessories, or any other damage that would render the window inoperable when tested in accordance with ASTM E 330 and TAS 202 at a differential static pressure as follows: 65.0 psf positive and 65.0 psf negative.
- L. Forced Entry Resistance: Windows shall meet all test requirements of AAMA 1302.5 and TAS 202.
- M. Cyclic Load: Windows shall successfully pass the test requirements of both ASTM E 1886/E 1996 and South Florida Protocols TAS 203.
- N. Life Cycle Testing: When tested in accordance with AAMA 910, there shall be no damage to fasteners, hardware parts, or any other damage that would cause the specimen to be inoperable. Resistance to air leakage and water penetration resistance test results shall no exceed the gateway performance.

## 2.3 ALUMINUM WINDOWS

- A. Aluminum Windows Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  1. YKK AP, YVS 410 TU Operable Aluminum Window System (basis of design).
  2. Kawneer.
  3. EFCO.
  4. Oldcastle.
  5. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Types: Provide the following types in locations indicated on Drawings.

1. Double hung.
  2. Casement.
- C. Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.
1. Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.
- D. Glazing System: As specified in Section 088000.
- E. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- F. Casement Window Hardware:
1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
    - a. Type and Style: As selected by Architect from manufacturer's full range of types and styles.
  2. Hinges: Non-friction type, not less than two per sash.
  3. Lock: Lift-type throw, cam-action lock with keeper.
  4. Limit Devices: Concealed support arms with adjustable, limited, hold-open limit devices designed to restrict sash opening.
    - a. Limit clear opening to 4 inches for ventilation; with custodial key release.
- G. Hung Window Hardware:
1. Counterbalancing Mechanism: Complying with AAMA 902, concealed, of size and capacity to hold sash stationary at any open position.
  2. Locks and Latches: Allow unobstructed movement of the sash across adjacent sash in direction indicated and operated from the inside only.
- H. Weather Stripping: Provide full-perimeter, wool-pile weather stripping for each operable sash unless otherwise indicated.
- I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

## 2.4 ACCESSORIES

- A. Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.
- B. Column Covers: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- C. Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- D. Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.
- E. Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

## 2.5 INSECT SCREENS

- A. General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.
- B. Aluminum Frames: Manufacturer's standard aluminum alloy complying with SMA 1004 or SMA 1201. Fabricate frames with mitered and reinforced corners, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
  1. Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet.
  2. Frame Finish: Match window frames.
- C. Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.
  1. Mesh Color: Manufacturer's standard.

## 2.6 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Glaze aluminum windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- E. Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

- F. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- G. Window Assemblies: Provide operating units in configuration indicated. Provide window frames, sashes, hardware, and other trim and components necessary for a complete, secure, and weathertight installation, including the following:
  - 1. Angled mullion posts with interior and exterior trim.
  - 2. Angled interior and exterior extension and trim.
  - 3. Exterior head and sill casings and trim.
- H. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

## 2.7 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.8 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

- C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- E. Tolerances: Maximum Variation from Level or Plumb: 1/16 inches every 3 feet non-cumulative or 1/8 inches per 10 feet, whichever is less.

### 3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
  - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
  - 1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
  - 2. Air-Infiltration Testing:
    - a. Test Pressure: That required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance class indicated.
    - b. Allowable Air-Leakage Rate: 1.0 times the applicable AAMA/WDMA/CSA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
  - 3. Water-Resistance Testing:
    - a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA/CSA 101/I.S.2/A440 performance grade indicated.
    - b. Allowable Water Infiltration: No water penetration.

4. Testing Extent: Three windows of each type as selected by Architect and a qualified independent testing and inspecting agency. Windows shall be tested after perimeter sealants have cured.
  5. Test Reports: Prepared according to AAMA 502.
- C. Windows will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

#### 3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
1. Keep protective films and coverings in place until final cleaning.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 085113

## SECTION 087100 - DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY:

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
  - 1. Door hardware for steel (hollow metal) doors.
  - 2. Door hardware for aluminum doors.
  - 3. Door hardware for wood doors.
  - 4. Door hardware for other doors indicated.
  - 5. Keyed cylinders as indicated.
- B. Related Sections:
  - 1. Division 6: Rough Carpentry.
  - 2. Division 8: Aluminum Doors and Frames.
  - 3. Division 8: Hollow Metal Doors and Frames.
  - 4. Division 8: Flush Wood Doors.
  - 5. Division 26 Electrical.
  - 6. Division 28: Electronic Security.
- C. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
  - 1. Builders Hardware Manufacturing Association (BHMA).
  - 2. NFPA 101 Life Safety Code.
  - 3. NFPA 80 -Fire Doors and Windows.
  - 4. ANSI-A156.xx- Various Performance Standards for Finish Hardware.
  - 5. UL10C – Positive Pressure Fire Test of Door Assemblies.
  - 6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities.
  - 7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware.
  - 8. ICC – International Building Code.
- D. Intent of Hardware Groups:
  - 1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
  - 2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

1.3 SUBMITTALS:

- A. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
- B. Product Data: Manufacturer's specifications and technical data including the following:
  - 1. Detailed specification of construction and fabrication.
  - 2. Manufacturer's installation instructions.
  - 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
  - 4. Submit 6 copies of catalog cuts either hard copy or electronic files with hardware schedule.
  - 5. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2.
- C. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
  - 1. List groups and suffixes in proper sequence.
  - 2. Completely describe door and list architectural door number.
  - 3. Manufacturer, product name, and catalog number.
  - 4. Function, type, and style.
  - 5. Size and finish of each item.
  - 6. Mounting heights.
  - 7. Explanation of abbreviations and symbols used within schedule.
  - 8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
- D. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
  - 1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
- E. Samples:
  - 1. 1 sample of Lever and Rose/Escutcheon design, (pair).
  - 2. 3 samples of metal finishes.
- F. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.
  - 1. Operating and maintenance manuals: Submit 3 sets containing the following.
    - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
    - b. Catalog pages for each product.



- c. Name, address, and phone number of local representative for each manufacturer.
- d. Parts list for each product.
- 2. Copy of final hardware schedule, edited to reflect, "As installed".
- 3. Copy of final keying schedule.
- 4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
- 5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

#### 1.4 QUALITY ASSURANCE

##### A. Comply with Division 1.

- 1. Statement of qualification for distributor and installers.
- 2. Statement of compliance with regulatory requirements and single source responsibility.
- 3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
  - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
  - b. Hardware Schedule shall be prepared and signed by an AHC.
- 4. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
- 5. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
  - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
  - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
- 6. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

- B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

##### A. Packing and Shipping: Comply with Division 1.

- 1. Deliver products in original unopened packaging with legible manufacturer's identification.
- 2. Package hardware to prevent damage during transit and storage.
- 3. Mark hardware to correspond with "reviewed hardware schedule".
- 4. Deliver hardware to door and frame manufacturer upon request.

- B. Storage and Protection: Comply with manufacturer's recommendations.

#### 1.6 PROJECT CONDITIONS

- A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. It shall be the responsibility of the General Contractor to convey any existing conditions that may directly or indirectly impact the proper installation and / or function of any specified hardware item either mechanical or electromechanical to the architect, owner/owners representative, hardware supplier, and any affected sub contractor.
- C. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

#### 1.7 WARRANTY

- A. Refer to Conditions of the Contract.
- B. Manufacturer's Warranty:
  - 1. Closers: Ten years.
  - 2. Exit Devices: Five Years.
  - 3. Locksets & Cylinders: Seven years.
  - 4. All other Hardware: Two years.

#### 1.8 OWNER'S INSTRUCTION

- A. Instruct Owner's personnel in operation and maintenance of hardware units.

#### 1.9 MAINTENANCE

- A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
  - 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
  - 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
  - 3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.
- B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>	<u>Approved:</u>
Continuous Hinges	Best	Roton, Pemko
Locksets	Best	Schlage ND Series
Cylinders	Schlage Everest 29	NO SUBSTITUTION
Exit Devices	Precision	Von Duprin 99
Closers	Best EHD9000	LCN 4040XP
Push/Pull Plates	Trimco	Ives, Rockwood
Push/Pull Bars	Trimco	Ives, Rockwood
Protection Plates	Trimco	Ives, Rockwood
Overhead Stops	ABH	Rixson, Glynn Johnson
Door Stops	Trimco	Burns, Rockwood
Flush Bolts	Trimco	Rockwood, Burns
Coordinator & Brackets	Trimco	Rockwood, Burns
Threshold & Gasketing	National Guard	Pemko, Reese
Electric Strikes	Best	HES, RCI
Removable Mullions	Precision	Von Duprin, Sargent

### 2.2 MATERIALS

- A. Geared Continuous Hinges:

1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1.
2. Anti-spinning through fastener.
3. UL10C listed for 3 hour Fire rating.
4. Non-handed.
5. Lifetime warranty.
6. Provide Fire Pins for 3-hour fire ratings.
7. Sufficient size to permit door to swing 180 degrees.

- B. Cylindrical Type Locks and Latchsets:

1. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Fit modified ANSI A115.2 door preparation.
4. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty.
5. Locksets to have anti-rotational studs that are thru-bolted.
6. Keyed lever shall not have exposed "keeper" hole.
7. Each lever to have independent spring mechanism controlling it.
8. 2-3/4 inch (70 mm) backset.
9. 9/16 inch (14 mm) throw latchbolt.

10. Provide sufficient curved strike lip to protect door trim.
11. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy.
12. Keyed lever to be removable only after core is removed, by authorized control key.
13. Provide locksets with 7-pin removable and interchangeable core cylinders.
14. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
15. Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
16. Core face must be the same finish as the lockset.
17. Functions and design as indicated in the hardware groups.

C. Mortise Deadbolt:

1. Tested and approved by ANSI A156.5, Operational Grade 1.
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty.
4. 2-3/4 inch (70mm) backset.
5. 1 inch throw deadbolt.
6. Provide locksets with 7-pin core.

D. Exit Devices shall:

1. Tested and approved by BHMA for ANSI 156.3, Grade 1.
2. Provide 9001-Quality Management and 14001-Environmental Management.
3. Furnish UL or recognized independent laboratory certified mechanical operational testing to 9 million cycles minimum.
4. Provide a deadlocking latchbolt.
5. Non-fire rated exit devices shall have cylinder dogging.
6. Touchpad shall be "T" style.
7. Exposed components shall be of architectural metals and finishes.
8. Lever design shall match lockset lever design.
9. Provide strikes as required by application.
10. Fire exit devices to be listed for UL10C.
11. UL listed for Accident Hazard.
12. Shall consist of a cross bar or push pad, the actuating portion of which extends across, shall not be less than one half the width of the door leaf.
13. Provide vandal resistant or breakaway trim.
14. Aluminum vertical rod assemblies are acceptable only when provide with the manufacturers optional top and bottom stainless steel rod guard protectors.
15. Provide motorized latch retraction (MLR) where scheduled and specified.
  - a. Provide necessary wire harnesses and power transfers as required to ensure complete and intended operation of door opening.
  - b. Provide door loops at exiting openings where mortised power transfers can not be installed due to existing field conditions.

E. Cylinders:

1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.

2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
3. Coordinate and provide as required for related sections.

F. Door Closers shall:

1. Tested and approved by BHMA for ANSI 156.4, Grade 1.
2. UL10C certified.
3. Provide 9001-Quality Management and 14001-Environmental Management.
4. Closer shall have extra-duty arms and knuckles where specified.
5. Conform to ANSI 117.1.
6. Maximum 2 7/16 inch case projection with non-ferrous cover.
7. Separate adjusting valves for closing and latching speed, and backcheck.
8. Provide drop plates, adapter plates, shim spacers and blade stop spacers as required by frame and door conditions.
9. Full rack and pinion type closer with 1½" minimum bore.
10. Mount closers on non-public side of door, unless otherwise noted in specification.
11. Closers shall be non-handed, non-sized and multi-sized.
12. Provide all necessary drop plates and / or brackets to accommodate door and frame requirements related to frame head detail and top rail dimensions of door types.
13. All closers to be furnished with SNB / Through Bolts. No Exceptions.

G. Electric Strikes:

1. Comply with ANSI/BHMA A156.31, Grade 1.
2. Provide non-handed 24VDC electric strike suitable for door frame material and lock configuration scheduled.
3. Provide field Sectable Fail Safe/Fail Secure models.
4. Provide UL rated at fire rated openings.
5. Provide outdoor rated for use at exterior openings.
6. Electrical Contractor (E.C.) to provide wiring for all electric strikes to the appropriate location at each opening specified to receive electric strikes. Include all necessary transformers and rectifiers for complete installation.

H. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.

1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
2. Provide fastener suitable for wall construction.
3. Coordinate reinforcement of walls where wall stop is specified.
4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered.
5. Where Trimco 1283-6S is specified, this product is to be supplied NO SUBSTITUTION.
6. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.
7. Concealed overhead stops shall be heavy duty bronze or stainless steel.
8. Surface overhead stops shall be heavy duty bronze or stainless steel.

I. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.

- J. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plates with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.
- K. Push Pull Bars: Provide ANSI J504, .1" Dia. Pull and push bar model and series as listed in hardware set. Provide proper fasteners for door construction.
- L. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- M. Mop plates: Provide with four beveled edges ANSI J103, 6 inches high by width less 1 inch on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
- N. Door Bolts: Flush bolts for wood or metal doors:
  - 1. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 25 for hollow metal label doors.
  - 2. Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 27 at wood label doors.
  - 3. Manual flush bolts, Certified ANSI/BHMA 156.16 at openings where allowed local authority.
  - 4. Provide Dust Proof Strike, Certified ANSI/BHMA 156.16 at doors with flush bolts without thresholds.
- O. Coordinator and Brackets: Provide a surface mounted coordinator when automatic bolts are used in the hardware set.
  - 1. Coordinator, Certified ANSI/BHMA A1156.3 Type 21A for full width of the opening.
  - 2. Provide mounting brackets for soffit applied hardware.
  - 3. Provide hardware preparation (cutouts) for latches as necessary.
- P. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.
- Q. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
  - 1. Weatherstrip shall be resilient seal of Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone as specified in hardware sets.
  - 2. UL10C Positive Pressure rated seal set when required.
- R. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
  - 1. Door seal shall be resilient seal of Neoprene, Polyurethane, Nylon Brush, Silicone as specified in hardware sets.
  - 2. UL10C Positive Pressure rated seal set when required.

- S. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½" for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.
- T. Provide one wall mounted Telkee, Lund or MMF series key cabinet complete with hooks, index and tags to accommodate 150 Keys. Coordinate mounting location with architect.
- U. Silencers: Furnish silencers on all interior frames, 3 for single doors, 2 for pairs. Omit where any type of seals occur.
- V. Removable Mullions: Provide Dorma 1340KR(E) as specified. Mullions are to field prepped for specified electric strikes. Electric strikes to be installed by General Contractor and wiring to be done by electrical contractor. so final connection can be done at frame head.

## 2.3 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products.
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

## 2.4 KEYS AND KEYING:

- A. Provide keyed construction cores at ALL locks and cylinders as specified. Provide keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.
  - 1. General Contractor to test all locking hardware after installation while GREEN constructions cores are installed to insure proper operation prior to OWNER installing final keyed cores.
- B. Cylinders, removable and small format interchangeable core system: Schlage Everest 29 in the keyway specified by WCASD Director of Facilities.
- C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- D. Deliver Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- E. Furnish keys in the following quantities:
  - 1. 2 Key Blanks per Keyed Cylinder.
  - 2. 15 each Construction masterkeys – Delivered to WCASD for authorized distribution.
  - 3. 2 each Construction Control Keys - Delivered to WCASD for authorized distribution.

- F. The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- G. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
  - 1. Do not proceed until unsatisfactory conditions have been corrected.
  - 2. All existing door frames must be field measured prior to ordering and installation of new doors and door hardware to ensure proper fit of new doors and specified hardware.

#### 3.2 HARDWARE LOCATIONS

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
  - 1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
  - 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
  - 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

#### 3.3 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
  - 1. Adjust door closer sweep periods so that from the 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 landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.



3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
1. Check and adjust closers (all valves) to ensure proper operation.
  2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
    - a. Verify levers are free from binding.
    - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
  3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.5 SCHEDULE OF FINISH HARDWARE:

## Manufacturer List

<b>Code</b>	<b>Name</b>
AB	ABH Manufacturing Inc.
BE	Best Access Systems
BY	By Related Section
NA	National Guard
PR	BEST Precision Exit Devices
SC	Schlage
ST	BEST Hinges and Sliding
TR	Trimco
VO	Von Duprin

## Option List

<b>Code</b>	<b>Description</b>
1/4-20 SSMS/EA	STAINLESS MACHINE SCREWS/EXPANSION ANC.
3/4	3/4" THROW LATCH
7/8"LTC	7/8" Lip-To-Center Strike
90541	ANGLE JAMB BRACKET (8000,9000)
B4E-HEAVY-KP	BEVELED 4 EDGES - KICK PLATES
BSHD90	Blade Stop Spacer
BTB	Mastercraft Back to Back - Pierce
C	QUICK CONNECT WIRING OPTION
CD	CYLINDER DOGGING
CSK	COUNTER SINKING OF KICK and MOP PLATES

DP90	Drop Plate
EPT Prep	EPT Prep (full mortise)
EVEREST 29 R-RESTRICTED KWY	EVEREST 29 R RESTRICTED KWY (SFIC Only)
FL	Fire Exit Hardware
L283-712	Vacant/Occupied Indicator (Inside of Dr)
L283-722	Vacant/Occupied Indicator(Outside of Dr)
LBR	LESS BOTTOM ROD
LD	Less Dogging
MCS	Mullion Cap Spacer (600 Finish)
MLR	MOTORIZED LATCH RETRACTION
N	Thru-Bolt w/ Flow-Thru
NFHD90	Angled Narrow Frame Bracket - Painted
S3	ANSI Strike Package
S983	OPTIONAL FLAT LIP STRIKE - 7/8" SLC
SNB (2)	SEX BOLTS (2)
SNB (4)	SEX BOLTS (4)
SNB (6)	SEX BOLTS (6)
SNB (8)	SEX BOLTS (8)

## Finish List

<b>Code</b>	<b>Description</b>
600	Primed for Painting
626	Satin Chromium Plated
626W	Weatherized Satin Chrome
630	Satin Stainless Steel
689	Aluminum Painted
AL	Aluminum
GREY	Grey
US32D	Stainless Steel, Dull

## Hardware Sets

### Set #001 - Classrooms / Reception

Doors: 101.2, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 201, 203, 203A.2, 203B.2, 203C.2, 206, 207, 208, 210, 302, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Stop and Holder	1283-6S	626	TR
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #002 - Closets

Doors: 015, 105.1, 105.2, 107C, 107E

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Wall Bumper	1270CX	626	TR
3	Silencer	1229A	GREY	TR

### Set #003 - Faculty Dining

Doors: 301

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 SPA90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
3	Silencer	1229A	GREY	TR

### Set #004 - Faculty Workroom

Doors: 300

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 IS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #005 - Janitors / Outswing

Doors: 009

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 SPA90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware

NOTE: 180 Degrees

### Set #006 - Offices

Doors: 104B, 107B, 205, 303, 304, 305, 306

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Wall Stop and Holder	1283-6S	626	TR
3	Silencer	1229A	GREY	TR

### Set #007 - Janitors - Inswing

Doors: 024

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 AF90	689	BE
NOTE: REG ARM MOUNT				
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Mop Plate	KM050 6" x 1" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
3	Silencer	1229A	GREY	TR

### Set #008 - Health Suite

Doors: 107

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 SPA90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Stop and Holder	1283-6S	626	TR
3	Silencer	1229A	GREY	TR

### Set #009 - Multi Occupancy RR

Doors: 001, 002, 007, 008, 016, 018, 021

1	Continuous Hinge	662HD UL	AL	ST
1	Deadlock	48H-7R L/C	626	BE
1	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Pull Plate	1018-3B	630	TR
1	Push Plate	1001-11	630	TR
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Mop Plate	KM050 6" x 1" LDW B4E CSK	630	TR
1	Wall Stop and Holder	1283-6S	626	TR
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware and to all applicable fire codes.

All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #010 - Multi Occupancy RR

Doors: 022

1	Continuous Hinge	662HD UL	AL	ST
1	Deadlock	48H-7R L/C	626	BE
1	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Pull Plate	1018-3B	630	TR
1	Push Plate	1001-11	630	TR
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Mop Plate	KM050 6" x 1" LDW B4E CSK	630	TR
1	Floor Stop/Holder	1283-2S	626	TR
3	Silencer	1229A	GREY	TR

### Set #011 - Health Suite Toilet

Doors: 107A

1	Continuous Hinge	662HD UL	AL	ST
1	Privacy Set	9K3-0L15D S3	626	BE
1	Wall Bumper	1270CV	626	TR
3	Silencer	1229A	GREY	TR

### Set #012 - Health Suite Exam

Doors: 107D

1	Continuous Hinge	662HD UL	AL	ST
1	Hospital Privacy Set	9K3-0LL15D S3	626	BE
1	Wall Bumper	1270CV	626	TR
3	Silencer	1229A	GREY	TR

### Set #013 - Principal Toilet

Doors: 103A

1	Continuous Hinge	662HD UL	AL	ST
1	Privacy Set	9K3-0L15D S3	626	BE

1	Wall Bumper	1270CV	626	TR
1	Gasketing	2525B @ Head & Strike Jamb		NA

### Set #014 - Sgl Occ Toilet

Doors: 003, 004, 013, 014, 019, 020

1	Continuous Hinge	662HD UL	AL	ST
1	Mortise Deadbolt	L496L EVEREST 29 R-RESTRICTED KKY L283-712 L283-722		626
	SC			
1	Everest 29 Core	80-037	626	SC
1	Pull Plate	1018-3B	630	TR
1	Push Plate	1001-3	626	TR
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Mop Plate	KM050 6" x 1" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
1	Gasketing	2525B @ Head & Strike Jamb		NA

### Set #015 - Kitchen Toilet

Doors: 029

1	Continuous Hinge	662HD UL	AL	ST
1	Privacy Set	9K3-0L15D S3	626	BE
1	Closer	EHD9016 SDS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Mop Plate	KM050 6" x 1" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

### Set #016 - Principal Office

Doors: 103

1	Continuous Hinge	662HD UL	AL	ST
1	Lockset	9K3-7AB15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Overhead Stop	9020 Series x AJB 90541	US32D	AB
1	Gasketing	2525B @ Head & Strike Jamb		NA
1	Auto Door Bottom	225 WH		NA

NOTE: Coordinate undercut for use with ADB. Verify floor surface.

### Set #017 - Conference Room

Doors: 108.1, 108.2

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 AF90	689	BE
1	Wall Bumper	1270CX	626	TR
1	Gasketing	2525B @ Head & Strike Jamb		NA
1	Auto Door Bottom	225 WH		NA

NOTE: Coordinate undercut for use with ADB. Verify floor surface.

### Set #018 - Electrical

Doors: 006

1	Continuous Hinge	669HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
1	Gasketing	2525B @ Head & Jambs		NA

### Set #019 - Storage

Doors: 005

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Overhead Stop	9020 Series	US32D	AB
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #020 - Security Doors

Doors: C101, C103.7

2	Continuous Hinge	662HD UL	AL	ST
2	Exit Device	2208 X 4908A CD LBR SNB (4)	630	PR
4	Everest 29 Core	80-037	626	SC
2	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
2	Rim Cylinder Housing	80-129	626	SC
2	Closer	EHD9016 SPA90	689	BE
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2	Wall Stop and Holder	1283-6S	626	TR
2	Meeting Stile Seal	5070B		NA
2	Silencer	1229A	GREY	TR

### Set #021 – IDF – Card Access

Doors: 010, 025

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Electric Strike	BES-L65ULMKM		BE
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
1	Card Reader	BY E.C.		BY
3	Silencer	1229A	GREY	TR

NOTE: Operation: Door normally closed and locked. Presentation of valid credential releases electric strike allowing access.

Mechanical key by pass. Egress always allowed.

Electric Strike installed by GC and wired by EC.

### Set #022 – IDF – Card Access

Doors: 202A

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Electric Strike	BES-L65ULMKM		BE
1	Closer	EHD9016 SDS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Card Reader	BY E.C.		BY
1	Meeting Stile Seal	5070B		NA
3	Silencer	1229A	GREY	TR

NOTE: Operation: Door normally closed and locked. Presentation of valid credential releases electric strike allowing access.

Mechanical key by pass. Egress always allowed.

Electric Strike installed by GC and wired by EC.

Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #023 - Reading Study

Doors: 203A.1, 203B.1, 203C.1

1	Continuous Hinge	662HD UL	AL	ST
1	Passage Set	9K3-0N15D S3	626	BE
1	Wall Stop and Holder	1283-6S	626	TR
3	Silencer	1229A	GREY	TR

### Set #024 - Kiln

Doors: 202B

1	Continuous Hinge	669HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
1	Gasketing	2525B @ Head & Jambs		NA

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware and to all applicable fire codes. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #025 - Art Storage

Doors: 202

1	Continuous Hinge	662HD UL	AL	ST
1	Classroom Lockset	9K3-7R15D L/C S3	626	BE



1	Everest 29 Core	80-037	626	SC
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Stop and Holder	1283-6S	626	TR
3	Silencer	1229A	GREY	TR

NOTE: 180 Degrees. Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #026 - Calming

Doors: 212

1	Continuous Hinge	662HD UL	AL	ST
1	Passage Set	9K3-0N15D S3	626	BE
1	Wall Bumper	1270CX	626	TR
3	Silencer	1229A	GREY	TR

### Set #027 - Resource / Gym Office

Doors: 100A, 209

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Overhead Holder	9010A Series x AJB 90541	US32D	AB
1	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #027A – Design Lab

Doors: 213

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Overhead Holder	9010A Series	US32D	AB
1	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #028 - Library Exit

Doors: 211.2

1	Continuous Hinge	662HD UL	AL	ST
1	Exit Device	2101 LD SNB (6)	630	PR
1	Closer	EHD9016 SDS90	689	BE

1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

### Set #029 - Library Entrance

Doors: 211.1

2	Continuous Hinge	662HD UL	AL	ST
1	Exit Device	2201 CD LBR SNB (8)	630	PR
1	Exit Device	2203 CD LBR SNB (8)	630	PR
3	Everest 29 Core	80-037	626	SC
2	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SDS90	689	BE
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1	Gasketing	2525B @ Head		NA
1	Meeting Stile Seal	5070B		NA

### Set #030 - Janitor / Platform Stair Corr / Closet

Doors: 017, 033, 102C.1

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 SDS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #031 - Electrical

Doors: 011

2	Continuous Hinge	669HD UL	AL	ST
2	Manual Flushbolt	3913	626	TR
1	Lockset	9K3-7D15D L/C 7/8" LTC	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 SPA90	689	BE
	NOTE: @ Active Leaf			
2	Overhead Stop	9020 Series	US32D	AB
	NOTE: @ Inactive Leaf			
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
1	Dust Proof Strike	3910	630	TR
1	Gasketing	2525B @ Head & Jambs		NA
1	Astragal	139 SP		NA

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware and to all applicable fire codes. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #032 – IDF – Card Access

Doors: 012

1	Continuous Hinge	662HD UL	AL	ST
1	Continuous Hinge	662HD UL EPT PREP	AL	ST
2	Manual Flushbolt	3913	626	TR
1	Lockset	9K3-7D15D L/C 7/8" LTC	626	BE
1	Everest 29 Core	80-037	626	SC
1	Electric Strike	6223	US32D	VO
1	Closer	EHD9016 SPA90	689	BE
NOTE: @ Active Leaf				
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2	Wall Bumper	1270CX	626	TR
1	Card Reader	BY E.C.		BY
1	Dust Proof Strike	3910	630	TR
1	Harness	WH-192P		ST
1	Harness	WH-XXP LAR		ST
1	Power Transfer	EPT-12C	630	PR
2	Silencer	1229A	GREY	TR

NOTE: Operation: Door normally closed and locked. Presentation of valid credential releases electric strike allowing access. Mechanical key by pass. Egress always allowed. Electric Strike installed by GC and wired by EC.

### Set #033 - Gym Storage

Doors: 100B, 100C

2	Continuous Hinge	662HD UL	AL	ST
1	Manual Flushbolt	3917-12	626	TR
NOTE: Top Bolt Only				
1	Deadlock	48H-7R L/C	626	BE
1	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
2	Flush Pull	1111C BTB	630	TR
2	Overhead Stop	9020 Series	US32D	AB
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware and to all applicable fire codes. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #034 - Electrical

Doors: 030

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC

1	Closer	EHD9016 SDS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Gasketing	2525B @ Head & Strike Jamb		NA

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware and to all applicable fire codes. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #035 - Table Storage

Doors: 102E

2	Continuous Hinge	662HD UL	AL	ST
1	Manual Flushbolt	3917-12	626	TR
	NOTE: Top Bolt Only			
1	Lockset	9K3-7D15D L/C 7/8" LTC	626	BE
1	Everest 29 Core	80-037	626	SC
2	Overhead Holder	9010 Series	US32D	AB
2	Mop Plate	KM050 6" x 1" LDW B4E CSK	630	TR
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #036 - Gym Entrance

Doors: 100.1

2	Continuous Hinge	662HD UL	AL	ST
1	Exit Device	2701 CD LBR SNB (6)	630	PR
1	Exit Device	2703 CD LBR SNB (6)	630	PR
3	Everest 29 Core	80-037	626	SC
2	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
1	Closer	EHD9016 SPA90	689	BE
	NOTE: @ Active Leaf			
1	Closer	EHD9016 SDST90	689	BE
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1	Wall Stop and Holder	1283-6S	626	TR
	NOTE: @ Active Leaf			
1	Meeting Stile Seal	5070B		NA
2	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #037 - Cafeteria Entrance

Doors: 102.1, 102.2

2	Continuous Hinge	662HD UL	AL	ST
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1	Exit Device	2201 CD LBR SNB (8)	630	PR
1	Exit Device	2203 CD LBR SNB (8)	630	PR
3	Everest 29 Core	80-037	626	SC
2	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SDST90	689	BE
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1	Meeting Stile Seal	5070B		NA
2	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware. If existing frame allows for 180 degree opening with specified hinges, provide EHD9016 SPA and 1283-6S Wall Stop & Holder - VIF

### Set #038 - Serving Line

Doors: 104.1, 104.2

1	Continuous Hinge	662HD UL	AL	ST
1	Deadlock	48H-7K L/C	626	BE
1	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Push Plate	1001-11	630	TR
1	Flush Pull	1111C	630	TR
1	Closer	EHD9016 DST90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Mop Plate	KM050 6" x 1" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

### Set #039 - Lift Access

Doors: 102B.1, 102B.2

1	Continuous Hinge	662HD UL	AL	ST
1	Classroom Lockset	9K3-7R15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Overhead Holder	9010 Series	US32D	AB
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
3	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #040 - Platform Stair

Doors: 102C.2

1	Continuous Hinge	662HD UL	AL	ST
1	Classroom Lockset	9K3-7R15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 AF90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR

3	Silencer	1229A	GREY	TR
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NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware

### Set #041 - Stage Storage

Doors: 102D

2	Continuous Hinge	662HD UL	AL	ST
1	Manual Flushbolt	3917-12	626	TR
NOTE: Top Bolt Only				
1	Lockset	9K3-7D15D L/C 7/8"LTC	626	BE
1	Everest 29 Core	80-037	626	SC
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
2	Wall Bumper	1270CX	626	TR
2	Silencer	1229A	GREY	TR

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
Verify existing frame will allow 180 degree swing for use of wall bumpers.  
If not provide 9020 Series OH Stop @ RHR Leaf. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #042 - Existing Frames - No Doors

Doors: 104A, 104C.1, C103.2, C103.4

NOTE: Survey existing door frames and provide and install filler plates for all existing hardware preps.

### Set #043 - Boiler

Doors: 028.1

1	Continuous Hinge	662HD UL	AL	ST
1	Exit Device	FL 2103 X 4903A SNB (2)	630	PR
1	Everest 29 Core	80-037	626	SC
1	Rim Cylinder Housing	80-129	626	SC
1	Closer	EHD9016 SDS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Gasketing	700 NA @ Head & Jambs		NA
1	Auto Door Bottom	423 N		NA
1	Handicap Threshold	513 HD	AL	NA

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware and to all applicable fire codes. All existing door frames are to be field measured to ensure proper fit and function of specified hardware. Coordinate all specified hardware with wood door manufacturer to ensure compatibility with fire rating.

### Set #044 - EER

Doors: 023

1	Continuous Hinge	669HD UL	AL	ST
1	Exit Device	FL 2103 X 4903A SNB (2)	630	PR
1	Everest 29 Core	80-037	626	SC

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1	Rim Cylinder Housing	80-129	626	SC
1	Closer	EHD9016 SPA90	689	BE
	NOTE: 180 Degrees			
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
1	Gasketing	2525B @ Head & Jambs		NA

**Set #045 - EER/Electrical**

Doors: 027.1

1	Continuous Hinge	669HD UL	AL	ST
1	Passage Set	9K3-0N15D S3	626	BE
1	Closer	EHD9016 SPA90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
1	Gasketing	2525B @ Head & Jambs		NA

**Set #046 - Music**

Doors: 307, 308

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Stop and Holder	1283-6S	626	TR

NOTE: If sound seals are required, all sound seals / threshold by STC Door M

**Set #047 - Custodial**

Doors: 309

2	Continuous Hinge	662HD UL	AL	ST
1	Manual Flushbolt	3917-12	626	TR
	NOTE: Top Bolt Only			
1	Lockset	9K3-7D15D L/C 7/8" LTC	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 AF90	689	BE
	NOTE: @ Active Leaf			
1	Overhead Stop	9020 Series x AJB 90541	US32D	AB
	NOTE: @ Inactive Leaf			
2	Kick Plate	K0050 10" x 1" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
2	Silencer	1229A	GREY	TR

**Set #048 - Main Entrance**

Doors: V100.1

2	Continuous Hinge	661HD UL	AL	ST
1	Removable Mullion	KR822 MCS	600	PR
2	Exit Device	2101 CD SNB (6)	630	PR
3	Everest 29 Core	80-037	626	SC

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2	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Reqd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SPA90 BSHD90 DP90 NFHD90	689	BE
2	Overhead Stop	1020 SL Series	US32D	AB
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign	630	
	TR			
2	Door Sweep	B606 A		NA
1	Mullion Seal	5100 N		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Balance of seals by door / frame manufacturer. Coordinate door hardware with aluminum door / frame supplier.

**Set #049 - Main Ent Vestibule**

Doors: V100.3

2	Continuous Hinge	662HD UL	AL	ST
1	Removable Mullion	KR822 MCS	600	PR
2	Exit Device	2101 CD SNB (6)	630	PR
3	Everest 29 Core	80-037	626	SC
2	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Reqd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SDS90	689	BE
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign	630	
	TR			
2	Mullion Seal	5100 N		NA
2	Door Sweep	200 NA		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA
2	Silencer	1229A	GREY	TR

**Set #050 - Main Entrance - Card Access**

Doors: V100.2

1	Continuous Hinge	661HD UL	AL	ST
1	Continuous Hinge	661HD UL EPT PREP	AL	ST
1	Exit Device	2101 CD SNB (6)	630	PR
1	Exit Device	C MLR 2103 SNB (6)	630	PR
2	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Reqd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SPA90 BSHD90 DP90 NFHD90	689	BE
2	Overhead Stop	1020 SL Series	US32D	AB
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign	630	
	TR			
1	Card Reader	BY E.C.		BY
1	Harness	WH-192P		ST
1	Harness	WH-XXP LAR		ST



1	Power Supply	RPSMLR2		PR
1	Power Transfer	EPT-12C	630	PR
2	Door Sweep	B606 A		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Balance of seals by door / frame manufacturer.

Operation: Locked Hours: Entry by presentation of valid credential or remote release will retract exit device latchbolt of active leaf allowing entry.

Unlocked Hours: ACS schedules active leaf exit device latchbolt to retract allowing entry.

Egress always allowed. Mechanical key by pass.

Electrified hardware installed by GC and wired by EC.

Coordinate door hardware with aluminum door / frame supplier. Mullion is part of frame.

### Set #051 - Main Entrance Vestibule - Card Access

Doors: V100.4

1	Continuous Hinge	662HD UL	AL	ST
1	Continuous Hinge	662HD UL EPT PREP	AL	ST
1	Exit Device	2101 CD SNB (6)	630	PR
1	Exit Device	C MLR 2103 SNB (6)	630	PR
2	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SDS90	689	BE
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign	630	
	TR			
1	Card Reader	BY E.C.		BY
1	Harness	WH-192P		ST
1	Harness	WH-XXP LAR		ST
1	Power Supply	RPSMLR2		PR
1	Power Transfer	EPT-12C	630	PR
2	Door Sweep	200 NA		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA
2	Silencer	1229A	GREY	TR

NOTE: Operation: Locked Hours: Entry by presentation of valid credential will retract exit device latchbolt of active leaf allowing entry.

Unlocked Hours: ACS schedules active leaf exit device latchbolt to retract allowing entry.

Egress always allowed. Mechanical key by pass. Electrified hardware installed by GC and wired by EC.

Mullion is part of frame.

### Set #052 - Main Entrance EO

Doors: C100.1

1	Continuous Hinge	662HD UL	AL	ST
1	Exit Device	2101 LD SNB (6)	630	PR
1	Closer	EHD9016 SDS90	689	BE

1	Kick Plate TR	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign	630	
1	Gasketing	700 NA @ Head & Jambs		NA
1	Door Sweep	B606 A		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

### Set #053 - Reception - Card Access

Doors: 101.1

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Electric Strike	BES-L65ULMKM		BE
1	Closer	EHD9016 IS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Card Reader	BY E.C.		BY
1	Door Sweep	200 NA		NA
1	Handicap Threshold	513 HD	AL	NA

NOTE: Operation: Door normally closed and locked. Presentation of valid credential releases electric strike allowing access. Mechanical key by pass. Egress always allowed.  
Electric Strike installed by GC and wired by EC.

### Set #054 - Courtyard Exit

Doors: C102.5, C103.6

1	Continuous Hinge	661HD UL	AL	ST
1	Exit Device	2103 LD SNB (6)	626W	PR
1	Everest 29 Core	80-037	626	SC
1	Rim Cylinder Housing	80-129	626	SC
1	Door Pull	1191-4J N	630	TR
1	Closer	EHD9016 IS90	689	BE
1	Door Sweep	B606 A		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Balance of seals by door / frame manufacturer. Coordinate door hardware with aluminum door / frame supplier.

### Set #055 - Corridor Entrance - Card Access

Doors: V103.1

1	Continuous Hinge	661HD UL	AL	ST
1	Continuous Hinge	661HD UL EPT PREP	AL	ST
1	Removable Mullion	KR822 MCS	600	PR
1	Exit Device	2101 CD SNB (6)	630	PR
1	Exit Device	C MLR 2103 SNB (6)	630	PR
3	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
2	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SPA90 BSHD90 DP90 NFHD90	689	BE

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2	Overhead Stop	1020 SL Series	US32D	AB
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign	630	
	TR			
1	Card Reader	BY E.C.		BY
1	Harness	WH-192P		ST
1	Harness	WH-XXP LAR		ST
1	Power Supply	RPSMLR2		PR
1	Power Transfer	EPT-12C	630	PR
2	Door Sweep	B606 A		NA
1	Mullion Seal	5100 N		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Balance of seals by door / frame manufacturer.

Operation: Door normally closed and locked. Presentation of valid credential retracts exit device latchbolt (active leaf) allowing entry.

Egress always allowed. Mechanical key by pass.

Electrified hardware installed by GC and wired by EC.

Coordinate door hardware with aluminum door / frame supplier.

## Set #056 – NOT USED

## Set #057 - Vestibule

Doors: V101.2, V103.2

2	Continuous Hinge	662HD UL	AL	ST
2	Dummy Touchbar	671DR-3 SNB (4)	630	PR
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SDS90	689	BE
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign	630	
	TR			
2	Door Sweep	200 NA		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA
2	Silencer	1229A	GREY	TR

## Set #058 - Custodial Entrance - Card Access

Doors: V101.1

1	Continuous Hinge	661HD UL	AL	ST
1	Continuous Hinge	661HD UL EPT PREP	AL	ST
1	Exit Device	2101 CD SNB (6)	630	PR
1	Exit Device	C MLR 2103 SNB (6)	630	PR
2	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SPA90 BSHD90 DP90 NFHD90	689	BE
2	Overhead Stop	1020 SL Series	US32D	AB
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Immuminated Exit Sign	630	
	TR			
1	Card Reader	BY E.C.		BY

1	Harness	WH-192P		ST
1	Harness	WH-XXP LAR		ST
1	Power Supply	RPSMLR2		PR
1	Power Transfer	EPT-12C	630	PR
2	Door Sweep	B606 A		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Balance of seals by door / frame manufacturer.

Operation: Doors normally closed and locked. Presentation of valid credential retracts latchbolt of exit device (active leaf only) allowing entry.

Egress always allowed. Mechanical key by pass.

Electrified hardware installed by GC and wired by EC.

Coordinate door hardware with aluminum door / frame supplier. Mullion is part of frame.

### Set #059 - Maintenance

Doors: 026.1

1	Continuous Hinge	662HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C 3/4 S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 SDS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Gasketing	700 NA @ Head & Jambs		NA
1	Door Sweep	B606 A		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

### Set #060 - Electrical - Card Access

Doors: 027.2

1	Continuous Hinge	662HD UL	AL	ST
1	Exit Device	FL MLR 2103 X 1703A SNB (2)	630	PR
1	Everest 29 Core	80-037	626	SC
1	Rim Cylinder Housing	80-129	626	SC
1	Closer	EHD9016 SDS90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Card Reader	BY E.C.		BY
1	Power Supply	RPSMLR2		PR
1	Door Loop	EPT-2	630	PR
1	Gasketing	700 NA @ Head & Jambs		NA
1	Door Sweep	B606 A		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Operation: Door normally closed and locked. Presentation of valid credential retracts latchbolt of exit device (active leaf only) allowing entry.

Egress always allowed. Mechanical key by pass. Electrified hardware installed by GC and wired by EC. All wiring / junction boxes / conduits / Etc by EC.

Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware and to

all applicable fire codes. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #061 - OH Door

Doors: 026.2

1	ALL HARDWARE BY DOOR MFR.	BY
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### Set #062 - Boiler Room - Card Access

Doors: 028.2

2	Continuous Hinge	662HD UL	AL	ST
2	Manual Flushbolt	3917-12	626	TR
1	Exit Device	C FL MLR 2303 X 1703A S983 SNB (2)	630	PR
1	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Closer	EHD9016 SPA90	689	BE
NOTE: 180 Degrees @ Active Leaf				
1	Kick Plate	K0050 10" x 1" LDW B4E CSK x Self Illuminated Exit Sign		630
	TR	K0050 10" x 1" LDW B4E CSK	630	TR
1	Kick Plate			
2	Floor Stop	1209HA	630	TR
1	Card Reader	BY E.C.		BY
1	Dust Proof Strike	3910	630	TR
1	Power Supply	RPSMLR2		PR
1	Door Loop	EPT-2	630	PR
1	Astragal	139 SP		NA
1	Gasketing	700 NA @ Head & Jamb		NA
2	Door Sweep	B606 A		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Operation: Doors normally closed and locked. Presentation of valid credential retracts latchbolt of exit device (active leaf only) allowing entry.

Egress always allowed. Mechanical key by pass.

Electrified hardware installed by GC and wired by EC. All wiring / junction boxes / conduits / Etc by EC.

Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #063 - Kitchen Exit

Doors: 104C.2

1	Continuous Hinge	662HD UL	AL	ST
1	Exit Device	2103 X 1703A CD SNB (2)	630	PR
2	Everest 29 Core	80-037	626	SC
1	Mortise Cylinder Housing	80-102 x Cam/Length/Collars As Req'd	626	SC
1	Rim Cylinder Housing	80-129	626	SC
1	Closer	EHD9016 SDST90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign		630
	TR			

1	Gasketing	700 NA @ Head & Jambs		NA
1	Door Sweep	B606 A		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

### Set #064 - Gym Exit

Doors: 100.3

2	Continuous Hinge	662HD UL	AL	ST
1	Removable Mullion	KR822 MCS	600	PR
2	Exit Device	2101 LD SNB (6)	630	PR
1	Everest 29 Core	80-037	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Closer	EHD9016 SDS90	689	BE
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign		630
	TR			
1	Gasketing	700 NA @ Head & Jambs		NA
2	Door Sweep	B606 A		NA
2	Mullion Seal	5100 N		NA
1	Drip Cap	16 A - 4" ODW		NA
2	Astragal Set	9605 A (SET)		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware.  
All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #065 - Gym Exit - Card Access

Doors: 100.2

2	Continuous Hinge	662HD UL	AL	ST
1	Removable Mullion	KR822 MCS	600	PR
1	Exit Device	2101 LD SNB (6)	630	PR
1	Exit Device	C MLR 2102 X 1702A SNB (2)	630	PR
1	Everest 29 Core	80-037	626	SC
1	Rim Cylinder Housing	80-129	626	SC
2	Closer	EHD9016 SDST90	689	BE
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign		630
	TR			
1	Card Reader	BY E.C.		BY
1	Power Supply	RPSMLR2		PR
1	Door Loop	EPT-2	630	PR
1	Gasketing	700 NA @ Head & Jambs		NA
2	Door Sweep	B606 A		NA
1	Mullion Seal	5100 N		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Astragal Set	9605 A (SET)		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Operation: Doors normally closed and locked. Presentation of valid credential retracts exit device latchbolt (active leaf).

Egress always allowed. No keyed access from exterior or mechanical dogging.

Electrified hardware installed by GC and wired by EC. All wiring / junction boxes / conduits / Etc by EC.

Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

### Set #066 – Mezz / Closet

Doors: 032, 028

1	*	ALL EXISTING HARDWARE TO REMAIN		BY
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### Set #067 - Art Room

Doors: 204

1	Continuous Hinge	669HD UL	AL	ST
1	Storeroom Lockset	9K3-7D15D L/C S3	626	BE
1	Everest 29 Core	80-037	626	SC
1	Closer	EHD9016 SPA90	689	BE
1	Kick Plate	K0050 10" x 2" LDW B4E CSK	630	TR
1	Wall Bumper	1270CX	626	TR
1	Gasketing	2525B @ Head & Jambs		NA

### Set #068 - Corridor Exit - EO

Doors: C100.2

2	Continuous Hinge	662HD UL	AL	ST
2	Exit Device	2101 LD SNB (6)	630	PR
2	Closer	EHD9016 SDS90	689	BE
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Immuminated Exit Sign	630	
	TR			
1	Gasketing	700 NA @ Head & Jambs		NA
2	Door Sweep	B606 A		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Mullion is part of frame.

### Set #069 - Corridor Side Exit / Entrance – Card Access

Doors: C102.3

1	Continuous Hinge	661HD UL EPT PREP	AL	ST
1	Continuous Hinge	661HD UL	AL	ST
1	Exit Device	2101 LD SNB (6)	630	PR
1	Exit Device	C MLR 2103 SNB (6)	626W	PR
1	Everest 29 Core	80-037	626	SC
1	Rim Cylinder Housing	80-129	626	SC
1	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 SPA90 BSHD90 DP90 NFHD90	689	BE
2	Overhead Stop	1020 SL Series	US32D	AB
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign	630	
	TR			

1	Card Reader	BY E.C.		BY
1	Harness	WH-192P		ST
1	Harness	WH-XXP LAR		ST
1	Power Supply	RPSMLR2		PR
1	Power Transfer	EPT-12C	630	PR
2	Door Sweep	B606 A		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Balance of seals by door / frame manufacturer.

Operation: Doors normally closed and locked. Presentation of valid credential retracts latchbolt of exit device (active leaf only) allowing entry.

Egress always allowed. Mechanical key by pass.

Electrified hardware installed by GC and wired by EC.

Coordinate door hardware with aluminum door / frame supplier. Mullion is part of frame.

### Set #070 - Courtyard Exit / Entrance

Doors: C102.4, C103.5

2	Continuous Hinge	661HD UL	AL	ST
1	Exit Device	2103 LD SNB (6)	626W	PR
1	Exit Device	2101 LD SNB (6)	626W	PR
1	Everest 29 Core	80-037	626	SC
1	Rim Cylinder Housing	80-129	626	SC
1	Door Pull	1191-4J N	630	TR
2	Closer	EHD9016 IS90	689	BE
2	Door Sweep	B606 A		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA

NOTE: Balance of seals by door / frame manufacturer. Coordinate door hardware with aluminum door / frame supplier. Mullion is part of frame. - VERIFY

*Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware*

### Set #071 - Library Corridor Exit - EO

Doors: C103.3

2	Continuous Hinge	662HD UL	AL	ST
2	Exit Device	2101 LD SNB (6)	630	PR
2	Closer	EHD9016 DS90	689	BE
2	Kick Plate	K0050 10" x 2" LDW B4E CSK x Self Illuminated Exit Sign		630
	TR			
2	Gasketing	700 NA @ Head & Jambs		NA
2	Door Sweep	B606 A		NA
1	Drip Cap	16 A - 4" ODW		NA
1	Saddle Threshold	425 HD 1/4-20 SSMS/EA	AL	NA



NOTE: Mullion is part of frame. Where existing frames are to remain; Prep / Repair existing frame to accept specified hardware. All existing door frames are to be field measured to ensure proper fit and function of specified hardware.

## Opening List

Opening	Hdw Set	Opening Label	Door Type	Frame Type
001	009			
002	009			
003	014			
004	014			
005	019			
006	018	45		
007	009			
008	009			
009	005			
010	021			
011	031	45		
012	032			
013	014			
014	014			
015	002			
016	009			
017	030			
018	009			
019	014			
020	014			
021	009			
022	010			
023	044	45		
024	007			
025	021			
028	066			
029	015			
030	034	45		
032	066			
033	030			
103	016			
107	008			
109	001			
110	001			
111	001			
112	001			
113	001			
114	001			
115	001			
116	001			
117	001			
118	001			
119	001			
201	001			

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202	025
203	001
204	067
205	006
206	001
207	001
208	001
209	027
210	001
212	026
213	027A
300	004
301	003
302	001
303	006
304	006
305	006
306	006
307	046
308	046
309	047
310	001
311	001
312	001
313	001
314	001
315	001
316	001
317	001
318	001
319	001
320	001
321	001
100A	027
100B	033
100C	033
102D	041
102E	035
103A	013
104A	042
104B	006
107A	011
107B	006
107C	002
107D	012
107E	002
202A	022
202B	024

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C101	020	
026.1	059	
026.2	061	
027.1	045	45
027.2	060	45
028.1	043	90
028.2	062	90
100.1	036	
100.2	065	
100.3	064	
101.1	053	
101.2	001	
102.1	037	
102.2	037	
104.1	038	
104.2	038	
105.1	002	
105.2	002	
108.1	017	
108.2	017	
211.1	029	
211.2	028	
102B.1	039	
102B.2	039	
102C.1	030	
102C.2	040	
104C.1	042	
104C.2	063	
203A.1	023	
203A.2	001	
203B.1	023	
203B.2	001	
203C.1	023	
203C.2	001	
C100.1	052	
C100.2	068	
C102.3	069	
C102.4	070	
C102.5	054	
C103.2	042	
C103.3	071	
C103.4	042	
C103.5	070	
C103.6	054	
C103.7	020	
V100.1	048	
V100.2	050	
V100.3	049	

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V101.1	058
V101.2	057
V100.4	051
V103.1	055
V103.2	057

## SECTION 088000 - GLAZING

### 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. Glass products.
  - 2. Laminated glass.
  - 3. Insulating glass.
  - 4. Glazing sealants.
  - 5. Glazing tapes.
  - 6. Miscellaneous glazing materials.

- B. Related Requirements:

- 1. Section 081213 "Hollow Metal Frames".
  - 2. Section 081416 "Flush Wood Doors".
  - 3. Section 084113 "Aluminum-Framed Entrances and Storefronts".
  - 4. Section 085113 "Aluminum Windows".

#### 1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Fire-Resistance-Rated Glazing: Glazing that prevents spread of fire and smoke and radiant heat; used in rated wall and door applications 60 minutes and above without size limitations.
- C. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.
- D. IBC: International Building Code.
- E. Interspace: Space between lites of an insulating-glass unit.

#### 1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper

safety margins for glazing retention under each design load case, load case combination, and service condition.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of adjoining framing system.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer manufacturers of fabricated glass units glass testing agency and sealant testing agency.
- B. Product Certificates: For glass.
- C. Product Test Reports: For fabricated glass and glazing sealants, for tests performed by a qualified testing agency.
  - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

#### 1.7 QUALITY ASSURANCE

- A. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved and certified by primary glass manufacturer.
- B. Installer Qualifications: A qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AG&M) contractors.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

- E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
  - 1. Install glazing in mockups specified in Section 084113 "Aluminum-Framed Entrances and Storefronts", and Section 085113 "Aluminum Windows" to match glazing systems required for Project, including glazing methods.

#### 1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
  - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
  - 2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
  - 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
  - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
  - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

#### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

#### 1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

#### 1.11 WARRANTY

- A. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written



instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five (5) years from date of Substantial Completion.

- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Glass: Obtain glass from single source from single manufacturer.
- B. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.
- C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
1. Guardian Glass (basis of design)
  2. Vitro Architectural Glass.
  3. Pilkington.
  4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

### 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:
1. Design Wind Pressures: As indicated on Drawings.
    - a. Wind Design Data: As indicated on Drawings.
  2. Design Snow Loads: As indicated on Drawings.

3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
  4. Thermal Loads: Design glazing to resist thermal stress breakage induced by differential temperature conditions and limited air circulation within individual glass lites and insulated glazing units.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
  2. For laminated-glass lites, properties are based on products of construction indicated.
  3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  4. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F.
  5. SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.
  6. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

## 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
  2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.

## 2.4 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- B. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
  - 1. Locations:
    - a. Glazed lites in doors.
    - b. Glazed lites in operable windows.
    - c. Glazed lites in frames adjacent to doors and operable windows (above or to the side).
    - d. Glazed lites where the exposed area of an individual pane is greater than 9 s.f.
    - e. Glazed lites where the bottom edge of glazing is less than 18 inches above the floor.
    - f. Glazed lites where the top of the glazing is greater than 36 inches above the floor.
    - g. Glazing adjacent to stairways and ramps where the glazing lites' bottom edge is less than 60 inches above the plane of the adjacent walking surface of the stairs, ramps, and landings.
    - h. Glazing within 60 inches of the bottom of a stair or ramp landing.
    - i. Elsewhere indicated on Drawings.
  - 2. Tint: Clear.
  - 3. Thickness: 1/4 inch nominal minimum.
- C. Fire-Resistance-Rated Glazing:
  - 1. Fire-Resistance-Rated Glazing: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing in accordance with ASTM E119 or UL 263.
  - 2. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that glazing is approved for use in walls, and fire-resistance rating in minutes.
  - 3. Fire-Resistance-Rated Framing and Doors: Fire-resistance-rated glazing with 60-, 90-, and 120-minute ratings requires framing and doors from glass supplier, tested as an assembly complying with ASTM E119 or UL 263.
  - 4. Fire-Resistance-Rated Laminated Glass: Laminated glass made from multiple plies of uncoated, clear float glass; complying with 16 CFR 1201, Category II.
    - a. Technical Glass Products (TGP) Firelite Plus, or approved equal.

## 2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer (PVB) to comply with interlayer manufacturer's written instructions.
2. Interlayer Thickness: 8 mil.
3. Interlayer Color: Clear unless otherwise indicated.
4. Graves Tear Resistance: 1,000 lbs.
5. Tensile Strength: 31,500 psi.
6. Elongation at Break: 135%.
7. PVB Interlayer Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. 3M, Ultra 800 (basis of design).
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.
  1. Sealing System: Dual seal, with polyisobutylene and silicone primary and secondary sealants.
  2. Perimeter Spacer: Aluminum with bent and soldered corners, finished black, color anodic finish.
  3. Desiccant: Molecular sieve or silica gel, or a blend of both.
- B. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and complying with other requirements specified.

## 2.7 GLAZING SEALANTS

- A. General:
  1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  3. Colors of Exposed Glazing Sealants: Black.
- B. Neutral-Curing Silicone Glazing Sealant, Class 25: Complying with ASTM C920, Type S, Grade NS, Use NT.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

- a. General Electric IGS 3204, IGS 3100, or Dow Corning 982, or approved equal.

## 2.8 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
- D. Setting Blocks:
  1. Silicone with Shore A durometer hardness of 85, plus or minus 5; 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.
- E. Spacers:
  1. Neoprene blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- F. Edge Blocks:
  1. Silicone with Shore A durometer hardness per manufacturer's written instructions.

## 2.9 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
  1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep systems.
  - 3. Minimum required face and edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

### 3.3 GLAZING, GENERAL

- A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.
- B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and

- glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch-minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide spacers for glass lites where length plus width is larger than 50 inches.
1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  2. Provide 1/8-inch-minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- 3.4 TAPE GLAZING
- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
  - B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
  - C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
  - D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
  - E. Do not remove release paper from tape until right before each glazing unit is installed.
  - F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- 3.5 GASKET GLAZING (DRY)
- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.7 CLEANING AND PROTECTION

- A. Immediately after installation, remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.



3.8 MONOLITHIC GLASS SCHEDULE

- A. Clear Glass Type GL-1: Fully tempered float glass.
  - 1. Minimum Thickness: 1/4 inch.
- B. Clear Glass Type GL-1S: Fully tempered float glass.
  - 1. Minimum Thickness: 1/4 inch.
  - 2. Safety glazing required.

3.9 FIRE-RESISTANCE-RATED GLAZING SCHEDULE

- A. Glass Type FRGL-45: 45-minute fire-resistance-rated glazing complying with ASTM E119 or UL 263 in a tested assembly of glass and framing with 450 deg F temperature-rise limitation; fire-resistance-rated laminated glass.
- B. Glass Type FRGL-90: 90-minute fire-resistance-rated glazing complying with ASTM E119 or UL 263 in a tested assembly of glass and framing with 450 deg F temperature-rise limitation; fire-resistance-rated laminated glass.

3.10 INSULATING GLASS SCHEDULE

- A. Low-E-Coated, Clear Insulating Glass Type IG-1:
  - 1. Basis-of-Design Product: Guardian Glass LLC, or approved equal.
  - 2. Overall Unit Thickness: 1 inch.
  - 3. Minimum Thickness of Each Glass Lite: 1/4 inch.
  - 4. Outdoor Lite: Fully tempered float glass.
  - 5. Interspace Content: Air.
  - 6. Indoor Lite: Fully tempered float glass.
  - 7. Low-E Coating: Sputtered on second surface.
  - 8. Winter Nighttime U-Factor: 0.28 maximum.
  - 9. Summer Daytime U-Factor: 0.27 maximum.
  - 10. Visible Light Transmittance: 68 percent minimum.
  - 11. Light to Solar Gain (LSG): 2.43.
  - 12. Visible Light Reflectance: 13% exterior, 14% interior.
  - 13. SGHC: 0.28 maximum.
  - 14. Shading Coefficient: 0.34.
- B. Low-E-Coated, Clear Insulating Glass Type IG-1S:
  - 1. Basis-of-Design Product: Guardian Glass LLC, or approved equal.
  - 2. Overall Unit Thickness: 1 inch.
  - 3. Minimum Thickness of Each Glass Lite: 1/4 inch.
  - 4. Outdoor Lite: Fully tempered float glass.
  - 5. Interspace Content: Air.
  - 6. Indoor Lite: Fully tempered float glass.
  - 7. Low-E Coating: Sputtered on second surface.

8. Winter Nighttime U-Factor: 0.28 maximum.
9. Summer Daytime U-Factor: 0.27 maximum.
10. Visible Light Transmittance: 68 percent minimum.
11. Light to Solar Gain (LSG): 2.43.
12. Visible Light Reflectance: 13% exterior, 14% interior.
13. SGHC: 0.28 maximum.
14. Shading Coefficient: 0.34.
15. Safety glazing required.

### 3.11 INSULATING-LAMINATED-GLASS SCHEDULE

#### A. Low-E-Coated, Clear Insulating Laminated Glass Type IGL-1S:

1. Basis-of-Design Product: Guardian Glass LLC, or approved equal.
2. Overall Unit Thickness: 1-3/16 inch.
3. Minimum Thickness of Each Glass Lite: 1/4 inch.
4. Outdoor Lite: Clear laminated glass with two plies of fully tempered float glass.
  - a. PVB Interlayer Thickness: 0.080 inch.
5. Interspace Content: Air.
6. Indoor Lite: Clear fully tempered float glass.
7. Low-E Coating: Sputtered on second surface.
8. Safety glazing required.

END OF SECTION 088000

## SECTION 090561.13 - MOISTURE VAPOR EMISSION CONTROL

### 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. Fluid-applied, resin-based, membrane-forming systems that control the moisture-vapor-emission rate of high-moisture, interior concrete to prepare it for floor covering installation.
  - 2. Contractor to perform testing of the floor before installing any materials to the subfloors. Contractor to review test results with each finish flooring manufacturer for manufacturer's additional recommendations.

- B. Related Requirements:

- 1. Section 035416 "Hydraulic Cement Underlayment" for patching, repairing, leveling of concrete subflooring.
  - 2. Division 09 finished flooring specification sections for scheduled floor finishes and subfloor preparation requirements.

#### 1.3 DEFINITIONS

- A. MVE: Moisture vapor emission.
- B. MVER: Moisture vapor emission rate.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Prior to submitting product data, Contractor shall review project specific conditions with each installer and manufacturer for each scheduled floor finish. Manufacturer for each scheduled floor finish to provide documentation and approval for the products provided in the submittals.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.

- B. Product Test Reports: For each MVE-control system, for tests performed by a qualified testing agency.
- C. Preinstallation testing reports.
- D. Field quality-control reports.

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Employs factory-trained personnel who are available for consultation and Project-site inspection.
- B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Comply with MVE-control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.
  - 1. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature of not less than 65 deg F and not more than 85 deg F at least 48 hours before use.
  - 2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE-control system manufacturer, but not less than 65 deg F or more than 85 deg F and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.
  - 3. Install MVE-control systems where concrete surface temperatures will remain a minimum of 5 deg F higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. MVE-Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:

1. MVER: Maximum 24 lb. of water/1000 sq. ft. when tested according to ASTM F1869.
2. Relative Humidity: Maximum 99 percent when tested according to ASTM F2170 using in situ probes.
3. Water-Vapor Transmission: Through MVE-control system, maximum 0.10 perm when tested according to ASTM E96/E96M.
4. Tensile Bond Strength: For MVE-control system, greater than 200 psi with failure in the concrete according to ASTM D7234.
5. Compressive Strength: 12,000 psi minimum according to ASTM D695.
6. Adhesion: Greater than 450 psi according to ASTM D7234.
7. Alkali Resistance: Rated as "resistant" according to ASTM D1308.
8. Microbial Resistance: Passes Rating 1 according to ASTM G21.
9. VOC Content: 0 g/L according to 40 CRF 60, Appendix A7, Method 24.

## 2.2 MVE-CONTROL SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  1. ARDEX Americas.
  2. Dex-O-Tex, VaporControl Primer 1P.
  3. Laticrete International, Inc.
  4. MAPEI Corporation.
  5. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. MVE-Control System: ASTM F3010-qualified, fluid-applied, two-component, epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives.
  1. Substrate Primer: Provide MVE-control system manufacturer's concrete-substrate primer if required for system indicated by substrate conditions.
  2. Cementitious Underlayment Primer: If required for subsequent installation of cementitious underlayment products, provide MVE-control system manufacturer's primer to ensure adhesion of products to MVE-control system.

## 2.3 ACCESSORIES

- A. Patching and Leveling Material: Moisture-, mildew-, and alkali-resistant product recommended in writing by MVE-control system manufacturer and with minimum of 3000-psi compressive strength after 28 days when tested according to ASTM C109/C109M.
- B. Crack-Filling Material: Resin-based material recommended in writing by MVE-control system manufacturer for sealing concrete substrate crack repair.
- C. Cementitious Underlayment: If required to maintain manufacturer's warranty, provide MVE-control system manufacturer's hydraulic cement-based underlayment.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance of the Work. Verify with the manufacturer the condition of the floor substrates and what preparation Work needs to be completed as per the manufacturer's installation instructions.
- B. Proceed with application only after unsatisfactory conditions have been corrected and the manufacturer for schedule floor finishes have approved the condition of the substrates.
  - 1. Installation of system indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Preinstallation Testing:
  - 1. Testing Agency: Engage a qualified testing agency to perform tests.
  - 2. Alkalinity Testing: Perform pH testing according to ASTM F710. Install MVE-control system in areas where pH readings are less than 7.0 and in areas where pH readings are greater than 8.5.
  - 3. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Internal Relative Humidity Test: Using in situ probes, ASTM F2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.
  - 4. Tensile-Bond-Strength Testing: For typical locations indicated to receive installation of MVE-control system, install minimum 100-sq. ft. area of MVE-control system to prepared concrete substrate and test according to ASTM D7234.
    - a. Proceed with installation only where tensile bond strength is greater than 200 psi with failure in the concrete.
- B. Concrete Substrates: Prepare and clean substrates according to MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.
  - 1. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
  - 2. Provide concrete surface profile complying with ICRI 310.2R by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
  - 3. After shot blasting, repair damaged and deteriorated concrete according to MVE-control system manufacturer's written instructions.
  - 4. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.

5. Fill surface depressions and irregularities with patching and leveling material.
  6. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack-filling material.
  7. Allow concrete to dry, undisturbed, for period recommended in writing by MVE-control system manufacturer after surface preparation, but not less than 24 hours.
  8. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.
- C. Protect walls, floor openings, electrical openings, door frames, and other obstructions during installation.

### 3.3 INSTALLATION

- A. Install MVE-control system according to ASTM F3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.
1. Install primers as required to comply with manufacturer's written instructions.
- B. Do not apply MVE-control system across substrate expansion, isolation, and other moving joints.
- C. Apply system, including component coats if any, in thickness recommended in writing by MVE-control system manufacturer for MVER indicated by preinstallation testing.
- D. Cure MVE-control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.
- E. After curing, examine MVE-control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.
- F. Install cementitious underlayment over cured membrane if required to maintain manufacturer's warranty and in thickness required to maintain the warranty.

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform installation inspections.
- B. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE-control system is installed without deficiencies.
1. Verify that surface preparation meets requirements.
  2. Verify that component coats and complete MVE-control-system film thicknesses comply with manufacturer's written instructions.
  3. Verify that MVE-control-system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.
- C. MVE-control system will be considered defective if it does not pass inspections.

3.5 PROTECTION

- A. Protect MVE-control system from damage, wear, dirt, dust, and other contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE-control system manufacturer.
- B. Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or otherwise compromise the MVE-control system membrane.

END OF SECTION 090561.13



## SECTION 092216 - NON-STRUCTURAL METAL FRAMING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Non-load-bearing steel framing systems for interior partitions.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For firestop tracks, post-installed anchors, and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

#### 1.5 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

- C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft..

## 2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
  - 2. Protective Coating: ASTM A653/A653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. ClarkDietrich.
  - 2. Jaimes Industries.
  - 3. MarinoWARE.
  - 4. Phillips Manufacturing Co.
  - 5. SCAFCO Steel Stud Company.
  - 6. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- C. Studs and Tracks: ASTM C645.
  - 1. Steel Studs and Tracks:
    - a. Minimum Base-Steel Thickness: As indicated on Drawings.
    - b. Depth: As indicated on Drawings.
- D. Slip-Type Head Joints: Where indicated, provide the following:
  - 1. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- E. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
  - 1. Minimum Base-Steel Thickness: 0.0296 inch.
- G. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch-wide flanges.
  - 1. Depth: 1-1/2 inches.
  - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.

## 2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

### 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
  - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
  - 1. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  - 2. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  - 3. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
  - 4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 092216

## SECTION 092900 - GYPSUM BOARD

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Interior gypsum board.
  - 2. Tile backing panels.
  - 3. Joint treatment materials.
  - 4. Auxiliary materials.

- B. Related Requirements:

- 1. Section 079219 "Acoustical Joint Sealants" for acoustical joint sealants installed in gypsum board assemblies.
  - 2. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Samples: For the following products:

- 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

#### 1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

### 2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. American Gypsum.
  - 2. CertainTeed Corporation; Saint-Gobain North America.
  - 3. National Gypsum Company.
  - 4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

### 2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C1396/C1396M.
  - 1. Application: Non-fire-rated vertical surfaces and soffits.
  - 2. Thickness: 5/8 inch.
  - 3. Long Edges: Tapered.
- B. Gypsum Board, Type X: ASTM C1396/C1396M.
  - 1. Application: Fire-rated locations.
  - 2. Thickness: 5/8 inch.
  - 3. Long Edges: Tapered.

C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch.
2. Long Edges: Tapered.
  - a. Provide Gypsum Board, Type X: ASTM C 1396/C 1396M, 5/8 inch with tapered edges at fire-rated conditions.

D. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.

1. Core: 5/8 inch, Type X.
2. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 3 requirements.
3. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
4. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
5. Long Edges: Tapered.
6. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
7. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
8. Fire resistance rated Type X, UL or WH listed at fire rated assemblies.
9. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. American Gypsum Company; M-Bloc AR Type X.
  - b. CertainTeed; AirRenew Extreme Abuse Resistant Gypsum Board.
  - c. National Gypsum Company; Gold Bond Hi-Abuse XP Gypsum Board.
  - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

E. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Core: 5/8 inch, Type X.
2. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.

2. Shapes:

- a. Cornerbead.
- b. Bullnose bead.
- c. LC-Bead: J-shaped; exposed long flange receives joint compound.
- d. L-Bead: L-shaped; exposed long flange receives joint compound.
- e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
- f. Expansion (control) joint.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
  - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

D. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."



- E. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Wallboard Type: As indicated on Drawings.
  - 2. Type X: Fire rated wall assemblies and as indicated on Drawings.
  - 3. Ceiling Type: Interior ceiling and soffit surfaces.
  - 4. Abuse-Resistant Type: As indicated on Drawings.
  - 5. Mold-Resistant Type: Interior wet room locations not scheduled to receive tile backing panels and ceramic wall tile.
  - 6. Tile Backing Panels: As a substrate to wall locations where ceramic tile is shown on the Drawings.
- B. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
  - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
  - 1. On ceilings, apply gypsum board indicated for base layers before applying face layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
  - 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
  - 3. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

### 3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

### 3.5 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.

### 3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
  - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
  - 2. Level 2: Panels that are substrate for tile.
  - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
  - 4. Level 5: Where indicated on Drawings.
    - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

## SECTION 093013 - CERAMIC TILING

### 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. Quarry tile.
2. Porcelain tile.
3. Glazed wall tile.
4. Waterproof membrane for thinset applications.
5. Metal edge strips.

B. Related Requirements:

1. Section 035416 "Hydraulic Cement Underlayment" for patching, repairing, leveling of existing or new concrete subflooring as required to prepare floor substrate to meet ceramic tile flooring manufacturer's requirements.
2. Section 090561.13 "Moisture Vapor Emission Control" for treating concrete subflooring due to high-moisture emission rate as required to prepare floor substrate to meet ceramic tile flooring manufacturer's requirements.
3. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
4. Section 092900 "Gypsum Board" for tile backing panels.

#### 1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Face Size: Actual tile size, excluding spacer lugs.
- D. Module Size: Actual tile size plus joint width indicated.

#### 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Initial Selection: For tile, grout, and accessories involving color selection.
- D. Samples for Verification:
  - 1. Full-size units of each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.
  - 2. Full-size units of each type of trim and accessory for each color and finish required.
  - 3. Metal edge strips in 6-inch lengths.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
  - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

#### 1.8 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
  - 2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
- B. Ventilate spaces receiving tile in accordance with material manufacturer's instructions.
- C. For interior applications:
  - 1. Do not begin installation until building is completely enclosed and maintains temperature and humidity conditions consistent with "after occupancy" conditions for a minimum of two (2) weeks.
  - 2. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
  - 3. Vent temporary heaters to exterior to prevent damage to tilework from carbon dioxide build-up.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
  - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
  - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
  - 2. Obtain waterproof membrane, except for sheet products, from manufacturer of setting and grouting materials.

- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Waterproof membrane.
2. Metal edge strips.

## 2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements.

- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

- E. Slip-resistance: Ceramic floor tile shall meet or exceed the following dynamic coefficients of friction (DCOF), as tested using the BOT3000E AcuTest (wet), for the following conditions and types of spaces:

1. Dry and Level Interior Spaces: greater than or equal to 0.42.
2. Wet and Level Interior Spaces: greater than or equal to 0.50.
3. Exterior Service or Recreation Spaces: greater than or equal to 0.60.
4. Service or production areas involving oils, grease, fats, lubricants: greater than or equal to 0.60.
5. Ramps and Inclines: greater than or equal to 0.65.

## 2.3 TILE PRODUCTS

- A. Ceramic Tile Type QT-1: Unglazed square-edged quarry tile.

1. Metropolitan Ceramics, Quarrybasics quarry tile.
2. Face Size: 6 by 6 inches.
3. Thickness: 1/2 inch.
4. Wearing Surface: Nonabrasive, smooth.
5. Dynamic Coefficient of Friction: Not less than 0.42.



6. Tile Color and Pattern: As indicated on Drawings.
7. Grout Color: As selected by Architect from manufacturer's full range.
8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
  - a. Base WB-3: Coved with surface bullnose top edge, face size 6 by 6 inches. See Drawings for additional information.

B. Ceramic Tile Type PT-1: Glazed porcelain tile.

1. Crossville Inc., Color Blox EC.
2. Face Size: 12 by 12 inches.
3. Thickness: 3/8 inch.
4. Dynamic Coefficient of Friction: Not less than 0.42.
5. Tile Color, Glaze, and Pattern: As indicated on Drawings.
6. Grout Color: As selected by Architect from manufacturer's full range.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
  - a. Base Cap: Surface bullnose, module size.
  - b. Wainscot Cap: Surface bullnose, module size.
  - c. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
  - d. External Corners: Surface bullnose, module size.
  - e. Internal Corners: Field-butt square corners.
  - f. Base WB-2: See Drawings for additional information.

C. Ceramic Tile Type WT-1: Glazed wall tile.

1. DalTile.
2. Module Size: 4-1/4 by 4-1/4 inches.
3. Face Size Variation: Rectified.
4. Thickness: 5/16 inch.
5. Face: Plain with modified square edges or cushion edges.
6. Tile Color and Pattern: Almond, semi-gloss.
7. Grout Color: As selected by Architect from manufacturer's full range.
8. Mounting: Factory, back mounted.
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
  - a. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 6 by 2 inches.
  - b. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.
  - c. Internal Corners: Field-butt square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

D. Ceramic Tile Type WT-2: Glazed wall tile.

1. DalTile.
2. Module Size: 4-1/4 by 4-1/4 inches.
3. Face Size Variation: Rectified.
4. Thickness: 5/16 inch.
5. Face: Plain with modified square edges or cushion edges.
6. Tile Color and Pattern: Semi-gloss, color as selected by Architect from full range of colors in manufacturer's Group 4 Price Range.
7. Grout Color: As selected by Architect from manufacturer's full range.
8. Mounting: Factory, back mounted.
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
  - a. Wainscot Cap for Thinset Mortar Installations: Surface bullnose, module size 6 by 2 inches.
  - b. External Corners for Thinset Mortar Installations: Surface bullnose, same size as adjoining flat tile.
  - c. Internal Corners: Field-buttet square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

## 2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
  1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

## 2.5 TILE BACKING PANELS

- A. As specified in Section 09200 "Gypsum Board."

## 2.6 SURFACE PREPARATION MATERIALS

- A. Trowelable Floor/Wall Patch and Render Mortar: Quick-setting, polymer-modified, fiber-reinforced, cementitious rendering, patching, ramping and leveling mortar, can be applied from 1/8 inch to 1-1/4 inches.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. MAPEI, Planitop 330 Fast.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

- B. Trowelable Concrete Floor Patch: High-performance, fast-setting cementitious patching compound. Can be applied at 1/16 inch to 1-1/2 inches neat and from 1-1/2 inches to 3 inches neat in areas no larger than 24 square feet.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. MAPEI, Mapecem Quickpatch.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.7 ADHESIVES AND PRIMERS

- A. Concrete Primer: Advanced-technology, low-odor, low-VOC, acrylic latex primer for concrete, gypsum-based underlayments and patches.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. MAPEI, Primer L.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.8 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Mapei Mapelastic AquaDefense with Mapei Reinforcing Fabric.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.9 WATERPROOF / CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

- B. Fabric-Reinforced Latex Based Waterproofing and Crack Isolation Membrane; fast setting, flexible, thin, load-bearing, waterproofing membrane system consisting of a premixed, quick-drying liquid latex, for installation under ceramic tile complying with ANSI A118.10 and ANSI A118.12; and having IAPMO certification as a shower pan liner.
  - 1. Product: MAPEI, Mapelastic AquaDefense with Mapei Reinforcing Fabric.
  - 2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.10 SETTING MATERIALS

- A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.
  - 1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
  - 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
  - 3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Mapei Ultralite S1 Quick.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.11 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Standard Cement Grout: ANSI A118.6.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Mapei Keracolor S.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- C. Premium Epoxy Mortar and Grout: For grout joints from 1/16 inch to 3/8 inch, ANSI A118.3 and ISO 13007 R2/RG, with a VOC content of 65 g/L or less.
  - 1. Product: MAPEI, Kerapoxy.
  - 2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.12 MISCELLANEOUS MATERIALS

- A. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless steel, ASTM A276/A276M or ASTM A666, 300 Series exposed-edge material.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Schluter.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. 100%-Silicone Sealant: Heavy-traffic expansion and movement joints, horizontal and vertical complying with ASTM standards; ASTM: Meets C920, Type S, Grade NS, Class 25, Use T1, T2, NT, I, M, G, A and O, and conforms to C794 adhesion properties, (#23 Clear color meets ASTM C920, Type S, Grade NS, Class 50, Use NT).
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. MAPEI, Mapesil T.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- C. Tile Cleaner: A neutral, zero-VOC cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. MAPEI, UltraCare Concentrated Tile & Grout Cleaner.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- D. Floor and Wall Sealer: Manufacturer's standard water-based product for sealing grout joints and that does not change color or appearance of grout.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. MAPEI, UltraCare Grout Sealer.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.13 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
  - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from

other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.3 INSTALLATION OF CERAMIC TILE

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
  - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
  - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
  - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
  - 1. Quarry Tile: 3/8 inch.
  - 2. Glazed Wall Tile: 1/8 inch.
  - 3. Porcelain Tile: 3/8 inch.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

- J. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
- K. Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

### 3.4 INSTALLATION OF TILE BACKING PANEL

- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

### 3.5 INSTALLATION OF WATERPROOF / CRACK ISOLATION MEMBRANE

- A. Install membrane to comply with ANSI A108.13, ANSI A108.17, and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B. Allow membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

### 3.6 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  1. Remove grout residue from tile as soon as possible.
  2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

### 3.7 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.



- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

### 3.8 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

#### A. Interior Floor Installations, Concrete Subfloor:

- 1. Porcelain Tile Installation: TCNA F122; thinset mortar on waterproof / crack isolation membrane.
  - a. Ceramic Tile Type: Porcelain Tile (ANSI A137.1).
  - b. Grout: Standard cement grout (ANSI A118.6).
  - c. Thinset Mortar: Modified dry-set mortar (ANSI A118.4).
  - d. Waterproof / Crack Isolation Membrane: (ANSI A118.10).
- 2. Quarry Tile Installation: TCNA F122; thinset mortar on waterproof membrane and crack isolation membrane.
  - a. Ceramic Tile Type: Quarry Tile.
  - b. Grout: Epoxy grout (ANSI A118.3).
  - c. Thinset Mortar: Modified dry-set mortar (ANSI A118.4).
  - d. Waterproof / Crack Isolation Membrane: (ANSI A118.10).

#### B. Interior Wall Installations, Masonry or Concrete:

- 1. Ceramic Tile Installation: TCNA W202 I-20; thinset mortar on waterproof membrane.
  - a. Ceramic Tile Type: Glazed Wall Tile(ANSI A137.1).
  - b. Grout: Standard cement grout (ANSI A118.6).
  - c. Thinset Mortar: Modified dry-set mortar (ANSI A118.4).
  - d. Waterproof / Crack Isolation Membrane: ANSI A118.10.

#### C. Interior Wall Installations, Metal Studs or Furring:

- 1. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on waterproof membrane, on tile backer board.
  - a. Ceramic Tile Type: Glazed Ceramic Wall Tile (ANSI A137.1).
  - b. Grout: Standard cement grout (ANSI A118.6).
  - c. Thinset Mortar: Modified dry-set mortar (ANSI A118.4).
  - d. Waterproof / Crack Isolation Membrane: ANSI A118.10.

END OF SECTION 093013

## SECTION 095123 - ACOUSTICAL TILE CEILINGS

### 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. Acoustical tiles for interior ceilings.
  - 2. Fully concealed, direct-hung, suspension systems.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Initial Selection: For components with factory-applied finishes.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Ceiling suspension-system members.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Method of attaching hangers to building structure.
    - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
  - 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
  - 5. Size and location of initial access modules for acoustical tile.
  - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
    - a. Lighting fixtures.
    - b. Diffusers.
    - c. Grilles.
    - d. Speakers.
    - e. Sprinklers.

- f. Access panels.
  - g. Perimeter moldings.
  - h. Other items shown on or related to the Reflected Ceiling Drawings.
- 7. Show operation of hinged and sliding components adjacent to acoustical tiles.
- 8. Minimum Drawing Scale: 1/8 inch = 1 foot.
- B. Qualification Data: For testing agency.
- C. Field quality-control reports.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Units: Full-size tiles equal to five (5%) percent of quantity installed.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
  - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

#### 1.9 WARRANTY

- A. Manufacturer's Material and Workmanship Warranty: Manufacturer warrants the suspension systems and ceiling products shall be free from defects in material and factory workmanship for

a period from the Date of Substantial Completion as outlined below. Any units or parts proven defective during the warranty period will be repaired or replaced.

1. Systems installed in high humidity locations kitchens, toilets, wash rooms, janitor's closets, warranty period: Ten (10) years.
2. Systems installed in all other interior locations, warranty period: Thirty (30) years for panels and ten (10) years for grid.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

#### A. Source Limitations:

1. Suspended Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile and its suspension system from single source from single manufacturer.
2. Directly Attached Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile from single source from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: Class A according to ASTM E1264.
  2. Smoke-Developed Index: 50 or less.

### 2.3 ACOUSTICAL TILES TYPE A

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
1. Armstrong Ceilings, School Zone Fine Fissured Square Lay-in 1714.
  2. Certaineed, Performa School Board.
  3. USG, Radar Acoustical Panels, Climaplust Performance.
  4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide tiles as follows:
1. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.

2. Pattern: CE (perforated, small holes and lightly textured).
- D. Color: White, painted.
- E. Light Reflectance (LR): 0.84 to 0.86 percent.
- F. Ceiling Attenuation Class (CAC): 35 to 40.
- G. Noise Reduction Coefficient (NRC): Not less than 0.55.
- H. Edge/Joint Detail: Square, kerfed, and rabbeted; tongue and grooved; or butt.
- I. Thickness: 5/8 inch.
- J. Modular Size: 24 by 48 inches.
- K. Humidity / Sag Resistant.
- L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.
- M. VOC Emissions: GREENGUARD Gold Certified.

#### 2.4 ACOUSTICAL TILES TYPE A1

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  1. Armstrong Ceilings, Kitchen Zone Square Lay-in.
  2. USG, Kitchen Lay-In Panel, Climaplust Performance.
  3. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.
- C. Classification: Provide tiles as follows:
  1. Type and Form: Type IX, mineral base with painted finish; Form 2, water felted.
  2. Pattern: G (smooth).
- D. Color: White, painted.
- E. Light Reflectance (LR): Not less than 0.89.
- F. Ceiling Attenuation Class (CAC): Not less than 33.
- G. Edge/Joint Detail: Square, kerfed, and rabbeted; tongue and grooved; or butt.

- H. Thickness: 5/8 inch.
- I. Modular Size: 24 by 48 inches.
- J. Humidity / Sag Resistant.
- K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.
- L. VOC Emissions: GREENGUARD Gold Certified.

## 2.5 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Armstrong Ceilings, Prelude XL.
  - 2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, fully concealed, metal suspension system and accessories of type, structural classification, and finish indicated that complies with applicable requirements in ASTM C635/C635M.
  - 1. High-Humidity Finish: In wet areas (kitchens, toilets, wash rooms, janitor's closets), provide coating tested and classified for "severe environment performance" according to ASTM C635/C635M.
  - 2. Construction: Double web.
  - 3. Profile: Tee, 15/16 inch wide face.
  - 4. Finish: White, painted.

## 2.6 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
  - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
    - a. Type: Post-installed expansion anchors.
    - b. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.
  - 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory

devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.

- B. Wire Hangers, Braces, and Ties: Provide wires as follows:
  - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
  - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- F. Where hold-down clips are indicated on the Drawings, and at locations adjacent to exterior doors (within 30 feet) and vestibules provide the following:
  - 1. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
  - 2. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.
  - 3. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical tiles in-place during a seismic event.

## 2.7 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for of suspension-system runners.
  - 1. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
  - 2. Finish: Painted white.
- B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
  - 1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C635/C635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
- C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:

1. Armstrong Ceilings, Axiom Classic Perimeter Trim System.
  2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- D. Bullnose Corner Cover: At all outside masonry corners.
- E. Touch-up Paint: Type and color to match acoustical and grid units.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

#### 3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustical tile ceilings according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
  1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard



- suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  8. Do not attach hangers to steel deck tabs.
  9. Space hangers not more than 48 inches on center along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical tiles.
1. Screw attach moldings to substrate at intervals not more than 16 inches on center and not more than 3 inches from ends. Miter corners accurately and connect securely.
  2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Arrange directionally patterned acoustical tiles as follows:
1. As indicated on reflected ceiling plans.
- F. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges of tiles so tile-to-tile joints are interlocked.
1. Fit adjoining tiles to form flush, tight joints. Scribe and cut tiles for accurate fit at borders and around penetrations through ceiling.
  2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tiles and moldings, spaced 12 inches on center.
- 3.4 ERECTION TOLERANCES
- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

### 3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
  - 1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.
- B. Perform the following tests and inspections of completed installations of acoustical tile ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no tiles have been installed. Do not proceed with installations of acoustical tile ceiling hangers for the next area until test results for previously completed installations of acoustical tile ceiling hangers show compliance with requirements.
  - 1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and post-installed anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two post-installed anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
  - 2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.
- C. Acoustical tile ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.6 ADJUSTING

- A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

## SECTION 096513 - RESILIENT BASE AND ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Vinyl base.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.
- C. Product Schedule: For resilient base and accessory products.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.
- B. Warranty: Warranty documents specified herein.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

#### 1.7 QUALITY ASSURANCE

- A. Single Source Responsibility: For each flooring type, provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.
- B. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
  1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

#### 1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
  1. 48 hours before installation.
  2. During installation.
  3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during flooring installation.
- D. Close spaces to traffic for 48 hours after flooring installation.
- E. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.
- F. Install resilient products after other finishing operations, including painting, have been completed.

1.10 WARRANTY

- A. Vinyl Wall Base: Manufacturer guarantees base products against manufacturing defects and adhesive bond under normal conditions for two (2) years from the date of Substantial Completion. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge

PART 2 - PRODUCTS

2.1 VINYL BASE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Roppe Rubber Flooring and Vinyl Flooring Products, Vinyl Wall Base.
  - 2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Product Standard: ASTM F1861, Type TV (vinyl, thermoplastic).
  - 1. Group: II (layered).
  - 2. Style and Location:
    - a. Style B, Cove: Where indicated on Drawings.
- C. Critical Radiant Flux (ASTME648/NFPA 253): Class 1, > 0.45 W/cm2.
- D. Smoke Density (NFPA 258): Passes, <450.:
- E. Flammability (ASTM E84): Class A.
- F. Minimum Thickness: 0.125 inch.
- G. Height: 4 inches, unless otherwise indicated on Drawings.
- H. Lengths: Coils in manufacturer's standard length.
- I. Outside Corners:
  - 1. Field formed at bullnose CMU walls.
  - 2. Preformed at all other wall conditions.
- J. Inside Corners:
  - 1. Preformed.
- K. Color: As indicated on Drawings.

## 2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- H. Preformed Corners: Install preformed corners before installing straight pieces.
- I. Field-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 4 inches in length.
    - a. Form without producing discoloration (whitening) at bends.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 4 inches in length.
    - a. Miter corners to minimize open joints.

### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.

### 3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum horizontal surfaces thoroughly.
  - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

## SECTION 096519 - RESILIENT TILE FLOORING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Vinyl composition floor tile.
  - 2. Rubber floor system.

- B. Related Requirements:

- 1. Section 035416 "Hydraulic Cement Underlayment" for patching, repairing, leveling of concrete subflooring.
  - 2. Section 090561.13 "Moisture Vapor Emission Control" for treating concrete subflooring due to high-moisture emission rate.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For each type of resilient floor tile.

- 1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 2. Show details of special patterns.

- C. Samples: Full-size units of each color, texture, and pattern of floor tile required.

- D. Product Schedule: For floor tile. Use same designations indicated on Drawings.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Submit manufacturer's installation instructions for all products specified in this Section.

- C. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.



1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.
- B. Warranty: Warranty documents specified herein.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Single Source Responsibility: For each flooring type, provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.
- B. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by each manufacturer for floor tile installation and seaming method indicated.
  - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in labeled packages.
- B. Store and handle in strict compliance with manufacturer's recommendations.
- C. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.
- D. Deliver materials sufficiently in advance of installation to condition materials to the required temperature for 48-hours prior to installation.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.

- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.
- F. Install floor tile after other finishing operations, including painting, have been completed.

#### 1.10 WARRANTY

- A. Vinyl Composition Tile: Manufacturer guarantees flooring products against manufacturing defects, adhesive bond and underbed bond under normal conditions for ten (10) years from the date of Substantial Completion. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge.
- B. Rubber Floor Tile: Manufacturer guarantees flooring products against manufacturing defects, adhesive bond and underbed bond under normal conditions for fifteen (15) years from the date of Substantial Completion. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Slip-resistance: Flooring shall meet or exceed the following dynamic coefficients of friction (DCOF), as tested using the BOT3000E AcuTest (wet), for the following conditions and types of spaces:
  - 1. Dry and Level Interior Spaces: greater than or equal to 0.42.
  - 2. Wet and Level Interior Spaces: greater than or equal to 0.50.
  - 3. Exterior Service or Recreation Spaces: greater than or equal to 0.60.
  - 4. Pool Decking and Other Wet Areas with Minimal Footware: greater than or equal to 0.60.
  - 5. Service or production areas involving oils, grease, fats, lubricants: greater than or equal to 0.60.
  - 6. Ramps and Inclines: greater than or equal to 0.65.

## 2.2 VINYL COMPOSITION FLOOR TILE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Armstrong Flooring, Standard Excelon Tile Flooring.
  - 2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Tile Standard: ASTM F1066, Class 2, through pattern.
- C. Wearing Surface: Smooth.
- D. Thickness: 0.125 inch.
- E. Size: 12 by 12 inches.
- F. Color: As indicated on Drawings.

## 2.3 RUBBER FLOOR TILE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Nora Systems (Interface), Norament Grano Rubber Tile Flooring.
  - 2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Performance Data:
  - 1. ASTM F1344 Standard Specification for Rubber Floor Tile: Type IB and Grade 2.
  - 2. Material: Vulcanized rubber compound 926 with environmentally compatible color pigments that are free of toxic heavy metals like lead, cadmium, or mercury.
  - 3. Composition: Homogeneous rubber compound with a random scattered design.
  - 4. Color: As selected by Architect and Owner from manufacturer's 32 standard colors.
  - 5. Surface: Hammered.
  - 6. Back of Tile: Double-sanded smooth.
  - 7. Material Size (ASTM F2055): 39.53 inches by 39.53 inches,  $\pm 0.02$  inches.
  - 8. Squareness (ASTM F2055):  $\pm 0.010$  inches.
  - 9. Thickness (ASTM F386): 0.14 inches,  $+ 0.015/-0.005$  inches.
  - 10. Dimensional Stability (ASTM F2199):  $\leq 0.15\%$  in both directions.
  - 11. Flammability (E648/NFPA 253):  $\geq 0.45$  watts/sq. cm for Class 1.
  - 12. Smoke Density (ASTM E662/NFPA 258):  $< 450$  is required
  - 13. Burn Resistance: Resistant to cigarette and solder burns.
  - 14. Slip Resistance (ASTM D2047):  $\geq 0.5$ .
  - 15. Bacteria Resistance (ASTM E2180/ASTM G21): Resistant to bacteria, fungi, and micro-organism activity.
  - 16. Indoor Air Quality: Greenguard Gold Certified for low VOC emissions in compliance with CDPH 01350.

17. Carbon: 3rd party verified carbon neutral throughout their entire life cycle through the Interface Carbon Neutral Floors™ program.
18. Latex Allergies (ASTM D6499): Inhibition ELISA, results are below detection level.
19. Sound Absorption (ASTM E2179/ISO 10140-3):  $\Delta$  IIC 11,  $\Delta$  Lw 11 dB (compare only  $\Delta$  values)
20. Hardness (ASTM D2240):  $\geq 70$ , Shore type "A", 82.
21. Static Load (ASTM F970):  $\leq 0.005$  inches with 250 lbs., residual compression of 0.005 inches with 800 lbs.
22. Rolling Load Limit (ASTM F2753):  $\leq 850$  lbs./sq. inch; for forklift traffic, installed with manufacturer's polyurethane adhesive.
23. Static Generation (AATCC 134):  $< 1000$  Volts at 20% RH.

## 2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
  2. Verify that substrates comply with flooring manufacturer's requirements prior to installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F710.
  1. Verify with the manufacturer what the substrate preparation requirements are for the installation of all finish materials.
  2. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

3. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
4. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
5. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
  - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours.
  - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Existing Terrazzo Substrates:

1. Clean floor of all paint, varnish, oil, wax and finishes.
2. Roughen glazed or smooth existing terrazzo surfaces by means of grinding or other approved method as recommended by the tile manufacturer.
3. Repair poorly fitted joints or cracks with manufacturer's approved underlayment or repair compound.
4. Level areas of existing floor with manufacturer's approved underlayment.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

### 3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis or in pattern indicated on Drawings.

- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
  - 1. Lay tiles in pattern of colors and sizes indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

#### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Substantial Completion.

END OF SECTION 096519

## SECTION 096723 - RESINOUS FLOORING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Resinous flooring.
  - 2. Integral cove base accessories.

- B. Related Requirements:

- 1. Section 035416 "Hydraulic Cement Underlayment" for patching, repairing, leveling of concrete subflooring as required to prepare floor substrate to meet resinous flooring manufacturer's requirements.
  - 2. Section 090561.13 "Moisture Vapor Emission Control" for treating concrete subflooring due to high-moisture emission rate as required to prepare floor substrate to meet resinous flooring manufacturer's requirements.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

- 1. Review manufacturer's written instructions for substrate preparation and environmental conditions affecting resinous flooring installation.
  - 2. Review details of integral cove bases.
  - 3. Review manufacturer's written instructions for installing resinous flooring systems.
  - 4. Review protection measures for adjacent construction and installed flooring, floor drainage requirements, curbs, base details, and so forth.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.

- B. Samples: For each resinous floor system required and for each color and texture specified, 6 inches square in size, applied to a rigid backing by Installer for this Project.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Material Certificates: For each resinous flooring component.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
  - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.
- C. Close spaces to traffic during resinous flooring installation and for 24 hours after installation unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Flammability: Self-extinguishing in accordance with ASTM D635.



## 2.2 RESINOUS FLOORING

- A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.
1. Dur-A-Flex, Inc, Dur-A-Crete, Epoxy-Based seamless flooring system (basis of design).
  2. Dudick, Inc.
  3. Key Resin, Co.
  4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.
- C. System Characteristics:
1. Color and Pattern: As selected by Architect from manufacturer's full range.
  2. Wearing Surface: Textured for slip resistance.
  3. Overall System Thickness: 1/8 inch.
- D. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested in accordance with test methods indicated:
1. Primer: Dur-A-Glaze #4.
    - a. Percent Solids: 100 %.
    - b. VOC: 3.8 g/L.
    - c. Compressive Strength, ASTM D 695: 11,200 psi.
    - d. Tensile Strength, ASTM D 638: 2,100 psi.
    - e. Flexural Strength, ASTM D 790: 5,100 psi.
    - f. Abrasion Resistance, ASTM D 4060.
    - g. C-10 Wheel, 1,000 gm load, 1,000 cycles: 29 mg loss.
    - h. Flame Spread/NFPA-101, ASTM E 84: Class A.
    - i. Impact Resistance MIL D-24613: 0.0007 inches, no cracking or delamination.
    - j. Water Absorption. MIL D-24613: Nil.
    - k. Potlife @ 70 F: 20 minutes.
  2. Overlay: Dur-A-Crete.
    - a. VOC: 0 g/L.
    - b. Compressive Strength, ASTM D 695: 17,500 psi.
    - c. Tensile Strength, ASTM D 638: 2,500 psi.
    - d. Flexural Strength, ASTM D 790: 5,900 psi.
    - e. Flexural Modulus of Elasticity, ASTM D 790: 6.0 x 10<sup>5</sup>.
    - f. Abrasion Resistance, ASTM D 4060.
    - g. CS-17 Wheel, 1,000 gm load, 1,000 cycles: 18 mg loss.
    - h. Flame Spread/NFPA-101, ASTM E 84: Class A.
    - i. Flammability, ASTM D 635: Self Extinguishing.

- j. Indentation, MIL D-3134: No indentation.
  - k. Impact Resistance MIL D-3134: Pass.
  - l. Water Absorption. ASTM D 570: 0.04%.
3. Topcoat: Crete-Gard.
- a. Percent Solids: 100 %.
  - b. VOC: 59 g/L.
  - c. Compressive Strength, ASTM D 695: 16,000 psi.
  - d. Tensile Strength, ASTM D 638: 3,800 psi.
  - e. Flexural Strength, ASTM D 790: 4,000 psi.
  - f. Abrasion Resistance, ASTM D 4060.
  - g. C-10 Wheel, 1,000 gm load, 1,000 cycles: 35 mg loss.
  - h. Flame Spread/NFPA-101, ASTM E 84: Class A.
  - i. Flammability, ASTM D 635: Self Extinguishing.
  - j. Impact Resistance MIL D-3134: 0.025 inch Max.
  - k. Water Absorption. MIL D-3134: 0.04 %.
  - l. Potlife @ 70 F: 20-25 minutes.

## 2.3 INTEGRAL COVE BASE ACCESSORIES

- A. Precast, Integral Cove Base: Impact-resistant, polymer-resin, cove base moldings with a grit profile to promote adhesion of resinous flooring and recommended in writing by resinous flooring manufacturer.
- 1. Radius Cove: Cove molding with approximately 1-inch radius for adhesive installation at floor-to-wall joint as substrate to receive resinous flooring system to form an integral cove base.
  - 2. Radius Cove Base: 4-inch- high base molding that provides approximately 1-inch radius cove at floor-to-wall joint; for adhesive installation as substrate for resinous flooring system to form an integral cove base.
    - a. Preformed Inside and Outside Corners: Provide manufacturer's standard square inside and 3/4- to 1-inch bullnose outside corners.
- B. Installation Adhesive: As recommended in writing by accessory manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resinous flooring systems.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare and clean substrates in accordance with resinous flooring manufacturer's written instructions for substrate indicated to ensure adhesion.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  - 1. Roughen concrete substrates as follows:
    - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
    - b. Comply with requirements in SSPC-SP 13/NACE No. 6, with a Concrete Surface Profile of 3 or greater in accordance with ICRI Technical Guideline No. 310.2R, unless manufacturer's written instructions are more stringent.
  - 2. Repair damaged and deteriorated concrete in accordance with resinous flooring manufacturer's written instructions.
  - 3. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
    - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
  - 4. Alkalinity and Adhesion Testing: Perform tests recommended in writing by resinous flooring manufacturer. Proceed with installation only after substrate alkalinity is not less than 6 or more than 8 pH unless otherwise recommended in writing by flooring manufacturer,
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates in accordance with manufacturer's written instructions.
  - 1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring in accordance with manufacturer's written instructions.
- D. Resinous Materials: Mix components and prepare materials in accordance with resinous flooring manufacturer's written instructions.

### 3.3 INSTALLATION

- A. Apply components of resinous flooring system in accordance with manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness specified.
  - 1. Coordinate installation of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  - 2. Cure resinous flooring components in accordance with manufacturer's written instructions. Prevent contamination during installation and curing processes.
  - 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Primer: Apply primer over prepared substrate at spreading rate recommended in writing by manufacturer.
- C. Integral Cove Base Accessories: Adhesively install precast accessories before applying flooring coats and in accordance with manufacturer's written instructions.
- D. Field-Formed Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring coats. Apply in accordance with manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
- E. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness specified for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended in writing by manufacturer.
- F. Topcoats: Apply topcoats in number indicated for flooring system specified, at spreading rates recommended in writing by manufacturer, and to produce wearing surface specified.

### 3.4 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

## SECTION 096813 - TILE CARPETING

### 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. Modular carpet tile.

- B. Related Requirements:

- 1. Section 024119 "Selective Demolition" for removing existing floor coverings.
  - 2. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Include manufacturer's written installation recommendations for each type of substrate.

- B. Shop Drawings: For carpet tile installation, plans showing the following:

- 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
  - 2. Carpet tile type, color, and dye lot.
  - 3. Type of subfloor.
  - 4. Type of installation.
  - 5. Pattern of installation.
  - 6. Pattern type, location, and direction.
  - 7. Pile direction.
  - 8. Type, color, and location of insets and borders.
  - 9. Type, color, and location of edge, transition, and other accessory strips.
  - 10. Transition details to other flooring materials.

- C. Samples for Initial Selection: For each type of carpet tile.

- 1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

- D. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
  - 1. Carpet Tile: Full-size Sample.
  - 2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- C. Sample Warranty: For special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Carpet and Rug Institute's CRI 104, and carpet tile manufacturer's requirements.

#### 1.9 FIELD CONDITIONS

- A. Comply with the Carpet and Rug Institute's CRI 104 and carpet tile manufacturer's requirements for temperature, humidity, and ventilation limitations.

- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

#### 1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, the following:
    - a. More than 10 percent edge raveling, snags, and runs.
    - b. Dimensional instability.
    - c. Excess static discharge.
    - d. Loss of tuft-bind strength.
    - e. Loss of face fiber.
    - f. Delamination.
  - 3. Warranty Period: 15 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 CARPET TILE

- A. Interface Aerial Collection, Aerial Flying Colors.
- B. Color and Pattern: As selected by Architect from manufacturer's full range.
- C. Fiber Content: 100 percent nylon 6, 6. Solution Dyed
- D. Pile Characteristic: Tufted textured loop.
- E. Density: 6,059 oz./cu. yd.
- F. Pile Thickness: 0.10 inches for finished carpet tile according to ASTM D6859.
- G. Stitches: 9.00 stitches per inch.
- H. Primary Backing/Backcoating: Manufacturer's standard composite materials.

- I. Size: 9.845 by 39.38 inches.
- J. Applied Treatments:
  - 1. Soil-Resistance Treatment: Manufacturer's standard treatment.
  - 2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:
    - a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
- K. Performance Characteristics:
  - 1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D7330.
  - 2. Flooring Radiant Panel (ASTM E-648): Passes.
  - 3. Smoke Density (ASTM E662): Less than 450.
  - 4. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) according to AATCC 16, Option E.
  - 5. Electrostatic Propensity: Less than 3.0 kV according to AATCC 134.

## 2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.



1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
  - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
  - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
  - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

### 3.3 INSTALLATION

- A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns as selected by Architect.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

## SECTION 097519 - STONE TRIM

### 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 interior stone trim, including slate window sills.
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants" for sealing joints in interior stone trim with elastomeric sealants.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.
- B. Shop Drawings: Show fabrication and installation details for stone trim, including dimensions and profiles of stone units.
  - 1. Show locations and details of joints.
  - 2. Show locations and details of anchors, including locations of supporting construction.
- C. Samples for Initial Selection: For joint materials involving color selection.
- D. Samples for Verification:
  - 1. For each stone type indicated, in sets of Samples not less than 12 inches (300 mm) square. Include two or more Samples in each set, and show the full range of variations in appearance characteristics in completed Work.
  - 2. For each color of sealant required.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Material Test Reports:
  - 1. Stone Test Reports: For each stone variety proposed for use on Project, by a qualified testing agency, indicating compliance with required physical properties, other than

abrasion resistance, according to referenced ASTM standards. Base reports on testing done within previous five years.

2. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer, indicating that sealants will not stain or damage stone. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of interior stone trim.
- B. Installer Qualifications: A firm or individual experienced in installing interior stone trim similar in material, design, and extent to that indicated for this Project, whose work has a record of successful in-service performance.

#### 1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Sealant Adhesion and Compatibility Testing: Submit to joint-sealant manufacturers, for compatibility and adhesion testing according to sealant manufacturer's standard testing methods and Section 079200 "Joint Sealants," Samples of materials that will contact or affect joint sealants.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, and other causes.
- B. Mark stone units, on surface that will be concealed after installation, with designations used on Shop Drawings to identify individual stone units. Orient markings on vertical units, so that they are right side up when units are installed.
- C. Deliver sealants to Project site in original unopened containers labeled with manufacturer's name, product name and designation, color, expiration period, pot life, curing time, and mixing instructions for multicomponent materials.
- D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

#### 1.8 FIELD CONDITIONS

- A. Maintain air and material temperatures to comply with requirements of installation material manufacturers, but not less than 50 deg F during installation and for seven days after completion.
- B. Field Measurements: Verify dimensions of construction to receive interior stone trim by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.9 COORDINATION

- A. Time delivery and installation of interior stone trim to avoid extended on-site storage and to coordinate with work adjacent to interior stone trim.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Stone: Obtain stone, from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.
  - 1. For stone types that include same list of varieties and sources, provide same variety from same source for each.

2.2 SLATE

- A. Material Standard: Comply with ASTM C 629/C 629M, Classification II Interior.
- B. Description: Blue-gray slate with a fine, even grain and unfading color, from clear, sound stock.
- C. Finish: Honed.
- D. Match Architect's samples for color, finish, and other stone characteristics relating to aesthetic effects.

2.3 SETTING MATERIALS

- A. Adhesives, General: Use only adhesives formulated for stone and ceramic tile and recommended by their manufacturer for the application indicated.
- B. Stone Adhesive: Two-part, epoxy-resin stone adhesive with an initial set time of not more than two hours at 70 deg F (21 deg C).
  - 1. Color: Match stone.
  - 2. Epoxy Adhesive:

2.4 SEALANTS

- A. Joint Sealants: Manufacturer's standard sealants that comply with applicable requirements in Section 079200 "Joint Sealants" and will not stain the stone they are applied to.
  - 1. Use mildew-resistant joint sealant adjacent to plumbing fixtures and for control and expansion joints in toilet rooms and other wet locations.
  - 2. Colors: Provide colors of exposed sealants to match other joints in stone adjoining sealed joints unless otherwise indicated.

## 2.5 STONE ACCESSORIES

- A. Temporary Setting Shims: Rigid plastic shims, non-staining to stone, sized to suit joint thickness.
- B. Cleaner: Stone cleaner specifically formulated for stone types, finishes, and applications indicated, as recommended by stone producer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.
- C. Stone Sealer: Colorless, stain-resistant sealer that does not affect color or physical properties of stone surfaces, as recommended by stone producer for application indicated.

## 2.6 STONE FABRICATION, GENERAL

- A. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.
  - 1. Repairs that are characteristic of the varieties specified are acceptable, provided they do not impair structural integrity or function and are not aesthetically displeasing, as judged by Architect.
- B. Cut stone to produce pieces of thickness, size, and shape indicated and to comply with fabrication and construction tolerances recommended by applicable stone association.
  - 1. Where items are installed with adhesive or where stone edges are visible in the finished work, make items uniform in thickness and of identical thickness for each type of item; gage back of stone if necessary.
  - 2. Clean sawed backs of stones to remove rust stains and iron particles.
  - 3. Dress joints straight and at right angle to face unless otherwise indicated.
  - 4. Cut and drill sinkages and holes in stone for anchors, supports, and lifting devices as indicated or needed to set stone securely in place; shape beds to fit supports.
- C. Finish exposed faces and edges of stone to comply with requirements indicated for finish of each stone type required and to match approved Samples and mockups.
- D. Carefully inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.
  - 1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved Samples.

## 2.7 STONE TRIM

- A. Stone Window Stools:
  - 1. Material Standard: Comply with ASTM C629/C629M, Classification II Interior.
  - 2. Nominal Thickness: 3/4 inch unless otherwise indicated.
  - 3. Edge Detail: Straight, slightly eased at corners.
  - 4. Ends: Extend stools beyond opening as indicated and finish ends to match exposed edge.

5. Joints: Bonded joints, 1/32 inch or less in width.
6. Color: Black slate with fine, even grain from clear, sound stock.
7. Finish: Honed.
8. Fabricate window stools in one piece unless otherwise indicated.
9. Assemble window stools that consist of more than one piece by bonding joints with stone adhesive. Mask areas adjacent to joints to prevent adhesive smears. Clamp units to temporary bracing to ensure that window stools are properly aligned and joints are minimum width.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine surfaces to receive stone trim and conditions under which stone trim will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone trim.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of stone trim.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 SETTING STONE, GENERAL

- A. Before setting stone, clean surfaces that are dirty or stained by removing soil, stains, and foreign materials. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
- B. Do necessary field cutting as stone is set. Use power saws with diamond blades to cut stone. Cut lines straight and true, with edges eased slightly to prevent snipping.
- C. Contiguous Work: Provide reveals and openings as required to accommodate contiguous work.
- D. Set stone to comply with requirements indicated. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure stone in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
- E. Erect stone units level, plumb, and true with uniform joint widths. Use temporary shims to maintain joint width.
- F. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.
  1. Sealing of expansion and other joints is specified in Section 079200 "Joint Sealants."
  2. Keep expansion joints free of plaster, mortar, grout, and other rigid materials.

### 3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/8 inch in 96 inches (3 mm in 2400 mm), 1/4 inch (6 mm) maximum.
- B. Variation from Level: For lintels, sills, window stools, chair rails, horizontal bands, horizontal grooves, and other conspicuous lines, do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (10 mm) maximum.
- C. Variation of Linear Building Line: For position shown in plan and related portion of walls and partitions, do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (10 mm) maximum.
- D. Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions indicated, do not exceed plus or minus 1/8 inch (3 mm).
- E. Variation in Joint Width: Do not vary from average joint width more than plus or minus 1/16 inch (1.5 mm) or one-fourth of nominal joint width, whichever is less.
- F. Variation in Plane between Adjacent Stone Units (Lipping): Do not exceed 1/32-inch (0.8-mm) difference between planes of adjacent units.

### 3.4 INSTALLATION

- A. Stone Window Stools: Set stone window stools on wood or metal framing or wood blocking in a full bed of water-cleanable epoxy adhesive. Hold adhesive back from exposed edges of joints to allow for pointing with sealant.
- B. Assemble indicated multiple-piece units by bonding joints with stone adhesive as units are set. Mask areas adjacent to joints to prevent adhesive smears. Clamp units in place to ensure that surfaces are properly aligned and joints are minimum width.

### 3.5 JOINT-SEALANT INSTALLATION

- A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants." Remove temporary shims before applying sealants.

### 3.6 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean interior stone trim as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately.
- B. Remove and replace interior stone trim of the following description:
  - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
  - 2. Defective stone trim.
  - 3. Defective joints, including misaligned joints.



4. Interior stone trim and joints not matching approved Samples and mockups.
  5. Interior stone trim not complying with other requirements indicated.
- C. Replace in a manner that results in interior stone trim that matches approved Samples and mockups, complies with other requirements, and shows no evidence of replacement.
- D. Sealer Application: Apply stone sealer to comply with stone producer's and sealer manufacturer's written instructions and recommendations.

3.7 PROTECTION

- A. Protect stone surfaces, edges, and corners from construction damage. Use securely fastened untreated wood, plywood, or heavy cardboard to prevent damage.
- B. Before inspection for Substantial Completion, remove protective coverings and clean surfaces.

END OF SECTION 097519

## SECTION 097720 – DECORATIVE FRP WALL PANELS

### 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: Prefinished polyester glass reinforced plastic sheets and adhered to unfinished gypsum wallboard and CMU, and accessories, designated as FRP on the Finish Legend on the Drawings.

- 1. PVC trim.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.
- C. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.
- D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
  - 1. Submit complete with specified applied finish.
  - 2. For selected patterns show complete pattern repeat.
  - 3. Exposed Molding and Trim: Provide samples of each type, finish, and color.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Manufacturers Material Safety Data Sheets (MSDS) for adhesives, sealants and other pertinent materials prior to their delivery to the site (available as downloads for most Marlite's products at <http://www.marlite.com/tech-details.aspx> or by contacting Marlite at [info@marlite.com](mailto:info@marlite.com)).

## 1.5 QUALITY ASSURANCE

- A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
  - 1. ASTM E 84 (Method of test for surface burning characteristics of building Materials):
    - a. Wall Required Rating – Class III/C.
- B. Sanitary Standards: System components and finishes to comply with:
  - 1. United States Department of Agriculture (USDA) requirements for food preparation facilities, incidental contact.
  - 2. Food and Drug Administration (FDA) 1999 Food Code 6-101.11.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials factory packaged as per manufacturer's requirements, with factory labeling identifying the materials, colors, accessories.
- B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (range of 60 to 75°F) for 48 hours prior to installation.

## 1.7 PROJECT / SITE CONDITIONS

- A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work
- B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
  - 1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

## 1.8 WARRANTY

- A. Furnish one year guarantee against defects in material and workmanship.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Marlite, Symmetrix SmartSeam FRP wall panels and accessories.

2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

## 2.2 PANELS

### A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.

1. Coating: Multi-layer print, primer and finish coats or applied over-layer.
2. Dimensions:
  - a. Thickness: 0.090 inches nominals
  - b. Width: 4 feet nominal.
  - c. Length: 10 feet nominal.
3. Tolerance:
  - a. Length and Width: +/-1/8 inches.
  - b. Square: Not to exceed 5/32 inch for 10 foot panels.

### B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.

1. Flexural Strength: 1.0 x 10<sup>4</sup> psi per ASTM D 790.
2. Flexural Modulus: 3.1 x 10<sup>5</sup> psi per ASTM D 790.
3. Tensile Strength: 7.0 x 10<sup>3</sup> psi per ASTM D 638.
4. Tensile Modulus: 1.6 x 10<sup>5</sup> psi per ASTM D 638.
5. Water Absorption: 0.72% per ASTM D 570.
6. Barcol Hardness (scratch resistance) of 35-55 as per ASTM D 2583.
7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256.

### C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

### D. Front Finish: pattern and color as selected by Architect from manufacturer's full range, unless otherwise indicated on the Drawings.

## 2.3 ACCESSORIES

### A. PVC Trim: Thin-wall semi-rigid extruded PVC, as part of the manufacturer's wall panel system.

1. Marlite M 350 Inside Corner, 10 foot length.
2. Marlite M 360 Outside Corner, 10 foot length.
3. Marlite M 375 Edge, 10' length.
4. Color: Match wall panel finish.

### B. Fasteners: Non-staining nylon drive rivets.

1. Match panel colors.
2. Length to suit project conditions.

- C. Adhesive: Complying with ASTM C 557, as part of the manufacturer's wall panel system.
  - 1. Titebond Advanced Polymer Panel Adhesive – VOC compliant, non-flammable, environmentally safe adhesive.
- D. Sealant:
  - 1. Marlite Brand - Color Match Sealant.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
  - 1. Verify that stud spacing does not exceed 24 inches on-center.
- B. Repair defects prior to installation.
  - 1. Level wall surfaces to panel manufacturer's requirements. Remove protrusions and fill indentations.

#### 3.2 INSTALLATION

- A. Comply with manufacturer's recommended procedures and installation sequence.
- B. Cut sheets to meet supports allowing 1/8 inch clearance for every 8 foot of panel.
  - 1. Cut and drill with carbide tipped saw blades or drill bits, or cut with shears.
  - 2. Pre-drill fastener holes 1/8 inch oversize with high speed drill bit.
    - a. Space at 8 inch maximum on center at perimeter, approximately 1 inch from panel edge.
    - b. Space at in field in rows 16 feet on center, with fasteners spaced at 12 inches maximum on center.
- C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
  - 1. Install panels with manufacturer's recommended gap for panel field and corner joints.
    - a. Adhesive trowel and application method to conform to adhesive manufacturer's recommendations.
    - b. Drive fasteners for snug fit. Do not over-tighten.
- D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.

1. All moldings must provide for a minimum 1/8 inches of panel expansion at joints and edges, to insure proper installation.
2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

### 3.3 CLEANING

- A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.
- B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION 097720

## SECTION 097723 - FABRIC-WRAPPED PANELS

### 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 shop-fabricated, fabric-wrapped wall panels (tackable wall system).
- B. Related Sections:
  - 1. Section 101100 "Visual Display Units" for markerboards.

#### 1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include fabric facing, panel edge, core material, and mounting indicated.
- B. Shop Drawings: For panel assembly and installation.
  - 1. Include plans, elevations, sections, and mounting devices and details.
  - 2. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
  - 3. Include details at cutouts and penetrations for other work.
  - 4. Include direction of fabric weave and pattern matching.
- C. Samples for Initial Selection: For each type of fabric facing.
  - 1. Include Samples of hardware and accessories involving color or finish selection.
- D. Samples for Verification: For the following products:
  - 1. Fabric: Full-width by approximately 36-inch- long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
  - 2. Panel Edge: 12-inch-long Sample(s) showing each edge profile, corner, and finish.
  - 3. Core Material: 12-inch-square Sample at corner.

4. Mounting Devices: Full-size Samples.
5. Assembled Panels: Approximately 36 by 36 inches, including joints and mounting methods.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  1. Electrical outlets, switches, thermostats, etc.
  2. Items penetrating or covered by panels including the following:
- B. Product Certificates: For each type of panel.
- C. Sample Warranty: For manufacturer's special warranty.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of panel to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and panel manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and panels in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install panels until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Air-Quality Limitations: Protect panels from exposure to airborne odors such as tobacco smoke, and install panels under conditions free from odor contamination of ambient air.
- C. Field Measurements: Verify panel locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

#### 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace panels and components that fail in materials or workmanship within specified warranty period.



1. Failures include, but are not limited to, the following:
  - a. Fabric sagging, distorting, or releasing from panel edge.
  - b. Warping of core.
2. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Panels shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

### 2.2 FABRIC-WRAPPED WALL PANELS

- A. Fabric-Wrapped Wall Panel: Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. USG Micore 300 Conwed Designscape, Respond TK/AC Acoustical Tack Panels.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  2. Panel Shape: Flat.
  3. Mounting: Back mounted with manufacturer's standard adhesive with impaling clips, secured to substrate.
  4. Core: Mineral-fiber board.
  5. Edge Construction: Manufacturer's standard extruded-aluminum or zinc-coated, rolled-steel frame in corridors and chemically hardened core with no frame in remaining spaces.
  6. Edge Profile: Square.
  7. Corner Detail in Elevation: Square with continuous edge profile indicated.
  8. Facing Material: As indicated below.

9. Nominal Core Thickness: 3/4 inch.
10. Panel Width: As indicated on Drawings.
11. Panel Height: As indicated on Drawings.

## 2.3 MATERIALS

### A. Core Materials:

1. Mineral-Fiber Board: Maximum flame-spread and smoke-developed indexes of 25 and 10, respectively; minimum density of 22 lb./cu. ft.

### B. Facing Material: Fabric from same dye lot; color and pattern as per Owner Campus Standards.

1. Manufacturer: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - a. Guilford of Maine.
  - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
2. Product Line/Pattern: FR701, 2100.
3. Color: Wheat 130.
4. Width: 66 inches.
5. Flammability: ASTM E84, Class 1 or A.

### C. Mounting Devices: Concealed on back of panel, recommended by manufacturer to support weight of panel, and as follows:

1. Direct applied with adhesive and impaling clips.
2. Reinforce with exposed mechanical fasteners at corners.

## 2.4 FABRICATION

- A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.
- B. Edge Hardening: For mineral-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.
- C. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.
- D. Facing Material: Apply fabric fully covering visible surfaces of panel; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
  1. Square Corners: Tailor corners.

2. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent panels.
- E. Dimensional Tolerances of Finished Panels: Plus or minus 1/16 inch for the following:
1. Thickness.
  2. Edge straightness.
  3. Overall length and width.
  4. Squareness from corner to corner.
  5. Chords, radii, and diameters.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine fabric, fabricated panels, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting panel performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Install panels in locations indicated. Unless otherwise indicated, install panels with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of panels using type of mounting devices indicated. Mount panels securely to supporting substrate.
- C. Align fabric pattern and grain with adjacent panels.

#### 3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.
- B. Variation of Joint Width: Not more than 1/16 inch wide from hairline in 48 inches, noncumulative.

#### 3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 097723

## SECTION 098433 - SOUND-ABSORBING WALL AND CEILING UNITS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
  - 1. Sound-absorbing panels.

#### 1.3 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound Absorption Average.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include fabric facing, panel edge, core material, and mounting indicated.
- B. Shop Drawings: For unit assembly and installation.
  - 1. Include plans, elevations, sections, and mounting devices and details.
  - 2. Include details at panel head, base, joints, and corners; and details at ceiling and wall intersections. Indicate panel edge profile and core materials.
  - 3. Include details at cutouts and penetrations for other work.
  - 4. Include direction of fabric weave and pattern matching.
- C. Samples for Initial Selection: For each type of fabric facing.
  - 1. Include Samples of hardware and accessories involving color or finish selection.
- D. Samples for Verification: For the following products:
  - 1. Fabric: Full-width by approximately 36-inch-long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
  - 2. Panel Edge: 12-inch-long Sample(s) showing each edge profile, corner, and finish.

3. Core Material: 12-inch-square Sample at corner.
4. Mounting Devices: Full-size Samples.
5. Assembled Panels: Approximately 36 by 36 inches, including joints and mounting methods.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  1. Electrical outlets, switches, and thermostats.
  2. Items penetrating or covered by units including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
    - d. Alarms.
    - e. Sprinklers.
    - f. Access panels.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install units until a permanent level of lighting is provided on surfaces to receive the units.
- C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

- D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain sound-absorbing units specified in this Section from single source from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

### 2.3 SOUND-ABSORBING WALL AND CEILING UNITS

- A. Sound-Absorbing Panel: Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.
  - 1. Manufacturers:
    - a. Essi Acoustical Products Company: [www.essiacoustical.com](http://www.essiacoustical.com).
    - b. G&S Acoustics: [www.gsacoustics.com](http://www.gsacoustics.com).
    - c. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - 2. Panel Shape: Flat.
  - 3. Mounting: Edge mounted with splines secured to substrate.
  - 4. Core: Glass-fiber board.
  - 5. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
  - 6. Edge Profile: Square.
  - 7. Corner Detail in Elevation: Square with continuous edge profile indicated.
  - 8. Nominal Core Thickness: 2 inches.

9. Panel Width: As indicated on Drawings.
10. Panel Height: As indicated on Drawings.

## 2.4 MATERIALS

### A. Core Materials:

1. Glass-Fiber Board: ASTM C612; of type standard with manufacturer; nominal density of 6 to 7 lb./cu. ft., unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

### B. Facing Material: Woven polyester fabric from same dye lot; color and pattern as selected by Architect from manufacturer's full range.

1. Color: Fabric manufacturer and color as indicated on Drawings.

### C. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:

1. Splines: Manufacturer's standard concealed metal or plastic splines that engage the kerfed edges of the unit, with other moldings and trim for interior corners, exterior corners, and exposed edges, with factory-applied finish on exposed items.

## 2.5 FABRICATION

### A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

### B. Edge Hardening: For glass-fiber board cores, chemically harden core edges and areas of core where mounting devices are attached.

### C. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.

1. Square Corners: Tailor corners.
2. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent units.

### D. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:

1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install units in locations indicated, following manufacturer's installation instructions. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
- C. Align fabric pattern and grain with adjacent units.

### 3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.
- B. Variation of Joint Width: Not more than 1/16-inch variation from hairline in 48 inches, noncumulative.

### 3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

### 3.5 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 098433



## SECTION 099113 - EXTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Concrete.
2. Concrete masonry units (CMUs).
3. Steel and iron.
4. Galvanized metal.
5. Aluminum (not anodized or otherwise coated).

- B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for shop priming of metal substrates.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Indicate VOC content.

- B. Samples for Initial Selection: For each type of topcoat product.

- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Sherwin Williams Company.
  - 2. Benjamin Moore & Co.
  - 3. PPG Paints.
  - 4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range.

## 2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  2. Testing agency will perform tests for compliance with product requirements.
  3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
  2. Masonry (Clay and CMUs): 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer. but not less than the following:
  - 1. SSPC-SP 3.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
  - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed to view, and as indicated on Drawings:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory-applied final finishes.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 EXTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
  - 1. Prime Coat:

- a. Sherwin Williams A-100 Latex Primer.
  - b. PPG Seal Grip Interior/ Exterior Primer.
  - c. Benjamin Moore Ultra Spec Masonry Interior/Exterior 100% Acrylic Sealer 608.
2. Intermediate Coat: Same as topcoat.
3. Topcoat, flat finish:
  - a. Sherwin Williams A-100 Exterior 100% Acrylic Latex.
  - b. PPG Speedhide Exterior 6-650XI.
  - c. Benjamin Moore Ultra Spec EXT N447.

B. CMU and Masonry Substrates:

1. Prime Coat:
  - a. Sherwin Williams ProIndustrial Heavy Duty Block Filler.
  - b. PPG Speedhide Interior/Exterior Masonry Latex Block Filler 6-15XI.
  - c. Benjamin Moore Ultra Spec Masonry Interior/Exterior Hi-Build Block Filler 571.
2. Intermediate Coat: Same as topcoat.
3. Topcoat, flat finish:
  - a. Sherwin Williams A-100 Exterior 100% Acrylic High Build Latex System.
  - b. PPG Speedhide Exterior 6-650XI.
  - c. Benjamin Moore Ultra Spec EXT N447.

C. Steel and Iron Ferrous Substrates:

1. Prime Coat:
  - a. Sherwin Williams ProIndustrial Pro-Cryl Primer.
  - b. PPG Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020F.
  - c. Benjamin Moore Super Spec HP Alkyd Metal Primer P06.
2. Intermediate Coat: Same as topcoat.
3. Topcoat, semi-gloss finish:
  - a. Sherwin Williams ProIndustrial DTM Acrylic Corrosion-resistant water-based system.
  - b. PPG Pitt-Tech Plus Interior/Exterior DTM Industrial Enamel 90-1310.
  - c. Benjamin Moore Ultra Spec HP DTM Acrylic Enamel HP29.

D. Galvanized-Metal Substrates:

1. Prime Coat:
  - a. Sherwin Williams ProIndustrial Pro-Cryl Universal Primer.
  - b. PPG Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020F.
  - c. Benjamin Moore Super Spec HP Alkyd Metal Primer P06.
2. Intermediate Coat: Same as topcoat.
3. Topcoat, semi-gloss finish:

- a. Sherwin Williams Sher-Cryl HPA.
- b. PPG Pitt-Tech Plus Interior/Exterior DTM Industrial Enamel 90-1310.
- c. Benjamin Moore Ultra Spec HP DTM Acrylic Enamel HP29.

E. Aluminum and Non-ferrous Substrates:

1. Prime Coat:

- a. Sherwin Williams ProIndustrial Pro-Cryl Primer.
- b. PPG Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020F.
- c. Benjamin Moore Ultra Spec HP Acrylic Metal Primer HP04.

2. Intermediate Coat: Same as topcoat.

3. Topcoat, semi-gloss finish:

- a. Sherwin Williams ProIndustrial DTM Acrylic Corrosion-resistant water-based system.
- b. PPG Pitt-Tech Plus Interior/Exterior DTM Industrial Enamel 90-1310.
- c. Benjamin Moore Ultra Spec HP DTM Acrylic Enamel HP29.

END OF SECTION 099113

## SECTION 099123 - INTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Concrete.
  - 2. Concrete masonry units (CMUs).
  - 3. Steel and iron.
  - 4. Galvanized metal.
  - 5. Aluminum (not anodized or otherwise coated).
  - 6. Wood.
  - 7. Gypsum board.
- B. Related Requirements:
  - 1. Section 051200 "Structural Steel Framing" for shop priming structural steel.
  - 2. Section 055000 "Metal Fabrications" for shop priming and painting metal fabrications.
  - 3. Section 055213 "Pipe and Tube Railings" for shop priming pipe and tube railings.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
  - 1. Submit Samples on rigid backing, 8 inches square.
  - 2. Apply coats on Samples in steps to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.
- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.



#### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

#### 1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

#### 1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Sherwin-Williams Company (basis of design).
  - 2. Benjamin Moore & Co.
  - 3. PPG Paints.
  - 4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

### 2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As indicated in a color schedule.

### 2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
  - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMUs): 12 percent.
  - 3. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer. but not less than the following:
  - 1. SSPC-SP 3 power-tool cleaning.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Aluminum Substrates: Remove loose surface oxidation.
- J. Wood Substrates:
  - 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime edges, ends, faces, undersides, and backsides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

### 3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
  - 1. Paint the following work where exposed in occupied spaces, and as indicated on Drawings:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.

- d. Pipe hangers and supports.
  - e. Metal conduit.
  - f. Plastic conduit.
  - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
  - h. Other items as directed by Architect.
2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  1. Contractor shall touch up and restore painted surfaces damaged by testing.
  2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.6 INTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Nontraffic Surfaces:
  1. Latex System:
    - a. Prime Coat: Alkali-resistant, water-based:
      - 1) Sherwin Williams ProMar 200 Zero VOC Primer.
      - 2) PPG Perma-Crete Alkali-Resistant Primer 4-603XI.
      - 3) Benjamin Moore Ultra Spec 500 Interior Latex Primer N534.
    - b. Intermediate Coat: Same as topcoat.

c. Topcoat: Latex, interior, semi-gloss.

- 1) Sherwin Williams Loxon Concrete and Masonry Primer.
- 2) PPG Speedhide Zero 6-4510XI.
- 3) Benjamin Moore Ultra Spec 500 Interior Latex N539.

B. Concrete Substrates, Traffic Surfaces:

1. Water-Based Concrete Floor Sealer System, VOC content less than 50g/L:

- a. First Coat: Sealer, Same as topcoat, or as required by the topcoat manufacturer.
- b. Topcoat: Sealer, water-based, for concrete floors, satin finish:
  - 1) Sherwin Williams ArmorSeal 8100 Water-based epoxy floor system.
  - 2) PPG Aquapon WB EP 9800 series – Water Based Epoxy, Ultra Low VOC.
  - 3) Benjamin Moore Corotech 100% Solids Epoxy Pre-Primer V155 with Corotech Waterborne Amine Epoxy V440.

C. CMU Substrates:

1. Water-Based Epoxy System:

- a. Prime Coat, or as required by the topcoat manufacturer:
  - 1) Sherwin Williams ProIndustrial Heavy Duty Block Filler.
  - 2) PPG Speedhide Blockfiller Primer 6-15XI.
  - 3) Benjamin Moore Ultra Spec Masonry Interior/Exterior Hi-Build Block Filler 571.
- b. Intermediate Coat: Same as topcoat.
- c. Topcoat: Water-based Epoxy, VOC content less than 100 g/L:
  - 1) Classrooms, educational spaces, administrative spaces, eggshell finish:
    - a) Sherwin Williams ProIndustrial Pre-Catalyzed Water-based Epoxy System.
    - b) PPG Pitt-Glaze WB 1 Epoxy 16-300 Series.
    - c) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy V342.
  - 2) Stairwells, corridors, semi-gloss finish:
    - a) Sherwin Williams ProIndustrial Pre-Catalyzed Water-based Epoxy.
    - b) PPG Pitt-Glaze WB 1 Epoxy 16-500 series.
    - c) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy V341.
  - 3) Areas subject to high humidity and moisture, and kitchen areas, 2-component Catalyzed Epoxy System, semi-gloss finish:
    - a) Sherwin Williams ProIndustrial Water-based Catalyzed Epoxy.
    - b) PPG Aquapon WB EP 9800 series – Water-based Epoxy, Ultra Low VOC.

- c) Benjamin Moore Corotech 100% Solids Epoxy Pre-Primer V155 with Corotech Waterborne Amine Epoxy V440.

D. CMU, Glazed Block Substrates:

1. Surface Preparation:

- a. Mechanically abrade surface and thoroughly clean to remove all dirt, dust, wax, cleaners and all contaminants from the tile and grout/mortar. Allow to dry.
- b. Prior to application, apply a test sample patch of the primer over a prepared surface. Contractor, along with paint representative to perform an adhesion test to ensure adhesion prior to complete application. This will set a project standard for the remainder of the work. Report in writing to the Architect the results of the test before completing the job.

2. Prime Coat:

- a. Sherwin Williams Extreme Bond Primer or DTM Bonding Primer.
- b. PPG SealGrip Primer 17-921XL.
- c. Benjamin Moore Insl-x Stix Waterborne Bonding Primer SXA-110.

3. Intermediate Coat: Same as topcoat.

4. Topcoat, flat finish:

1) Classrooms, educational spaces, administrative spaces, eggshell finish:

- a) Sherwin Williams ProIndustrial WaterBased Alkyd Urethane Enamel, B53 series.
- b) PPG Pitt-Glaze WB 1 Epoxy 16-300 Series.
- c) Benjamin Moore Ultra Spec 500 Interior Eggshell T538.

2) Stairwells, corridors, semi-gloss finish:

- a) Sherwin Williams ProIndustrial WaterBased Catalyzed Epoxy, B73-300 series.
- b) PPG Pitt-Glaze WB 1 Epoxy 16-500 series.
- c) Benjamin Moore Insl-x Stix Waterborne Bonding Primer SXA-110.

3) Areas subject to high humidity and moisture, and kitchen areas, 2-component Catalyzed Epoxy System, semi-gloss finish:

- a) Sherwin Williams MacroPoxy 646 Epoxy.
- b) PPG Aquapon WB EP 9800 series – Water-based Epoxy, Ultra Low VOC.
- c) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss V342.

E. Steel Substrates:

1. Prime Coat, or as required by the topcoat manufacturer:

- a. Sherwin Williams ProIndustrial Pro-Cryl Primer.
  - b. PPG Pitt Tech Plus Waterbourne Interior / Exterior Primer/ Finish 4020F.
  - c. Benjamin Moore Ultra Spec HP Acrylic Metal Primer HP04,
2. Intermediate Coat: Same as topcoat.
3. Topcoat:
  - a. Typical Locations, eggshell finish, unless indicated below:
    - 1) Sherwin Williams ProIndustrial DTM Acrylic Coating.
    - 2) PPG Pitt Tech Plus DTM Acrylic 90-1110.
    - 3) Benjamin Moore Ultra Spec HP DTM Acrylic Enamel HP25.
  - b. Corrosive Environments and exposed sprinkler pipe, semi-gloss finish:
    - 1) Sherwin Williams MacroPoxy 646 Epoxy, Hi Solids, anti-corrosive, 2 component epoxy paint system.
    - 2) PPG Amerlock 2 VOC – low VOC, Fast Dry, High Solids Epoxy Coating.
    - 3) Benjamin Moore Corotech 100% Solids Epoxy Pre-Primer V155 with Corotech Fast Dry Polyamide Epoxy V410.
  - c. High-temperature Pipes, Radiators, etc. (up to 250 deg. F), eggshell finish:
    - 1) Sherwin Williams ProIndustrial DTM Acrylic coating.
    - 2) PPG Pitt Tech Plus DTM Acrylic 90-1110.
    - 3) Benjamin Moore Ultra Spec HP DTM Acrylic Enamel HP25.

F. Steel Substrates, Exposed, Open Ceilings (Dry-fall System):

1. Prime Coat:
  - a. Sherwin Williams ProIndustrial Pro-cryl Universal Primer.
  - b. PPG Pitt Tech Plus Waterbourne Interior / Exterior Primer/ Finish 4020F.
  - c. Benjamin Moore Ultra Spec HP Acrylic Metal Primer HP04.
2. Intermediate Coat: Same as topcoat.
3. Topcoat, flat finish:
  - a. Sherwin Williams Low VOC Waterborne Acrylic Dryfall, B42-W00081.
  - b. PPG Speedhide Super Tech WB Dry Fall 6-700 series.
  - c. Benjamin Moore Latex Dry Fall.

G. Galvanized-Metal Substrates:

1. Prime Coat:
  - a. Sherwin Williams ProIndustrial Pro-Cryl Primer.
  - b. PPG Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020PF.
  - c. Benjamin Moore Ultra Spec HP Acrylic Metal Primer HP04.
2. Intermediate Coat: Same as topcoat.
3. Topcoat, eggshell finish:



- a. Sherwin Williams ProIndustrial DTM Acrylic Coating.
- b. PPG Pitt Tech Plus DTM Acrylic 90-1110.
- c. Benjamin Moore Ultra Spec HP DTM Acrylic Enamel HP25.

H. Aluminum (Not Anodized or Otherwise Coated) Substrates:

1. Prime Coat:

- a. Sherwin Williams ProIndustrial Pro-Cryl Primer.
- b. PPG Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020PF.
- c. Benjamin Moore Ultra Spec HP Acrylic Metal Primer HP04.

2. Intermediate Coat: Same as topcoat.

3. Topcoat, semi-gloss finish:

- a. Sherwin Williams ProIndustrial DTM Acrylic coating.
- b. PPG Pitt Tech Plus DTM Acrylic 90-1310.
- c. Benjamin Moore Ultra Spec HP DTM Acrylic Enamel HP29.

I. Wood Substrates: Architectural woodwork.

1. Prime Coat:

- a. Sherwin Williams Premium Wall and Wood Primer.
- b. PPG Seal Grip Interior/ Exterior Universal Primer Sealer 17-921XI.
- c. Benjamin Moore Fresh Start Multi Purpose Latex Primer N23.

2. Intermediate Coat: Same as topcoat.

3. Topcoat, semi-gloss finish:

- a. Sherwin Williams 100% Acrylic Solo.
- b. PPG Speedhide Zero 4510.
- c. Benjamin Moore Advance Waterborne Alkyd 793.

J. Gypsum Board Substrates:

1. Primer:

- a. Sherwin Williams ProMar 200 Zero VOC Primer.
- b. PPG Speedhide Zero 6-4900XI – Interior Primer.
- c. Benjamin Moore Ultra Spec 500 Interior Latex Primer N534.

2. Classrooms, education spaces, administrative spaces:

- a. Intermediate Coat: Same as topcoat.
- b. Topcoat, eggshell finish, VOC content less than 150 g/L:
  - 1) Sherwin Williams ProIndustrial Pre-Catalyzed water-based epoxy system.
  - 2) PPG Pitt-Glaze WB 1 Epoxy 16-300 series.
  - 3) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy V342.

3. Corridors, stairways, circulation and high traffic spaces:

- a. Intermediate Coat: Same as topcoat.
  - b. Topcoat, semi-gloss finish, VOC content less than 150 g/L:
    - 1) Sherwin Williams ProIndustrial Pre-Catalyzed water-based epoxy system.
    - 2) PPG Pitt-Glaze WB 1 Epoxy 16-500 series.
    - 3) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy V341.
4. High humidity and wet locations:
- a. Intermediate Coat: Same as topcoat.
  - b. Topcoat, semi-gloss finish, VOC content less than 150 g/L:
    - 1) ProIndustrial Pre-Catalyzed water-based epoxy system.
    - 2) PPG Pitt-Glaze WB 1 Epoxy 16-500 series.
    - 3) Benjamin Moore Corotech Pre-Catalyzed Waterborne Epoxy V341.

END OF SECTION 099123

## SECTION 101100 - VISUAL DISPLAY UNITS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Visual display board assemblies.

- B. Related Requirements:

- 1. Section 097723 "Fabric-Wrapped Panels" for tackable, fabric-covered panels mounted on walls.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.

- B. Shop Drawings: For visual display units.

- 1. Include plans, elevations, sections, details, and attachment to other work.
  - 2. Show locations of panel joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
  - 3. Show locations and layout of special-purpose graphics.
  - 4. Include sections of typical trim members.

- C. Samples: For each type of visual display unit indicated.

- 1. Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for final Work. Include one panel for each type, color, and texture required.
  - 2. Accessories: Full-size Sample of each type of accessory.

- D. Product Schedule: For visual display units.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Test Reports: For each visual display unit, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- C. Sample Warranties: For manufacturer's special warranties.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For visual display units to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

#### 1.9 WARRANTY

- A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Surfaces lose original writing and erasing qualities.
    - b. Surfaces exhibit crazing, cracking, or flaking.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.

### 2.2 VISUAL DISPLAY BOARD ASSEMBLY

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Claridge (basis of design).
  - 2. Nelson Adams NACO
  - 3. Aarco Products Inc.
  - 4. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Visual Display Board Assembly: factory fabricated.
  - 1. Assembly: Markerboard.
  - 2. Corners: Square.
  - 3. Width: As indicated on Drawings, custom sizes.
  - 4. Height: As indicated on Drawings, custom sizes.
  - 5. Mounting Method: Direct to wall.
- C. Markerboard Panel: Porcelain-enamel-faced markerboard panel on core indicated.
  - 1. Color: White.
- D. Tackboard Panel: Plastic-impregnated-cork tackboard panel on core indicated.
  - 1. Color and Pattern: As selected by Architect from full range of industry colors.
- E. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch-thick, extruded aluminum; standard size and shape with concealed fasteners.
  - 1. Aluminum Finish: Clear anodic finish.
- F. Special-Purpose Graphics: Fuse or paint music staff lines graphic onto surface of visual display unit at music rooms.

### 2.3 MARKERBOARD PANELS

- A. Porcelain-Enamel Markerboard Panels: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction, consisting of moisture-barrier backing, core

material, and porcelain-enamel face sheet with low-gloss finish. Laminate panels under heat and pressure with manufacturer's standard, flexible waterproof adhesive.

1. Face Sheet Thickness: 24 gage, 0.0239 inch minimum uncoated base metal thickness.
2. Particleboard Core: 1/2 inch thick; with 0.013-inch-thick, galvanized-steel sheet backing.
3. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.

## 2.4 MATERIALS

- A. Porcelain-Enamel Face Sheet: PEI-1002, with face sheet manufacturer's standard two- or three-coat process.
- B. Particleboard: ANSI A208.1, Grade M-1.
- C. Plastic-Impregnated-Cork Sheet: Seamless, homogeneous, self-sealing sheet consisting of granulated cork, linseed oil, resin binders, and dry pigments that are mixed and calendared onto fabric backing; with washable vinyl finish and integral color throughout; with surface-burning characteristics indicated.
- D. Extruded Aluminum: ASTM B221, Alloy 6063.
- E. Adhesives for Field Application: Mildew-resistant, non-staining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by visual display unit manufacturer.

## 2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.6 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine walls and partitions for proper preparation and backing for visual display units.
- C. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.
- C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.

### 3.3 INSTALLATION

- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- B. Factory-Fabricated Visual Display Board Assemblies: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display board assemblies with fasteners at not more than 16 inches on center. Secure tops and bottoms of boards to walls.
- C. Visual Display Board Assembly Mounting Heights: Install visual display units at mounting heights indicated on Drawings.

### 3.4 CLEANING AND PROTECTION

- A. Clean visual display units in accordance with manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect visual display units after installation and cleaning.

END OF SECTION 101100



## SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Dimensional characters.
  - a. Cast dimensional characters.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Dimensional Characters: Full-size Sample of each type of dimensional character.
2. Exposed Accessories: Full-size Sample of each accessory type.
3. Full-size Samples, if approved, will be returned to Contractor for use in the Project.

#### 1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranty: For special warranty.

#### 1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

## 1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Separation or delamination of sheet materials and components.
  - 2. Warranty Period: Five (5) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Signs and supporting elements shall withstand the effects of gravity and other loads within limits and under conditions indicated.
  - 1. Uniform Wind Load: As indicated on Drawings.
  - 2. Concentrated Horizontal Load: As indicated on Drawings.
  - 3. Other Design Load: As indicated on Drawings.
  - 4. Uniform and concentrated loads need not be assumed to act concurrently.
- B. Thermal Movements: For exterior fabricated channel dimensional characters, allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

### 2.2 DIMENSIONAL CHARACTERS

- A. Cast Characters: Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. A.R.K. Ramos.
    - b. Gemini Signage.
    - c. Signs PDQ.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.

2. Character Material: Cast aluminum.
3. Character Height: As indicated on Drawings.
4. Thickness: Manufacturer's standard for size of character.
5. Finishes:
  - a. Integral Aluminum Finish: Anodized color as selected by Architect from full range of industry colors and color densities.
6. Mounting: Concealed studs.
7. Typeface: As indicated on Drawings.

## 2.3 DIMENSIONAL CHARACTER MATERIALS

- A. Aluminum Castings: ASTM B26/B26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.

## 2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:
  1. Use concealed fasteners and anchors unless indicated to be exposed.
  2. For exterior exposure, furnish stainless steel devices unless otherwise indicated.
  3. Exposed Metal-Fastener Components, General:
    - a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
    - b. Fastener Heads: For nonstructural connections, use screws and bolts with tamper-resistant slots unless otherwise indicated.
  4. Sign Mounting Fasteners:
    - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

## 2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
  4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  5. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
  6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
  7. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.
- B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.
1. Stainless Steel Brackets: Factory finish brackets to match sign lettering finish unless otherwise indicated.

## 2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

## 2.7 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF DIMENSIONAL CHARACTERS

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
  - 3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:
  - 1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
    - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
    - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

### 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101419

## SECTION 101423.16 - PANEL SIGNAGE

### 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 accessibility signs that are directly attached to architectural cabinets.

#### 1.3 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

#### 1.4 COORDINATION

- A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For room-identification signs.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
  - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Room-Identification Signs: Full-size Sample.

2. Variable Component Materials: Full-size Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not included in Samples above.
  3. Exposed Accessories: Full-size Sample of each accessory type.
  4. Full-size Samples, if approved, will be returned to Contractor for use in Project.
- E. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

#### 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

#### 1.9 FIELD CONDITIONS

- A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

#### 1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image.
    - c. Separation or delamination of sheet materials and components.
  2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

### 2.2 SIGNAGE

- A. Signage: Sign system with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Inpro Corporation.
    - b. Mohawk Sign Systems.
    - c. Signature Signs.
    - d. Vista System.
    - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - 2. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
    - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
    - b. Subsurface Graphics: Reverse etch image.
    - c. Color(s): As selected by Architect from manufacturer's full range.
  - 3. Sign-Panel Perimeter: Finish edges smooth.
    - a. Edge Condition: Beveled.
    - b. Corner Condition in Elevation: Squared.
  - 4. Mounting: Surface mounted to wall with two-face tape.
  - 5. Text and Typeface: Accessible raised characters and Braille typeface as indicated on the Drawings. Finish raised characters to contrast with background color, and finish Braille to match background color.

### 2.3 SIGN MATERIALS

- A. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.



## 2.4 ACCESSORIES

- A. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

## 2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
  - 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  - 3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  - 4. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Subsurface-Etched Graphics: Reverse etch back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.

## 2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
  - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

- B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.
- C. Mounting Methods:
  - 1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

### 3.2 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423.16

## SECTION 102113.19 - PLASTIC TOILET COMPARTMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Solid-plastic toilet compartments configured as toilet enclosures.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for supports that attach floor-and-ceiling-anchored compartments to overhead structural system.
  - 2. Section 102800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

- B. Shop Drawings: For toilet compartments.

- 1. Include plans, elevations, sections, details, and attachment details.
  - 2. Show locations of centerlines of toilet fixtures.
  - 3. Show locations of floor drains.
  - 4. Show ceiling grid, ceiling-mounted items, and overhead support or bracing locations.

- C. Samples for Initial Selection: For each type of toilet compartment material indicated.

- 1. Include Samples of hardware and accessories involving material and color selection.

- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

- 1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch-square Samples of same thickness and material indicated for Work.
  - 2. Each type of hardware and accessory.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.
- B. Storage and handling requirements and recommendations from the manufacturer.
- C. Installation methods and requirements from the manufacturer.
- D. Manufacturer Qualifications.
- E. Installer Qualifications.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and source.
  - 1. Door Hinges: Two hinges with associated fasteners.
  - 2. Latch and Keeper: Two latches and keepers with associated fasteners.
  - 3. Door Bumper: Two bumpers with associated fasteners.
  - 4. Door Pull: Two door pulls with associated fasteners.
  - 5. Fasteners: Twenty four fasteners of each size and type.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this Section, and whose products have been in satisfactory use under similar service conditions for not less than five (5) years.
- B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. 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.

1.9 WARRANTY

- A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for twenty five (25) years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. Labor not included in warranty.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Class A Flame Spread/Smoke Developed Rating.
  - 2. National Fire Protection Association (NFPA) 286: Pass.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Scranton Products Hiny Hiders High Density Polyethylene (HDPE) Toilet Compartments, fabricated by Santana Toilet Partitions.
  - 2. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Toilet-Enclosure Style: Floor mounted, headrail braced.
- C. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
  - 1. Color and Pattern: Refer to finish schedule on Drawings.
- D. Pilaster Shoes: Manufacturer's standard design; 3 inch high, type 304 20 gage stainless steel.
- E. Brackets (Fittings):
  - 1. Stirrup Type: Ear or U-brackets, stainless steel.

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's heavy-duty operating hardware and accessories.

1. Hinges: Manufacturer's minimum 0.062-inch- (1.59-mm-) thick stainless-steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door. Mount with through-bolts.
  2. Latch and Keeper: Manufacturer's heavy-duty surface-mounted cast-stainless-steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible. Mount with through-bolts.
  3. Coat Hook: Manufacturer's heavy-duty combination cast-stainless-steel hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories. Mount with through-bolts.
    - a. Provide where indicated on Drawings.
  4. Door Bumper: Manufacturer's heavy-duty rubber-tipped cast-stainless-steel bumper at out-swinging doors. Mount with through-bolts.
  5. Door Pull: Manufacturer's heavy-duty cast-stainless-steel pull at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible. Mount with through-bolts.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

## 2.4 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).
- C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless-Steel Castings: ASTM A 743/A 743M.

## 2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
  - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  - 1. Maximum Clearances:
    - a. Pilasters and Panels: 3/8 inch.
    - b. Panels and Walls: 1 inch.
  - 2. De-burr all drill holes, cuts, modifications, etc., and ease all edges to ensure there are no sharp edges.
  - 3. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.
    - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
- B. Floor-and-Ceiling-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.
- C. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- D. Finished surfaces shall be cleaned after installation and be left free of imperfections.

#### 3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open

approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and doors in entrance screens to return doors to fully closed position.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 102113.19



## SECTION 102123 - CUBICLE CURTAINS AND TRACK

### 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. Cubicle-curtains, tracks and carriers.

- B. Related Requirements:

- 1. Section 092216 "Non-Structural Metal Framing" for supplementary metal framing and blocking for mounting items requiring anchorage.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. For each type of curtain fabric indicated, include durability, laundry temperature limits, fade resistance, applied curtain treatments, and fire-test-response characteristics.

- B. Shop Drawings: For curtains and tracks.

- 1. Show layout and types of cubicles, sizes of curtains, number of carriers, anchorage details, and conditions requiring accessories. Indicate dimensions taken from field measurements.
  - 2. Include details of blocking for track support.

- C. Samples: For each exposed product and for each color and texture specified, 10 inches in size.

- D. Product Schedule: For curtains and tracks.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For curtains, tracks, and hardware to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Cubicle Curtains: Provide curtain fabrics with the following characteristics:
  - 1. Flame Resistance: Provide fabrics identical to those that have passed NFPA 701 when tested by a qualified testing agency acceptable to authorities having jurisdiction.
    - a. Identify fabrics with appropriate markings of a qualified testing agency.

### 2.2 CUBICLE-CURTAIN SUPPORT SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Construction Specialties, Inc., 1062N (basis of design)
  - 2. Inpro Corporation.
  - 3. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Extruded-Aluminum Curtain Track: Not less than 1-1/4 inches wide by 3/4 inch high.
  - 1. Track Minimum Wall Thickness: 0.050 inch.
  - 2. Curved Track: Factory-fabricated, 12-inch- radius bends.
  - 3. Finish: Powder coat white finish.
- C. Curtain Track Accessories: Fabricate splices, end caps, connectors, end stops, coupling and joining sleeves, wall flanges, brackets, ceiling clips, and other accessories from same material and with same finish as track.
  - 1. Suspended-Track Support: Not less than 5/8-inch-square tube.
  - 2. End Stop: Removable with carrier hook.
  - 3. Switch Unit: Shuttle and coupling device for rerouting and securing cubicle curtain, with pull chain for switching track.
- D. Curtain Roller Carriers: Two nylon rollers and nylon axle with nylon hook.
- E. Exposed Fasteners: Stainless steel.
- F. Concealed Fasteners: Hot-dip galvanized.

### 2.3 CURTAINS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Construction Specialties, Inc., Cubicle Curtains "On the Right Track" (basis of design)
  - 2. Inpro Corporation.

3. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Fabric: Curtain manufacturer's standard, 100 percent polyester; inherently and permanently flame resistant, stain resistant, and antimicrobial.
  1. Antimicrobial Treatment: Nanotex + BioAM spill & stain resistant treatment combined with an antimicrobial agent for protection of fabrics.
  2. Pattern and Color: As selected by Architect from manufacturer's full range.
- C. Curtain Grommets: Two-piece, rolled-edge, rustproof, nickel-plated brass; spaced not more than 6 inches on center; machined into top hem.
- D. Mesh Top: Not less than 19-inch- high mesh top.
  1. Mesh: No. 40 nylon mesh.
- E. Beaded-Chain Curtain Drop: 18 inches long; nickel-plated steel with aluminum hook.
- F. Curtain Tieback: Nickel-plated brass chain; one at each curtain termination.

## 2.4 CURTAIN FABRICATION

- A. Continuous Curtain Panels:
  1. Width: Equal to track length from which curtain is hung plus 10 percent of added fullness, but not less than 12 inches of added fullness.
  2. Length: Equal to floor-to-ceiling height, minus depth of track and carrier at top, and minus clearance above the finished floor of 12 inches.
  3. Mesh Top: Top hem of mesh not less than 1 inch and not more than 1-1/2 inches wide, triple thickness, reinforced with integral web, and double lockstitched. Double lockstitch bottom of mesh directly to 1/2-inch triple thickness, top hem of curtain fabric.
  4. Bottom Hem: Not less than 1 inch and not more than 1-1/2 inches wide, triple thickness, reinforced, and double lockstitched.
  5. Side Hems: Not less than 1/2 inch and not more than 1-1/4 inches wide, with double turned edges, and single lockstitched.
  6. Vertical Seams: Not less than 1/2 inch wide, double turned and double stitched.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install tracks level and plumb, according to manufacturer's written instructions.
- B. For tracks of up to 20 feet in length, provide track fabricated from single, continuous length.
  - 1. Curtain-Track Mounting: Surface.
- C. Surface-Track Mounting: Fasten tracks to ceilings at intervals recommended by manufacturer. Fasten tracks to structure at each splice and tangent point of each corner. Center fasteners in track to ensure unencumbered carrier operation. Attach track to ceiling as follows:
  - 1. Mechanically fasten to furring through suspended ceiling with screw and tube spacer.
- D. Track Accessories: Install splices, end caps, connectors, end stops, coupling and joining sleeves, and other accessories as required for a secure and operational installation.
  - 1. Provide one locking switch unit for each pair of beds.
- E. Curtain Carriers: Provide curtain carriers adequate for 6-inch spacing along full length of curtain plus an additional carrier.
- F. Cubicle Curtains: Hang curtains on each curtain track. Secure with curtain tieback.

END OF SECTION 102123

## SECTION 102239 - FOLDING PANEL PARTITIONS

### 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. Electrically operated, acoustical panel partitions.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for supports that attach supporting tracks to overhead structural system.
  - 2. Section 092900 "Gypsum Board" for fire-rated assemblies and sound barrier construction above the ceiling at track.
  - 3. Electrical and communications Sections for electrical service and connections for motor operators, controls, and limit switches and for system disconnect switches.

#### 1.3 DEFINITIONS

- A. NIC: Noise Isolation Class.
- B. NRC: Noise Reduction Coefficient.
- C. STC: Sound Transmission Class.

#### 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For operable panel partitions.
  - 1. Include plans, elevations, sections, attachment details.
  - 2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.

3. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For each type of exposed material, finish, covering, or facing.
  1. Include Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed material, finish, covering, or facing, prepared on Samples of size indicated below:
  1. Panel Facing Material: Manufacturer's standard-size unit, not less than 3 inches square.
  2. Panel Edge Material: Not less than 3 inches long.
  3. Chair Rail: Manufacturer's standard-size unit, 6 inches long.
  4. Glass: Units 12 inches square.
  5. Hardware: One of each exposed door-operating device.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  1. Partition track, track supports and bracing, switches, turning space, and storage layout.
  2. Suspended ceiling components.
  3. Structural members to which suspension systems will be attached.
  4. Size and location of initial access modules for acoustical tile.
  5. Items penetrating finished ceiling including the following:
    - a. Lighting fixtures.
    - b. HVAC ductwork, outlets, and inlets.
    - c. Speakers.
    - d. Sprinklers.
    - e. Smoke detectors.
    - f. Access panels.
- B. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.
- C. Qualification Data: For Installer.
- D. Product Test Reports: For each operable panel partition, for tests performed by a qualified testing agency.
- E. Sample Warranty: For manufacturer's special warranty.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals.
  1. Panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.

2. Seals, hardware, track, track switches, carriers, and other operating components.
3. Electric operator and controls.

#### 1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Panel Finish-Facing Material: Furnish full width in quantity to cover both sides of two panels when installed.

#### 1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

#### 1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

#### 1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Faulty operation of operable panel partitions.
    - b. Deterioration of metals, metal finishes, hardware, and other materials beyond normal use.
  2. Warranty Period: Three (3) years from date of Substantial Completion.
  3. Warranty Period for Suspension System: Ten (10) years from date of Substantial Completion.
  4. Warranty Period for Standard Hinges: Lifetime.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:

1. Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E90, determined by ASTM E413, and rated for not less than the STC indicated.
  2. Noise-Reduction Requirements: Operable panel partition assembly, identical to partition tested for STC, tested for sound-absorption performance according to ASTM C423, and rated for not less than the NRC indicated.
  3. Noise-Isolation Requirements: Installed operable panel partition assembly, identical to partition tested for STC, tested for NIC according to ASTM E336, determined by ASTM E413, and rated for 10 dB less than STC value indicated.
- B. Fire-Test-Response Characteristics: Provide panels with finishes complying with one of the following as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction:
1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  2. Fire Growth Contribution: Complying with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.2 OPERABLE ACOUSTICAL PANELS

- A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Modernfold, Inc., Acousti-Premier 933E Partitions.
    - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Panel Operation: Electrically operated, continuously hinged panels, top supported with operable floor seals.
- C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.



- D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
  - 1. Panel Width: Equal widths.
- E. STC: Not less than 50.
- F. Panel Weight: 8 lb/sq. ft. maximum.
- G. Panel Thickness: Nominal dimension of 3 inches.
- H. Panel Materials:
  - 1. Steel Frame: Steel formed sheet, 18 gage minimum, with overlapped and welded corners.
- I. Panel Closure: Manufacturer's standard unless otherwise indicated.
  - 1. Final Closure: Side Jamb with overlapping trail panel with "Modernfold Presto Automation Package".
- J. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
  - 1. Hinges: Concealed (invisible).

## 2.3 SEALS

- A. Description: Seals that produce operable panel partitions complying with performance requirements and the following:
  - 1. Manufacturer's standard seals unless otherwise indicated.
  - 2. Seals made from materials and in profiles that minimize sound leakage.
  - 3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.
- B. Vertical Interlocking Sound Seals between panels: Roll-formed astragals, with reversible tongue and groove configuration in each panel edge, for universal panel operation. Rigid plastic astragals or astragals in only one panel edge are not acceptable.
- C. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.
- D. Horizontal Bottom Seals: Resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.
  - 1. Automatically Operated for Acoustical Panels: Extension and retraction of bottom seal automatically operated by movement of partition, with operating range not less than 2 inches between retracted seal and floor finish.

## 2.4 PANEL FINISH FACINGS

- A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant non-staining adhesive as recommended by facing manufacturer's written instructions.
- B. Reinforced heavy-duty vinyl with woven backing weighing not less than 30 ounces per lineal yard.
- C. Acoustical, non-woven needle punch carpet, with fused fibers to prevent unraveling or fray of material.
- D. Panel Trim: Exposed panel trim of one consistent color from manufacturer's standard offering.

## 2.5 SUSPENSION SYSTEMS

- A. Suspension Tracks: Minimum 7-gage, 0.18-inch roll-formed steel. Track shall be supported by adjustable steel hanger brackets connected to structural support by pairs of 1/2-inch diameter threaded rods. Brackets must support the load bearing surface of the track.
  - 1. Exposed track soffit: Steel, removable for service and maintenance, attached to track bracket without exposed fasteners, and pre-painted off-white.
- B. Carriers: All-steel trolleys with steel-tired ball bearing wheels.
- C. Steel Finish: Manufacturer's standard, factory-applied, corrosion-resistant, protective coating unless otherwise indicated.

## 2.6 ELECTRIC OPERATORS

- A. Factory-assembled electric operation system of size and capacity recommended and provided by operable panel partition manufacturer for partition specified; with electric motor and factory-prewired motor controls, speed reducer, chain drive, control stations, control devices, and accessories required for operation. Include wiring from control stations to motor. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
  - 1. Modernfold Presto Automation Package with Touch Screen Operator Control Station by Modernfold, Inc.
- B. Motor unit shall be reversible, continuous duty, and Class A insulated.
  - 1. Motor unit shall have NEMA MG 1 service factor, high starting torque, thermal overload protection, and open/drip proof enclosure.
  - 2. Motor assembly shall have wiring compliant with NFPA 70, 24-volt controls, compliant with UL 508A, and speed of 28 feet/minute.
  - 3. The drive unit motor shall be equipped with outboard limit switches to prevent over-extension.
  - 4. A positive chain drive attached to the lead panel shall pull the partition across the opening. Cable, belt, or other friction type drives will not be accepted.

C. Motor Electrical Characteristics:

1. Horsepower: 1 HP.
2. Volts: 208/230.
3. Phase: Single phase.
4. 70 FLA.

D. Control Stations: Two single-key-operated, constant-pressure control stations located remotely from each other on opposite sides and opposite ends of partition run. Wire in series to require simultaneous activation of both key stations to operate partition. Each three-position control station labeled "Open," "Close," and " Stop." Furnish two keys per station.

E. Obstruction-Detection Devices: Equip each motorized operable panel partition with indicated automatic safety sensor that causes operator to immediately stop and reverse direction.

1. Sensor Edge: Contact-pressure-sensitive safety edge along partition's leading edge.

F. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop operable panel partition at fully extended and fully stacked positions.

G. Emergency Release Mechanism: Quick disconnect-release of electric-motor drive system, permitting manual operation in event of operating failure.

H. Electric Interlock: Equip each motorized operable panel partition with electric interlocks at locations indicated, to prevent operation of operable panel partition under the following conditions:

1. On storage pocket door, to prevent operation if door is not in fully open position.
2. On partitions at location of convergence by another partition, to prevent operation if merging partitions are in place.

## 2.7 ACCESSORIES

A. Pass Doors: Swinging door built into and matching panel materials, construction, acoustical qualities, finish and thickness, complete with frames and operating hardware. Hinges finished to match other exposed hardware.

1. Accessibility Standard: Fabricate doors to comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.
2. Single Pass Door: 36 by 84 inches.
3. Pass-Door Hardware: Equip pass door with the following:
  - a. Door Seals: Mechanically operated floor seal on panels containing pass doors.
  - b. Hand pull with push plate.
  - c. Lever handles both sides of door.
  - d. Fire exit hardware.
  - e. Automatic concealed door closer.
  - f. Door Viewer: Installed with view in direction of swing.
  - g. Exit Sign: Recessed, self-illuminated.

- h. Lock: Deadlock to receive cylinder, operable from both sides of door. See Section 087100 "Door Hardware" for lock cylinder and keying requirements.
- B. Storage Pocket Door: Full height at end of partition runs to conceal stacked partition; of same materials, finish, construction, thickness, and acoustical qualities as panels; complete with operating hardware and acoustical seals at soffit, floor, and jambs. Hinges in finish to match other exposed hardware.
  - 1. Manufacturer's standard method to secure storage pocket door in closed position.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine flooring, floor levelness, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- B. Install panels in numbered sequence indicated on Shop Drawings.
- C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- D. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.
- E. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals.

#### 3.3 ADJUSTING

- A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust pass doors and storage pocket doors to operate smoothly and easily, without binding or warping.
- C. Verify that safety devices are properly functioning.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 102239

## SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Public-use washroom accessories.
  - 2. Hand dryers.

#### 1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
  - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
  - 3. Include electrical characteristics.
- B. Samples: For each exposed product and for each finish specified, full size.
  - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify accessories using designations indicated.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranties.

## 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

## 1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, visible silver spoilage defects.
  - 2. Warranty Period: Ten (10) years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Ten (10) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 OWNER-FURNISHED MATERIALS

- A. Owner-Furnished Materials, to be installed by General Contractor:
  - 1. Toilet Paper Dispenser.
  - 2. Paper Towel Dispenser.
  - 3. Soap Dispenser.
  - 4. Sanitary Napkin Disposal.
  - 5. And as indicated on Drawings.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Structural Performance: Design accessories and fasteners to comply with the following requirements:
  - 1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

## 2.3 PUBLIC-USE WASHROOM ACCESSORIES

- A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
- B. Grab Bar:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. American Specialties, Inc., 3800 Series (basis of design)
    - b. Bobrick Washroom Equipment, Inc.
    - c. Bradley Corporation.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - 2. Mounting: Flanges with concealed fasteners.
  - 3. Material: Stainless steel, 0.05 inch thick.
    - a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) on ends and slip-resistant texture in grip area.
  - 4. Outside Diameter: 1-1/2 inches.
  - 5. Configuration and Length: As indicated on Drawings.
- C. Mirror Unit:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. American Specialties, Inc., 0600 Series and 0535 Series for fixed angle tilt (basis of design).
    - b. Bobrick Washroom Equipment, Inc.
    - c. Bradley Corporation.
    - d. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - 2. Frame: Stainless steel channel and stainless steel, fixed tilt and surface mounted.
    - a. Corners: Welded and ground smooth.
  - 3. Size: As indicated on Drawings.
  - 4. 1/4" plate glass mirror.
  - 5. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

## 2.4 HAND DRYERS

- A. Warm-Air Dryer:



1. Basis of Design Product: World Dryer Corporation SmartDri K-973 (no substitutions).
2. Brushed stainless steel No. 4 (satin) finish.
3. Mounting: Surface mounted.
4. Operation: Electronic-sensor activated with timed power cut-off switch.
  - a. Operation Time: 10-15 seconds.
5. Electrical Requirements: 115 V, 13 A, 1500 W.

## 2.5 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch-minimum nominal thickness unless otherwise indicated.
- B. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch-minimum nominal thickness.
- C. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 hot-dip zinc coating.
- D. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
- E. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
- F. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

## 2.6 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
  1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

## SECTION 104413 - FIRE PROTECTION CABINETS

### 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. Fire-protection cabinets for the following:

- a. Portable fire extinguisher.

- B. Related Requirements:

- 1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semi-recessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

- B. Shop Drawings: For fire-protection cabinets.

- 1. Include plans, elevations, sections, details, and attachments to other work.

- C. Samples: For each type of exposed finish required.

- D. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semi-recessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.3 FIRE-PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Babcock-Davis.
    - b. J.L. Industries.
    - c. Larsens Manufacturing Company.
    - d. Potter Roemer LLC; a Division of Morris Group International.
    - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Cabinet Construction: Nonrated, one-hour fire rated, two-hour fire rated as required per wall type and location.
  - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch-thick cold-rolled steel sheet lined with minimum 5/8-inch-thick fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Stainless steel sheet.
  - 1. Shelf: Same metal and finish as cabinet.
- D. Provide the following where indicated on the Drawings:

1. Semi-recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
    - a. Rolled-Edge Trim: 2-1/2-inch backbend depth.
  2. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.
  3. Provide fire rated cabinet assembly where cabinets are located in fire rated wall assemblies.
- E. Cabinet Trim Material: Stainless steel sheet.
- F. Door Material: Stainless steel sheet.
- G. Door Style: Vertical duo panel with frame.
- H. Door Glazing: Acrylic sheet.
1. Acrylic Sheet Color: Clear transparent acrylic sheet.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
1. Provide recessed door pull and friction latch.
  2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.
- J. Accessories:
1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  2. Break-Glass Door Handle: Manufacturer's standard, integral to glass with the words "PULL TO BREAK GLASS" applied to handle.
  3. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
  4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
    - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.
      - 2) Application Process: Decals.
      - 3) Lettering Color: Red, black, or white (manufacturer's standard, as selected by Architect.
      - 4) Orientation: Vertical.
- K. Materials:

1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.
  - a. Finish: ASTM A480/A480M No. 4 directional satin finish.
2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 1.5 mm thick, with Finish 1 (smooth or polished).

## 2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  1. Weld joints and grind smooth.
  2. Miter corners and grind smooth.
  3. Provide factory-drilled mounting holes.
  4. Prepare doors and frames to receive locks.
  5. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
  1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
  2. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

## 2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in for hose valves, racks, and cabinets to verify actual locations of piping connections before cabinet installation.

- B. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

### 3.3 INSTALLATION

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated.
  - 1. Fire-Protection Cabinets: 42 inches above finished floor to top of fire extinguisher.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Provide inside latch and lock for break-glass panels.
  - 2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.
- C. Identification:
  - 1. Apply decals at locations indicated.

### 3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

## SECTION 104416 - FIRE EXTINGUISHERS

### 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 portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Requirements:
  - 1. Section 104413 "Fire Protection Cabinets" for fire protection cabinets holding portable, hand-carried fire extinguishers.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

#### 1.6 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.



## 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
    - b. Faulty operation of valves or release levers.
  - 2. Warranty Period: Six years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
  - 1. Provide fire extinguishers approved, listed, and labeled by FM Global.

### 2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
    - a. Babcock-Davis.
    - b. J.L. Industries.
    - c. Larsens Manufacturing Company.
    - d. Potter Roemer LLC; a Division of Morris Group International.
    - e. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - 2. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
  - 3. Valves: Manufacturer's standard.
  - 4. Handles and Levers: Manufacturer's standard.
  - 5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2-A:10-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
- C. Purple-K Dry-Chemical Type in Aluminum Container: UL-rated 30-B:C, 5-lb nominal capacity, with potassium bicarbonate-based dry chemical in enameled-aluminum container.
  - 1. Each Fire Extinguisher located in Kitchen 104 to be Purple-K Dry-Chemical extinguisher. Remaining extinguishers to be Multi-purpose Dry-Chemical extinguisher.

## 2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
  - 1. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
  - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
    - a. Orientation: Vertical.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
  - 1. Mounting Brackets: Top of fire extinguisher to be at 42 inches above finished floor.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

## SECTION 116623 - GYMNASIUM EQUIPMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Safety wall pads.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For gymnasium equipment.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of gymnasium equipment.
- D. Samples for Verification: For the following products:
  - 1. Pad Fabric: Wall padding minimum 3 inches square, with specified treatments applied. Mark face of material.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For gymnasium equipment to include in emergency, operation, and maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products or an entity that employs installers and supervisors who are trained and approved by manufacturer.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install gymnasium equipment until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Verify wall construction, openings, utilities, and layout for gymnasium equipment.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain gymnasium equipment from single source from single manufacturer.

### 2.2 SAFETY PADS

- A. Manufacturer: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
  - 1. Porter Athletic, 570 Series SuperSafe FR Wall Pads (basis of design).
  - 2. Draper, Inc., EcoVision Wall Pad System.
  - 3. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
- B. Impact Performance: Assembly shall meet the ASTM F2440 Standard Specification for Impact Performance. The maximum GMAX values for the padding shall not exceed 200 and the HIC shall not exceed 1000 when tested at a 48 inch drop height.
- C. Safety Pad Surface-Burning Characteristics: NFPA 286 Compliant.
- D. Pad Coverings: Provide safety pad fabric covering that is fabricated from puncture- and tear-resistant, PVC-coated polyester or nylon-reinforced PVC fabric, not less than 14-oz./sq. yd and treated with fungicide for mildew resistance; with surface-burning characteristics indicated.
  - 1. Cover material flame resistant in accordance with NFPA 701.
  - 2. Cover tear strength of 100 psi, minimum.
  - 3. Mildew and rot resistant, and fortified with an infection combating fungicide.
- E. Wall Safety Pads: Padded wall wainscot panels designed to be attached in a continuous row; each panel section consisting of fill laminated to backer board with visible surfaces fully covered by seamless fabric covering, free of sag and wrinkles and firmly attached to back of backer board.
  - 1. Backer Board: Not less than 7/16-inch-thick oriented strand board.
  - 2. Fire-Resistive Fill: Multiple-impact-resistant foam not less than 2-inch-thick, fire-resistive neoprene; 6.0-lb/cu. ft. density.
  - 3. Size: Each panel section, 24 inches wide by not less than 72 inches long.

4. Installation Method: Manufacturer's standard concealed mounting system with no exposed nailing margins.
    - a. Provide manufacturer's removable pad mounting detail at the stage front doors.
  5. Fabric Covering Color(s): As selected by Architect from manufacturer's full range of available finishes.
- F. Cut-out Trim: Provide manufacturer's standard flanged cut-out trim kits for fitting pads around switches, receptacles, and other obstructions.
1. Color: As selected by Architect from manufacturer's full range.

## 2.3 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for use and finish type indicated.
1. Extruded Bars, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
  2. Cast Aluminum: ASTM B 179.
  3. Flat Sheet: ASTM B 209 (ASTM B 209M).
- B. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed; tamperproof, vandal- and theft-resistant design.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for play court layout, alignment of mounting substrates, installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.
1. Verify critical dimensions.
  2. Examine wall assemblies, where reinforced to receive anchors and fasteners, to verify that locations of concealed reinforcements are clearly marked. Locate reinforcements and mark locations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written installation instructions and competition rules indicated for each type of gymnasium equipment. Complete equipment field assembly where required.
- B. Unless otherwise indicated, install gymnasium equipment after other finishing operations, including painting, are completed.

- C. Safety Pads: Mount with bottom edge at 4 inches above finished floor.
- D. Cut-out Trim: Limit cuts in face of padding from trim unit's corner-to-corner outside dimensions. Install with ends of cuts concealed behind trim flange.
- E. Anchoring to In-Place Construction: Use anchors and fasteners where necessary to secure built-in and permanently placed gymnasium equipment to structural support and to properly transfer load to in-place construction.

### 3.3 CLEANING

- A. After completing gymnasium equipment installation, inspect components. Remove spots, dirt, and debris and touch up damaged shop-applied finishes according to manufacturer's written instructions.
- B. Replace gymnasium equipment and finishes that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 116623

## SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad countertops, backsplashes, and end splashes.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for countertop support brackets.
2. Section 064116 "Plastic-Laminate-Clad Architectural Cabinets".
3. Section 123661.16 "Solid Surfacing Countertops."

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.
3. Show locations of grommets, accompanying hardware, etc.

C. Samples for Initial Selection: For plastic laminates.

D. Samples for Verification: As follows:

1. Plastic Laminates: For each type, color, pattern, and surface finish required, 8 by 10 inches in size.
2. Wood-Grain Plastic Laminates: For each type, color, pattern, and surface finish required, 12 by 24 inches in size.
3. Fabrication Sample: For each type and profile of countertop required, provide one sample applied to core material with specified edge material applied to one edge.

#### 1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

#### 1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
  - 1. Shop Certification: AWI's Quality Certification Program accredited participant.
- B. Installer Qualifications: AWI's Quality Certification Program accredited participant.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

#### 1.7 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

### PART 2 - PRODUCTS

#### 2.1 PLASTIC-LAMINATE-CLAD COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.



1. Provide inspections of fabrication and installation from AWI certification program indicating that countertops comply with requirements of grades specified.
  - B. Grade: Custom.
  - C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGF.
    1. To be installed at dry locations.
    2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include the following:
      - a. As noted on the Finish Legend shown on the Drawings.
      - b. Substitutions: See Section 016000 "Product Requirements" for procedures in submitting substitutions prior to receipt of Bid and after execution of the Agreement.
  - D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
    1. As selected by Architect from manufacturer's full range in the following categories:
      - a. Solid colors, gloss finish.
      - b. Solid colors with core same color as surface, gloss finish.
      - c. Wood grains, matte finish with grain running parallel to length of countertop.
      - d. Patterns, gloss finish.
  - E. Edge Treatment:
    1. Dry Locations: Same as laminate cladding on horizontal surfaces.
  - F. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.
  - G. Paper Backing: Provide paper backing on underside of countertop substrate.
- 2.2 WOOD MATERIALS
- A. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
    1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 150.
  - B. Core Thickness: 3/4 inch.
    1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.

## 2.3 ACCESSORIES

- A. Wire-Management Grommets: Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.
  - 1. As specified in Section 064116.

## 2.4 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: As selected by fabricator to comply with requirements.
  - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

## 2.5 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WT's "Architectural Woodwork Standards."
  - 1. Grade: Custom.
- B. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius of 1/16 inch.
- C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Joints: Fabricate countertops without joints.
- E. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing.

### 3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
  - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
  - 1. Secure field joints in countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical-treatment manufacturer's written instructions, including those for adhesives used to install woodwork.
- F. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  - 1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a 1/8-inch-in-96-inches variation from a straight, level plane.
  - 2. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

### 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semi-exposed surfaces.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches on center. Remove protection at Substantial Completion.

END OF SECTION 123623.13

## SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Solid surface material countertops, backsplashes, and end splashes.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for supports for countertops.
  - 2. Section 064116 "Plastic-Laminate-Clad Architectural Cabinets".
  - 3. Section 123623.13 "Plastic-Laminate-Clad Countertops."

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

- 1. Show locations and details of joints.
  - 2. Show direction of directional pattern, if any.
  - 3. Show locations of grommets, accompanying hardware, etc.

- C. Samples for Initial Selection: For each type of material exposed to view.

- D. Samples for Verification: For the following products:

- 1. Countertop material, 6 inches square.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

#### 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
  - 1. Shop Certification: AWI's Quality Certification Program accredited participant.
- B. Installer Qualifications: AWI's Quality Certification Program accredited participant.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

#### 1.8 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

#### 1.9 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

## PART 2 - PRODUCTS

### 2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
    - a. Wilsonart.
  - 2. Colors and Patterns: As selected by Architect from manufacturer's full range.

### 2.2 WOOD MATERIALS

- A. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
  - 1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 150.
- B. Core Thickness: 3/4 inch.
  - 1. Build up countertop thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.

### 2.3 ACCESSORIES

- A. Wire-Management Grommets: Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.
  - 1. As specified in Section 064116.

### 2.4 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
  - 1. Grade: Custom.
- B. Configuration:
  - 1. Front: Straight, slightly eased at top.
  - 2. Backsplash: Straight, slightly eased at corner.
  - 3. End Splash: Matching backsplash.
- C. Countertops: 1/2-inch- thick, solid surface material with front edge built up with same material.

- D. Backsplashes: 1/2-inch- thick, solid surface material.
- E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
- F. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- G. Joints: Fabricate countertops without joints.
- H. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- I. Cutouts and Holes:
  - 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
    - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
  - 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
  - 3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
  - 4. Grommets: Shop cut holes in counter for grommets.

## 2.5 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
  - 1. Verify adhesives have a VOC content of 70 g/L or less.
  - 2. Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."



### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- D. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
- E. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16